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## **The economics of marriage in North Africa**

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**Abstract:** Marriage is the single most important economic transaction and social transition in the lives of young people. Yet little is known about the economics of marriage in much of the developing world. This paper examines the economics of marriage in North Africa, where asymmetric rights in marriage create incentives for extensive up-front bargaining and detailed marriage contracts. As well as describing the limited literature on the economics of marriage in North Africa, this paper draws on economic theories of the marriage market and game-theoretic approaches to bargaining to propose a unifying framework for the economics of marriage in North Africa. New empirical evidence is presented on the economics of marriage in Egypt, Morocco, and Tunisia, illustrating how individuals' characteristics and ability to pay shape bargaining power and marriage outcomes, including age at marriage, marriage costs, consanguinity, and nuclear residence.

**Keywords:** economics of marriage, marriage market, marriage contract, bargaining, North Africa, age at marriage, marriage costs, consanguinity, nuclear residence

**JEL classification:** J12, J16, N37, C78

**Note:** Tables and Figures are at the end of the paper.

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## 1 Introduction

Marriage is the single most important transaction and transition in young North Africans' lives. Marriage defines the basic economic and social unit—the household—and joins two families together. Marriage marks the transition to adulthood (Hoodfar 1997; Singerman and Ibrahim 2003). Even the words used to describe females pivot on marriage. Females are girls until they marry, and then women (Sadiqi 2003). Adult roles, including engaging in sex, childbearing, and independent living are essentially exclusively reserved for married individuals (El Feki 2013; Hoodfar 1997; Singerman and Ibrahim 2003). The quantity of resources invested in this vital transition often exceeds any other inter-generational transfer, including inheritances (Singerman and Ibrahim 2003). We calculate that in Egypt, the costs of marriage exceed eight years of a groom's wages. Whom young people marry will shape their social and economic experience for decades to come, making matrimonial decisions extremely high stakes.

Despite the fact that marriage is the single largest transaction and most important contract undertaken by young North African men and women, there has been very little rigorous research on the economics of marriage in North Africa, and what research exists has been fragmentary. This paper reviews what is known about the economics of marriage in North Africa, focusing on Egypt, Morocco, and Tunisia. We compare and synthesize theoretical perspectives on the economics of marriage to generate a unified framework for future work. We also present important new empirical evidence on a number of issues within the economics of marriage in North Africa, and propose a research agenda for future work on the vitally important, but under-researched topics within the economics of marriage.

## 2 Conceptual framework

### 2.1 Modelling the economics of marriage

Although marriage has always been one of the most important contracts and opportunities for wealth transfer in an individual's life, marriage was not traditionally the subject of economic analysis. Becker's theory of marriage (1973, 1974a) was the first to apply economic theory to the institution of marriage. This framework of a marriage market, in which utility maximizing individuals make choices resulting in a market equilibrium, extended the basic concepts of neoclassical economics—rational choice and markets—to the institution of marriage (Becker 1973, 1974a; Grossbard-Shechtman 1995). The gains from marriage, based in part on complementary spousal labour, also encompass the quantity and quality of children resulting from the union. Alternatives in the marriage market, and in other markets (such as engaging in wage work instead of household labour) shape marriage market outcomes. Sorting, based on complementary or substitutable traits, plays an important role in maximizing marital output. The division of output in the resulting household is also linked to matching in the marriage market (Becker 1973). Becker's work on the economics of marriage has been applied to issues such as polygamy, polygyny, divorce, fertility, labour force participation, and wages (Angrist 2002; Becker et al. 1977; Becker 1974a; Dougherty 2006; Grossbard 1976; Grossbard-Shechtman 1986; Light 2004). Becker's theory additionally recognizes the inherent uncertainty in selecting a spouse and search costs (Becker 1974a).

An important alternative to Becker's framework in understanding the economics of marriage is the game-theoretic approach. Game theory has often been applied to understanding issues of allocation

within households and marriages (Lundberg and Pollak 1996, 2003; McElroy 1990; Udry 1996) in sharp contrast to models that treat the household as a single unit, perhaps with a benevolent head (Becker 1974b). These models also extend into the search for a partner in the marriage market (Adachi 2003; Bergstrom and Bagnoli 1993; Smith 2006). An important feature of these models is their focus on the bargaining power of different parties and bargaining behaviours, which can illuminate both processes and outcomes of the marriage market. In this paper, we draw on both Becker's framework and game-theoretic approaches to understand the economics of marriage in North Africa. We draw on Becker's understanding of how individuals' traits affect their marriage outcomes, and we draw on a game-theoretic understanding of how marriage contracts are negotiated.

## **2.2 Marriage in North Africa**

The institution of marriage in North Africa has a number of important features that shape the economics of marriage. Marriage outcomes are determined through bargaining between two families rather than two individuals. Asymmetric rights favour men once the marriage has taken place (Hoodfar 1997). While engagements can be broken off by both sides, divorce, although uncommon, is easily initiated by men, but more difficult to obtain for women. If it occurs, divorce is much more harmful for women, both socially and economically (El Feki 2013; Hoodfar 1997). Moreover, with the exception of Tunisia, Muslim men are able, at least in theory, to take up to four wives, substantially reducing women's bargaining power within marriage. Because of how marriages are structured, the bride-side's bargaining power is greatest up front, before the couple is married. Contracts detailing marriage conditions are negotiated up front. Marriage outcomes, in detail down to the level of kitchen utensils, are agreed to in conjunction with the marriage contract (Amin and Al-Bassusi 2004). Not only are material living conditions negotiated, but so are many financial and behavioural outcomes. Families can negotiate up front over issues such as whether the couple will have one meal or two a week that contains meat, as well as issues such as whether the bride will work, and whether the bride should use contraception in the first year of marriage or have a child and then use contraception (Hoodfar 1997). Thus, in North Africa, the marriage contract is of profound importance to the economic and social arrangements of young people.

Despite the profound importance of the institution of marriage in social and economic arrangements, there is an extremely limited and fragmentary literature on the economics of marriage in North Africa. A few topics receive particular attention in the literature. Economic demography has a robust but primarily descriptive literature, focusing on trends such as the age at marriage, which has been increasing, and prevalence of marriage, which has been relatively universal in the region, especially in contrast to areas such as South Africa (Eltigani 2000; Mensch 2005; Nosseir 2003; Salem n.d.). While the median age at marriage has been rising, this phenomenon has been met with mixed feelings, as delays in marriage also delay adult roles, and create a period of 'wait adulthood' or 'waithood' (Dhillon et al. 2009; Singerman 2007). Although there has been a popular portrayal of marriage as a declining and increasingly expensive institution in the region (El Feki 2013; Salem n.d.), as we show below, there is limited empirical support for such claims. The costs of marriage have also received some, primarily descriptive, attention in the literature (Nosseir 2003; Salem n.d., 2011; Singerman and Ibrahim 2003; Singerman 2007), as have issues such as nuclear residence (Nosseir 2003; Salem, n.d.; Singerman 2007). Finally, the high consanguinity levels in North Africa have received some attention in both the economic demography and health literatures (Ben Halim et al. 2013; Casterline and El-Zeini 2003; Elbadawy 2007; Mensch 2005; Mokhtar and Abdel-Fattah 2001).

The anthropological and sociological literature (Amin and Al-Bassusi 2004; El Feki 2013; Hoodfar 1997) on the institution of marriage tends to be much more thorough than the economics literature. The limited economics of marriage literature for North Africa is primarily descriptive in nature. Only a handful of papers attempt to estimate the determinants of various marriage outcomes. Several focus on the transition to and timing of marriage. Assaad et al. (2010) examine how the transition from school to work affects the transition to marriage for young men in Egypt. Assaad and Ramadan (2008) examine the role of housing policy reforms in curbing the delays in marriage for young men also in Egypt. Assaad and Zouari (2003) examine how the timing of marriage and fertility affect the level and type of female labour force participation in urban Morocco.

A few papers examine marriage outcomes such as consanguinity, costs, and bargaining power within marriage. Casterline and El-Zeini (2003) perform simulations of the effect of reductions in family size on consanguinity. Elbadawy (2007) examines the returns to education in the marriage market in Egypt, in terms of its association with spousal education, nuclear residence, consanguinity, and marriage costs. Sieverding (2012) examines how wage work affects young Egyptian women's marriage outcomes. Salem (2011) examines how women's marriage assets and wage work affect their bargaining power. Given the limited body of research, there is very little that can be said in terms of consistent findings or controversies in the literature. There is a clear need for substantially more research on the determinants of marriage outcomes, as well as the economics of marriage generally in North Africa.

### **2.3 A unifying framework**

In order to enhance the state of research on the economics of marriage in North Africa, and to set a framework and agenda for future work, we offer a unifying framework for considering the economics of marriage. We propose that marriage outcomes be considered the result of a bargaining process between families. This is consistent with the findings of the anthropological literature (Hoodfar 1997) and encompasses the descriptions and findings of much of the economics-oriented literature as well (Elbadawy 2007; Salem 2011; Sieverding 2012). While other perspectives such as a 'modernization' hypotheses can and have been considered, the empirical evidence provided elsewhere (Salem 2011), as well as what we present empirically here, is not consistent with modernization but is consistent with a bargaining framework.

As they search for and contract with spouses, young people's traits (and those of their families) determine a number of different marriage outcomes that will shape their adult lives. We specifically examine age at marriage, consanguinity, nuclear residence, total costs of marriage, bride-side share of costs, and the age difference between the bride and groom as outcomes of the matching and bargaining process. A potential wife seeks a smaller age difference for a more equitable marriage, optimal timing of marriage, a nuclear household, high costs to ensure a higher standard of living, more choice of groom (less cousin marriage), and a lower bride-side share. Total costs in particular are likely to be a sign of bride-side bargaining power. A potential husband may in fact desire a larger age difference, optimal timing of marriage for himself, may want a nuclear household but be deterred by the costs, want moderate costs (as his side pays a higher share), want more choice of bride (less cousin marriage) and a higher bride-side share.

Ultimately, these outcomes are affected by bargaining power, ability to pay, and the bride and groom's characteristics. There are potential tradeoffs among different outcomes. For instance, accumulating the savings necessary to form a nuclear household may cause a delay in age at

marriage. The prevalence and timing of marriage particularly depends on both male and female side bargaining power and the characteristics of individuals and their families, especially the ability to pay. Employment and housing options are particularly important for men's marriage prospects. Certain characteristics—such as a more educated partner—are more desirable.

Ability to pay and an individual's characteristics may interact to determine their side's share of marriage costs, and marriage outcomes. When one side has a low ability to pay, and bad characteristics, they are likely to contract a marriage with a low cost share, but with bad outcomes, such as non-optimal timing of marriage and a non-nuclear household. If one side has a low ability to pay but good characteristics, they will continue to have a low share, but may delay marriage in order to negotiate for potentially better outcomes. If one side has a high ability to pay, but bad characteristics (for instance, relatively low education for their wealth level), they will pay a higher share of costs, and will experience mixed outcomes. Households with a high ability to pay and good characteristics can generally expect good outcomes, but are also likely to pay a high share of costs to obtain such outcomes.

Table 1 delineates the different hypotheses we would expect in terms of how women's characteristics affect bargaining power and ultimately marriage outcomes, all else being equal. Better own education is expected to delay age at marriage because it increases a woman's expectations on marriage outcomes. Own education also increases nuclear residence, total costs, and the bride-side share, and decreases the age difference and chances of a consanguineous marriage. Parents' education and father's employment status are expected to lead to a more optimal age at marriage, a higher bride's share and similar effects as own education on consanguinity, nuclear residence, total costs, and age difference. We expect parental wealth to behave similarly, but in particular to increase optimal timing of marriage. We expect there to be a number of cohort effects associated with modernization, including a delay in age at marriage, increased nuclear residence, total costs, and bride share, and a decrease the age difference and chances of a consanguineous marriage. The cost of housing has been identified as a substantial barrier to marriage in the region (Assaad et al. 2010; Assaad and Ramadan 2008; Dhillon et al. 2009; Singerman 2007), and we expect increases in the supply of rental housing to decrease the age at marriage and total costs, increase nuclear residence, and decrease consanguineous marriages.

We expect substantial interactions between different marriages outcomes, as they are the result of a complex negotiation process with numerous tradeoffs (Table 1). We expect a later age at marriage to be related to a lower chance of consanguineous marriage and a higher chance of nuclear living arrangements. Later age at marriage is expected to increase and then decrease total costs on the theory that optimal age at marriage maximizes women's bargaining power and her family's ability to negotiate a larger contract. Older age at marriage is also expected to increase the bride share, but decrease the age difference. Consanguineous marriages are expected to be negatively associated with nuclear living arrangements, have lower costs, and less of an age difference. Nuclear household marriages will increase costs and the bride share. Total costs and bride share will be positively correlated, and the bride share will be negatively correlated to the age difference. Additionally, we expect that Christian women have greater bargaining power than Muslim women, since a Christian marriage contract is more symmetric with neither side having the right to repudiate the other and the husband has no right to take additional wives.

We also expect countries' demographic structures to have a substantial impact on the timing of marriage. Egypt, Morocco, and Tunisia have all experienced a substantial youth bulge, and all

commonly have a substantial age gap between husbands and wives. Together, these factors have substantially altered the prevalence and timing of marriage in North Africa. The demographic transition is also expected to affect the child quantity/quality tradeoff. As the demographic transition occurs, specifically as early mortality declines, parents can be more certain and secure that investments in their children will carry through to returns from adults. They therefore desire higher child quality. One way men can get higher child quality is by investing in a higher quality wife, and therefore we expect that the premium to female education will increase (Schultz 2008). Child quantity is primarily ensured by a younger wife, and the de-emphasis of child quantity may be one of the factors contributing to rising age of marriage among women.

### **3 Data**

Within North Africa, we focus on the countries of Egypt, Morocco, and Tunisia. Data from each of these countries are used to illustrate patterns and trends in the economics of marriage. In Egypt, we use the Egypt Labour Market Panel Survey (ELMPS), which was fielded in 1998, 2006, and 2012. The sample size in 2012, on which we focus, was 49,186.<sup>1</sup> In Morocco, we use the 2009–10 Morocco Household and Youth Survey (MHYS), which sampled 2,000 households consisting of 10,770 individuals (World Bank 2010).<sup>2</sup> In Tunisia, we use the National Survey on Household and Youth (NSHY) in Municipal Centres in Tunisia 2012, which sampled 16,995 individuals in 4,218 households. All of the surveys are representative of the area covered after the application of sample weights (nationally in Egypt and Morocco, urban and peri-urban areas in Tunisia). Despite the fact that marriage represents one of the most important transactions and contracts in young people's lives, there is limited data on marriage outcomes in North Africa. Only in the ELMPS are there data available on costs, bride-side share, and consanguinity. All the surveys have detailed household and demographic information.

### **4 Prevalence and timing of marriage**

There is substantial variation in both the timing and universality of marriage in Egypt, Morocco, and Tunisia, but there are also substantial similarities. In all three countries, a substantial share of women married earlier than men, often in their teens. Around a quarter of women had married by age 20 in all three countries, but very few men had married by the same age. Men do begin marrying around age 20 and thereafter. In terms of men and women marrying at relatively younger ages, Egypt and Morocco are quite similar, while individuals tend to marry later in Tunisia. At the median and thereafter, both women and men in Egypt are marrying earlier than in other countries, and almost universally. In contrast, while Tunisia is relatively near universal marriage, more than a quarter of female and almost half of men marry after age 30. In Morocco, marriage is not universal. Almost a quarter of men and women never marry. While half of women are married by 25, it is not until almost 40 years of age that 75 per cent of women are married.

In Egypt, the median age of marriage for men is 27 and for women 21. Rural males and females marry earlier in Morocco and Egypt, with the gap widening over the distribution in Egypt. Educated individuals marry later, but the gap narrows somewhat over the distribution.

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1 See Assaad and Krafft (2013) for additional information on the ELMPS 2012.

2 See [www.microdata.worldbank.org/index.php/ctalog/1546](http://www.microdata.worldbank.org/index.php/ctalog/1546) for additional information.

The timing and prevalence of marriage has been changing substantially over time in North Africa, as Figure 1 demonstrates. In Egypt, the proportion married by certain ages was declining over time, but in fact has reversed course among more recent cohorts, with the median age of marriage in fact decreasing. In Morocco, the proportion of individuals married by different ages has been falling steadily over time, although it may have stabilized for more recent cohorts. Additionally, it is clear that the universality of marriage has been steadily decreasing over time. Tunisia has also experienced a falling proportion of individuals married by different ages, and some decreases in the universality of marriage, although it too may be stabilizing. Figure 1 also allows comparisons of various percentiles, including the median age of marriage, over time. In Egypt, the distribution rose gradually over time, with the median for women peaking at age 22 for the birth cohorts of the late 1970s and the median for men peaking at age 28 for the 1970 birth cohort. The distribution has since been shifting downward, with median age of marriage decreasing. Additionally, there appears to be some slight convergence of the 25<sup>th</sup> and 75<sup>th</sup> percentiles towards the median. In Morocco, the distribution has shifted towards older ages of marriage, and also widened in variance, with marriage becoming less universal. For both men and women, the median has levelled off and may be decreasing for the most recent cohorts. Tunisia has followed a fairly similar pattern to Morocco, with the 75<sup>th</sup> percentile for age of marriage for women approaching 36 years. For men it reached 38 years, but the 75<sup>th</sup> percentile has since fallen and the median flattened.

In North Africa, women marry at earlier ages than men and husbands are often substantially older than their wives. These age differences both reproduce and justify gender inequality within marriage (Hoodfar, 1997). We examine the mean age difference between husband and wife for married women ages 30-59 by year of birth. In Egypt, this has increased slowly over time from a six-year to a seven-year difference. In Morocco, the gap has widened from seven to eight years. In Tunisia, the gap has fluctuated around six years. These age differences will have a substantial effect on bargaining within the household, and also affect whether or not the marriage markets will 'clear.' While there are relatively similar numbers of males and females born in the same year, the population structure in many countries is such that the number of males is not equal to females who are six or seven years younger.

Figure 2 demonstrates the population structure of the three countries, and the mismatch between the number of males and females five years younger. Egypt had a youth bulge that as of 2012 was centred around age 25-29, and additionally has an 'echo' of the bulge beginning to form among young children. While 20-24-year old males in Egypt face a shortage of 15-19-year old females to marry (because of the narrowing in the population pyramid at that age), otherwise there are consistently relatively more females than males. One factor contributing to this mismatch is the number of men working abroad, which can be seen in terms of the varying size of the male and female 25-29 populations. Morocco has a youth bulge whose peak in 2010 was at age 15-19. Thus the Moroccan youth bulge is approaching marriageable age. Prior to the youth bulge, there had been a relative excess of younger females relative to five-year-older males. This relative over-supply of females is one of the drivers of the unequal prevalence of marriage among males and females, as seen in Figure 1. After the peak of the youth bulge marries, there will be a relative excess of males in Morocco. Tunisia experienced a much more moderate youth bulge, and moderate contraction. As of 2012 Tunisia has a relative excess of females in their 30s, and will experience a shortage of potential wives for the generation of males that is 5-14 (there will be a shortage of females 0-9 in 2012) because of the smaller size of recent generations.

These different population structures have shaped, and will continue to shape, the economics of marriage in North Africa. In Morocco, while men may have trouble marrying early for economic reasons, they face an excess supply of younger women. When the excess supply flips to an excess of males, we expect to see the age gap between males and females decreasing in Morocco, as in Tunisia. We also expect a rise in the number of spinsters in Tunisia as the youth bulge of females does not universally marry.

## **5 Marriage outcomes**

### **5.1 Consanguinity**

Consanguinity, that is, marriage between individuals who share a (known) common ancestor, is a common practice in Arab countries (Casterline and El-Zeini 2003; Mensch 2005; Rashad et al. 2005). Marriage between first cousins is the most common form of consanguinity practiced in the region (Casterline and El-Zeini 2003). A variety of explanations have been proposed for consanguineous marriages, including the economic rationales that it will be lower cost (Casterline and El-Zeini 2003; Singerman 2007), or helps maintain family property, but these arguments do not have strong empirical support (Casterline and El-Zeini 2003). There are also a number of other rationales, including that there is less uncertainty about spouse qualities (since information issues are substantial in the marriage market), that the husband and wife and their families will be more compatible, that wives will be treated better, and that there will be less marital conflict and greater marital stability (Casterline and El-Zeini 2003). Consanguinity has been associated with traditional and arranged marriages, and modernization theorists expected substantial declines in consanguinity over time, declines which have not materialized in Egypt (Casterline and El-Zeini 2003; Singerman 2007). This may be because, although the debate is contentious, consanguinity is on the whole beneficial for women (Casterline and El-Zeini 2003). While young men and their families consider consanguineous marriages appealing because of lower costs, women consider this a disadvantage. Kin marriages essentially reduce the uncertainty around a spouse's characteristics. Additionally, they help protect women against domestic violence (Hoodfar 1997).

We analyse the pattern of consanguinity in Egypt from the female perspective. Overall, 28.6 per cent of married women 18-39 are in a consanguineous marriage. Most common are marriages to the son of a father's brother (6.4 per cent), but marriages with other first cousins are each around 3-4 per cent, and marriages to other blood relatives total around 11 per cent. Consistent with consanguinity being a 'traditional' phenomenon, consanguinity is higher in rural areas than urban areas in Egypt. Additionally, the prevalence of consanguinity has been falling in both urban and rural areas over the past decade. Consanguinity is around 30 per cent for women with secondary or lower levels of education, and only drops substantially, to around 15 per cent, for women with university education. Additionally, comparing 2000-05 to 2006-12, consanguinity rates have gone down for more educated women, but increased for women who have less than a secondary education. This may be because, as education levels increase, women achieving lower levels of education have poorer marriage prospects outside their family. In our multivariate models for consanguinity in Egypt (Table 5), consanguinity does not show a substantial or significant relationship with education, decreasing only for women with university or higher education, and this effect disappears when other marriage outcomes are included as covariates. There are large regional effects, consistent with consanguinity having a substantial cultural component. Overall, there is mixed support for modernization hypotheses related to consanguinity.

## 5.2 Nuclear residence

While traditionally married couples had lived with the husbands' extended family, increasingly nuclear households are becoming the norm in North Africa. Modernization trends, such as urbanization and education have been credited with driving this pattern (Nosseir 2003). The trend towards nuclear residence has been linked to increased costs of marriage and delayed marriage (Amin and Al-Bassusi 2004; Salem n.d.; Singerman 2007). The prevalence of nuclear household living arrangements varies substantially across North Africa. While 86 per cent of recently married women in Tunisia are in nuclear households, only 41 per cent are in nuclear households in Morocco. Egypt falls in the middle, with 63 per cent of ever-married women 18-39 living in nuclear households.

Nuclear household living arrangements in Egypt vary with urban/rural location, with individuals married in urban areas more likely to live in a nuclear household after marriage than individuals in rural areas. However, there is a converging trend, with the proportion of couples choosing to live in nuclear household arrangements after marriage increasing more rapidly in rural areas than in urban areas. As of 2011, 88 per cent of urban ever-married women 18-39 took up residence in a nuclear household after marriage, while 63 per cent of rural women did so. However, housing patterns are shifting in rural and poor urban areas and may be making it difficult to clearly identify what type of living arrangements households are pursuing. Extended families living under one roof increasingly have residences in buildings with multiple stories, each containing separate apartments with their own kitchen. As a result families may live in close proximity with their parents or in-laws, sharing some meals but not necessarily all meals, thus blurring the traditional definitions of household.<sup>3</sup>

Nuclear residence is closely linked with education in Morocco and Egypt, but the prevalence of nuclear households is around 85 per cent in Tunisia regardless of a woman's education level. The prevalence of nuclear households only reaches these levels in Egypt and Morocco for university-educated women. Additionally, in Egypt, comparing 2000-05 and 2006-11, the prevalence of nuclear households rose more quickly at lower levels of education than at higher levels.

In the multivariate models for nuclear residence (Tables 5, 6, and 7), more educated women are more likely to have nuclear arrangements at marriage, but only significantly so in Egypt. Also, in Egypt, where there are data on parents' education, daughters of men with higher education have a greater chance of moving into nuclear living arrangements upon marriage.

### *Costs of marriage<sup>4</sup>*

The costs of marriage are the most substantial investment young North Africans make. These costs have been identified as a substantial contributor to the delay in age of marriage, and a barrier to adult life (Amin and Al-Bassusi 2004; Assaad et al. 2010; Assaad and Ramadan 2008; Dhillon et al. 2009; Rashad et al. 2005; Singerman 2007). One way to quantify the costs of marriage is in terms of how many months of earnings it would take a groom to cover the entire up-front costs of the marriage.

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<sup>3</sup> See Assaad and Krafft (2013) for additional information on changing shelter patterns and identifying households over time in the ELMPS.

<sup>4</sup> Costs in 2006 were asked of the first marriage, while costs in 2012 were asked of the last marriage. For the population (18-39-year olds) we primarily focus on, the vast majority of first marriages are also the last marriage, and we treat the 2006 and 2012 data as comparable.

Although costs are generally shared between the bride's side and both the groom and the groom's family, this provides a helpful metric. In Egypt, men who were wage workers in 1998 and had married in the three years prior to 2006 would have had to save 104 months' worth of salary (8.6 years) in order to pay the total costs of the marriage. Men who were wage workers in 2006 and had married in the three years prior to 2012 would have had to have save 99 months (8.3 years) in order to pay the total costs of the marriage. Although there has been a very slight decline from 2006 to 2012, it is clear that the costs of marriage remain an enormous investment for young people in Egypt.

One measure of whether or not young people struggle to get married is the length of the engagement. Long engagements are often considered a sign of high costs and marriage crises (Amin and Al-Bassusi 2004; Singerman 2007). However, since engagements can be broken off without substantial social consequences (Hoodfar 1997), further research is needed on the nature of long engagements—they may also represent information issues and uncertainty, and provide a window in which to check a promising potential spouse's qualities (Hoodfar 1997). Examining the trends in different stages of engagement in Egypt over 2003-11 for Muslim women overall, the total length of marriage—from informal engagement to actual wedding—has been relatively flat or decreasing over time. Decreases in the time from formal engagement to legal wedding and legal wedding to actual wedding appear to be driving this trend.

The exact costs of marriage vary substantially based on a number of different dimensions. As Figure 1 demonstrates, for women, costs of marriage increase and then decrease with age at marriage. Costs are high for marriages between ages 20 and 30 (within the optimal window) and highest at age 25. Costs are lower for women who marry before 20 or after 30. There are a number of different components to marriage costs in North Africa. In Egypt, costs consist of the brideprice, jewellery given to the bride, home furnishings, a residence, the *gihaz* (trousseau, small home furnishings), and celebrations. As of 2012, total costs for marriages (based on the preceding three years) were around 62,000 LE (approximately US\$10,164 at an exchange rate of 6.1 LE to the US\$).

Costs, and the structure of costs, vary along a number of dimensions and have changed substantially over time. The largest components of cost are furniture and housing, followed by the *gihaz*. Jewellery is around 10 per cent, celebrations are around 7 per cent and brideprice is less than 5 per cent of total costs. Jewellery and brideprice tend to be a greater share of costs in rural than urban areas. Comparing marriages in 2003-05 and 2009-11 (in terms of 2012 LE), costs have increased in rural areas from 54,000 LE to 60,000 LE but have actually fallen in urban areas from 78,000 LE to 65,000 LE. Over time, in rural areas housing costs have become a greater share of what is a greater cost overall. The fall in overall costs in urban areas has been relatively across-the-board, although celebrations and the *gihaz* have dropped less than other components and are, therefore a larger share.

Because of the panel nature of the ELMPS, it is in fact possible to look at the characteristics of married individuals' natal households. Figure 1 examines the costs of marriage by parental wealth in 2006 for women 18-39 who were married between 2009-11 and were in the panel in 2006 and 2012. Total costs increase substantially—but not proportionately—with wealth level, indicating that the costs of marriage are likely to be particularly burdensome for poorer families. The structure of cost shares is quite similar across wealth levels. The share of housing, celebrations and jewellery is higher for poorer households, while the share of furniture is higher for richer households. Overall, parental

resources clearly play an important role in the resources available to a new couple. The costs of marriage represent an enormous intergenerational wealth transfer.

In our multivariate models, we estimate models for log total costs, so that the influence of outliers is reduced and coefficients can be interpreted as per cent changes. Costs increase with own education, and with highly educated parents. A more educated spouse increases costs. Nuclear residence also increases costs by 9.4 per cent, and the pattern of costs and optimal age in Figure 1 continues to hold in the multivariate model. Models estimated adding parental wealth (not shown) also suggest that women coming from wealthier households have higher marriage costs.

### 5.3 Cost structure

The cost structure, in terms of the division of costs among the bride and her family, and the groom and his family, is relatively fixed regardless of individuals' characteristics. There is only minor variation between urban and rural areas in terms of the distribution of costs. Regardless of education level, brides pay very little (1 per cent) of the total costs. For illiterate or less than primary-educated brides, their families pay 31 per cent of the costs, while for brides with primary through secondary schooling, the bride's family share is 34 per cent. Only if the bride has a university education does this increase to 38 per cent. The groom pays a relatively higher share (42 per cent), and his family a bit less (26 per cent) for an illiterate or less than primary-educated bride than for a bride with education. For primary and preparatory educated brides, the groom himself pays a bit less, around a third of costs, and his family a bit more, also a third of costs. Secondary educated brides are associated with a higher groom share and smaller groom's family share. Using data on costs by groom's education, fairly similar patterns were found. Looking at the percentage of costs paid by different parties by parental wealth, the bride-side share generally increases when the bride's parents are wealthier. The groom pays the largest share if the bride is from the poorest quintile of households, and otherwise pays about a third of total costs. In the multivariate models,<sup>5</sup> more educated women had a larger bride-side share, as did women with educated mothers.

### 5.4 Costs and consanguinity

It has been argued—although previously without strong empirical evidence—that consanguineous marriages are less costly (Casterline and El-Zeini, 2003; Singerman, 2007). They can also act as fallback positions in contracting a marriage. Consanguine marriages might cost less because the marriage contracts give asymmetric rights to men. Wives lose power once they sign the contract. Negotiations are therefore up-front, when women have the greatest bargaining. If an individual is marrying a cousin, there may be more trust and lower costs.

However, the empirical evidence in Egypt suggests that there is not a substantial shift in costs. Total costs for a consanguineous marriage are around 82 per cent of the total costs of a non-consanguineous marriage, and in fact, as we discuss later, after controlling for other factors there is no total cost difference for a consanguineous marriage. The cost structure is also fairly similar. Housing is a slightly greater share of consanguineous marriage costs, which may represent a larger wealth transfer since resources will remain in-family. There are also only minor variations in the shares paid by different parties. In the multivariate models that included marriage outcomes, there was, in fact, no significant total cost difference for consanguineous marriages, after accounting for other characteristics (Table 5).

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<sup>5</sup> We present OLS models but also tried logit transformations for the share and robust GLM; results were similar.

## **6 How characteristics shape outcomes**

In order to properly test the many hypotheses of the relationship between individual characteristics and marriage outcomes (in Table 1)—the outcomes of a bargaining process where ability to pay and characteristics create bargaining power—we turn to multivariate regression models (Tables 5, 6, and 7). We have previously mentioned some of the findings of these models in terms of individual outcomes, and in this section we synthesize their effects across different outcomes and, where possible, countries.

### **6.1 Cohorts and age at marriage**

In Egypt, the observed trend of a rise, and more recently a moderate decline in the median age at marriage is borne out in the multivariate hazard model. After accounting for other characteristics, the hazard of marriage in a given month was lowest for males born around 1965 and females born around 1970, and has risen for recent cohorts, meaning these groups would have had the highest ages at marriage, all else being equal. In contrast, in Morocco and Tunisia, the hazard are consistently lower for later cohorts, pointing towards consistently later ages at marriage.

### **6.2 Place of residence**

Differences by region and by urban/rural location are common across different outcomes. In all three countries, certain regions are generally associated with poorer marriage outcomes for women, which may represent different bases for women's status and bargaining power based on regional cultural variations. For instance, in Egypt, Upper Egypt, which tends to be the most culturally conservative region, has higher rates of consanguinity, lower rates of nuclear residence, lower costs, lower bride's share, and earlier marriages.

### **6.3 Own education, spouse education, and parents' education**

Women's (and men's) own education substantially decreased the hazard of marriage in Egypt, leading to greater ages at marriage, even at low levels of education for men, and starting at the secondary level for women. In Morocco, males and females with at least a primary education had substantially reduced hazards of marriage, and even females with less than a primary education (but who were not illiterate) had lower hazards. The effects were stronger for females, and increased with education for both genders. In Tunisia, higher education was generally associated with a decreased hazard of marriage, and therefore later marriages for men and women. A woman's own education decreases consanguinity, increases nuclear residence, total costs, and bride share, and reduces the age difference in Egypt. Primary education for women increased the age difference between spouses, but did not significantly affect nuclear living. In Tunisia, women who could read and write had smaller age differences than illiterate women.

More educated parents also tended to increase the age at marriage in Egypt. While having a less than intermediate educated mother, compared to an illiterate one, decreased the chances of nuclear residence, having a highly educated father increased the chances. More educated mothers and fathers were associated with higher total costs. Moderately educated mothers were associated with a greater bride-side share, but there was no relationship with the father's education. More educated mothers were actually associated with larger age differences between spouses.

In Egypt, having a relatively less educated spouse increased the hazard of marriage for men and decreased it for women; this may mean that men can marry less educated spouses more rapidly and

with less investment, while less educated spouses are more of a last resort for women. Only for men did relatively more educated spouses decrease the hazard of marriage, which may be because they need to save more to marry up. In Morocco, having a less educated spouse again increased the hazard of marriage for men but not for women, and for both genders, relatively more educated spouses were associated with lower hazards of marriage (later marriages) which may be related to bargaining for higher standards of living, which take time to accumulate. In Tunisia, there were only significant differences for men in the time to marriage in terms of relative spouse education. Less educated spouses were associated with earlier marriages and more educated spouses with later marriages. Overall, there is a clear pattern of tradeoffs in terms of spouse quality (more education) being associated with later marriages for men. If men are willing to settle for a less educated spouse, they can get married sooner.

In terms of other marriage outcomes, having a relatively less educated spouse was associated with consanguinity in Egypt. If spouse education was missing (because the spouse is not present), there was a lower chance of nuclear living (which may mean that wives are left with in-laws if the husband is working elsewhere). A relatively more educated spouse increased total costs by 16.2 per cent. In Morocco a more educated spouse was associated with a smaller age difference, a pattern also observed in Tunisia. In Tunisia, a spouse with less education was associated with a lower probability of nuclear living.

#### **6.4 Father's employment**

Only in Egypt was information available about fathers' characteristics. Compared to men with fathers engaged in public wage work, men with fathers in private wage work had a significantly lower hazard of marriage, which may be due to a lower ability to pay on the part of the groom's side. In different models, having a father who is an employer or own account worker increased the changes of consanguinity, which may represent a desire to keep business enterprises within the family. Compared to women whose father was a manager, women whose father was an agricultural worker have a smaller bride share in the costs of marriage, which may be related to more difficulty in accumulating assets. Fathers in clerical/sales occupations were also associated with a higher age difference; families may be accepting older husbands as a tradeoff for socioeconomic status of the family and ability to pay.

#### **6.5 Wealth and the supply of cousins**

In Egypt, because the ELMPS was the third round of a labour market panel, it was possible to apply characteristics of individuals' natal households (in the previous round, 2006) to their marriage outcomes in 2012 for those who were married in the interim. We focus on assets, which include household wealth (an asset index derived from a factor analysis), the value of livestock, and the area of land, all of which we expect will affect bargaining power and ability to pay. We do this for all the regressions for Egypt (not shown). We find that wealth, livestock, and land have no significant relationship with the timing of marriage. Wealthier families are less likely to arrange consanguineous marriages; the hypothesis that consanguineous marriages mean lower costs, which we disproved after accounting for other characteristics, may have been generated by the negative relationship between wealth and consanguinity and the positive relationship between costs and wealth. Wealth significantly raises the costs of marriage. No other marriage outcomes are affected by wealth, and none are affected by the value of livestock or land.

Casterline and El-Zeini (2003) had used micro-simulations to examine whether decreasing family size, affecting the supply of kin, would affect consanguinity, and found evidence that it is unlikely to do so. Using the same panel data as for wealth, we calculate the number of maternal or paternal aunts or uncles, as a proxy measure for the supply of cousins, and added this to the regression for consanguinity (not shown). We find that a greater number of maternal aunts slightly increases the probability of a consanguineous marriage, but that the other relative proxies are not significant. In line with previous findings, the supply of cousins is at most a minor factor in consanguinity.

## **6.6 Housing markets, employment, and migration**

Previous research has suggested that one of the factors, at least in Egypt, that has affected marriage outcomes is the housing market (Assaad et al. 2010; Assaad and Ramadan 2008). Since marriage often involves setting up an independent household, the costs of which can be substantial, the availability of housing, especially rental housing, can be of paramount importance in marriage negotiations and outcomes. In 1996 in Egypt, a ‘new rent’ law was passed that was designed to substantially increase the supply of rental housing. To examine the impact of this reform on marriage outcomes, we interact the proportion of new-rent contracts in an individual’s district of birth with year of birth dummies indicating exposure to the new rent law. Males born after 1972 and females born after 1977 are likely to be facing a different rental market as they are entering the marriage market because of the new rent law passed in 1996. Specifically, we include the per cent of rent in all housing in the district of birth, and the per cent of ‘new rent’ units in rent and the interactions that we expect to show the effect of the law. While new rent and rent overall tend not to be significant, the interactions after the policy change generally are; both the per cent of rent in all housing and the per cent of new-rent in rent interactions significantly increase the hazard of marriage, decreasing the age at marriage. The interaction of new-rent in rent also significantly increases the chances of residing in a nuclear household. Thus rental law reforms allow youth to marry earlier and make it easier for them to form independent households.

Because the Cox proportional hazard model allows for time-varying covariates, we can look at how a number of characteristics that change over time affect the timing of marriage, including migration and employment. When young people are in school, this decreases their hazard of marriage significantly and substantially, particularly for women. When men become employed, this significantly increases their hazard of marriage, but no effect is observed for women. Being employed in a ‘good’ job increases the hazard for both men and women. While women’s time to marry does not appear to benefit from employment overall, having secured a good, formal job allows women to marry earlier; this is clearly an appealing characteristic in a female spouse, and likely a source of bargaining power. When unmarried individuals migrate (almost exclusively men), their hazard of marrying is lower. While work as a migrant may increase their wealth and prospects for marriage in the long run, the time spent abroad may act as a substantial delay in the marriage timeline.

## **6.7 How outcomes inter-relate**

There are tradeoffs and other relationships between different marriage outcomes. For instance, in Egypt the hazard of marriage is lower for both men and women who have nuclear marriages, meaning that they have to wait longer for a marriage with independent living. Likewise, higher costs are related to later marriages. In contrast, the hazard for consanguineous marriages is higher, meaning these marriages occur at earlier ages. A nuclear residence is associated with a lower chance of consanguinity, higher total costs, a greater female age difference, but no difference in the bride

share. Bride share is not significant for any of the other marriage outcomes. Log total costs are only significantly related to nuclear residence, not consanguinity, or the bride share. Consanguinity is related to a smaller age difference as well as a lower chance of nuclear living.

## **7 Conclusions and directions for future research**

### **7.1 Previous literature**

The body of literature on the economics of marriage in North Africa is quite fragmentary, and primarily descriptive, focusing on patterns such as trends in the prevalence of marriage and age at marriage (Eltigani 2000; Mensch 2005; Nosseir 2003; Salem n.d.), costs (Nosseir 2003; Salem n.d., 2011; Singerman and Ibrahim 2003; Singerman 2007), nuclear residence (Nosseir 2003; Salem n.d.; Singerman 2007), and consanguinity (Ben Halim et al. 2013; Casterline and El-Zeini 2003; Elbadawy 2007; Mensch 2005; Mokhtar and Abdel-Fattah 2001). The anthropological literature has actually tended to take the most holistic approach to the economics of marriage (Amin and Al-Bassusi 2004; El Feki 2013; Hoodfar 1997). Only a few forays have been made into multivariate analyses of topics such as the timing of marriage (Assaad et al. 2010; Assaad and Ramadan 2008; Assaad and Zouari 2003), consanguinity (Casterline and El-Zeini 2003; Elbadawy 2007), and the relationship between women's work and marriage (Salem 2011; Sieverding 2012).

Marriage has not traditionally been the subject of economic analysis, and globally the framework of a marriage market, utility-maximizing individuals, potential uncertainty and search costs, and a resulting market equilibrium is relatively recent (Becker 1973, 1974a; Grossbard-Shechelman 1995). Even more recent are applications of game theory to the economics of marriage (Shelley Lundberg and Pollak, 2003; Shelly Lundberg and Pollak 1996; McElroy 1990; Udry 1996) and search for a partner (Adachi 2003; Bergstrom and Bagnoli 1993; Smith 2006) can help explain both the processes and outcomes of the marriage market.

### **7.2 This paper's contributions**

In this paper, we drew on both the classical, Becker approach to the economics of marriage and game theory to offer a unifying framework for understanding the economics of marriage in North Africa. Due to asymmetric rights that favour men once marriage has taken place (Hoodfar 1997), the bride-side's bargaining power is greatest up front, and so detailed marriage contracts are negotiated to secure potential benefits and agree on tradeoffs for both parties. We offer a unifying framework for understanding marriage outcomes, recognizing that ability to pay and individuals' characteristics create bargaining power and shape outcomes, and that there are tradeoffs between different outcomes. The outcomes we explored include age at marriage and age differences between spouses, consanguinity, nuclear residence, costs, and bride-side share of costs.

Given the nascent state of the literature, many important questions on the relationship between characteristics, ability to pay, bargaining power, and marriage outcomes were unanswered, as were questions about the relationships and tradeoffs between marriage outcomes, such as consanguinity and costs. We presented new evidence on trends in the prevalence and timing of marriage in Egypt, Morocco, and Tunisia, and the characteristics that affect marriage—including such important determinants as education, employment, migration, and housing markets. The factors that affect a variety of marriage outcomes were described, and evidence presented as to how bargaining power and ability to pay affect marriage outcomes, and the tradeoffs between different marriage outcomes.

We hope that this work will move forward the embryonic economics of marriage literature, and provide examples of what we can learn, even with existing data.

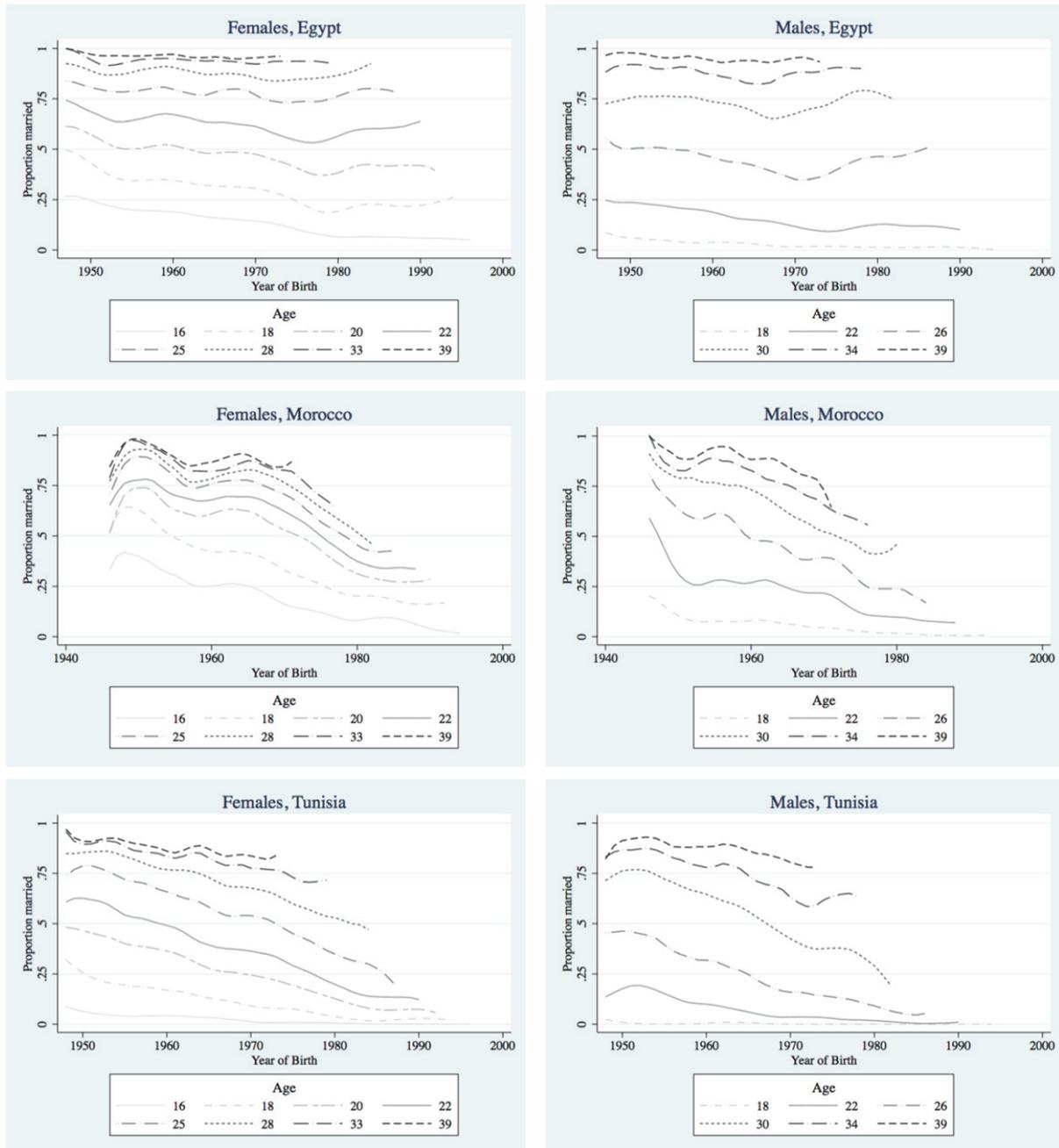
### **7.3 An agenda for future research**

One of the most important elements for progressing research on the economics of marriage in North Africa (and elsewhere) is improving the quantity and quality of information available on marriage outcomes and processes. Currently, the ELMPS is the only survey in the region with a detailed module on marriage, although in the Middle East, Jordan has comparable data, and a planned labour market survey in Tunisia similar to the ELMPS will include a module on marriage, allowing for future comparative work. Similar survey modules should be incorporated into other surveys in the region. Since marriage is a substantial expenditure, often the most substantial intergenerational transfer in young people's lives (Singerman and Ibrahim 2003), this topic ought to be incorporated into household income and expenditure surveys, which could collect data on savings for marriage and cost components for recent marriages. Questions on a number of topics, such as consanguinity and living arrangements at marriage, could be incorporated into surveys focusing on demographic or health issues. Surveys specifically on marriage—including the search for a spouse for those not yet married—would open up substantial new areas of research into search and bargaining behaviours, as well as the economics of the marriage market, including issues such as information problems and uncertainty.

Although new data will be an important component to future research on the economics of marriage in North Africa, there are numerous areas that merit future research, and for which there are at least some data available. What determines age differences between spouses, and how this affects bargaining power within the household merits further investigation. The relationship between employment and marriage for men and women is a vital topic for understanding transitions to adulthood. Men need employment to secure a successful marriage, and our evidence suggests that 'good' employment speeds marriage for women, but it is also clear that married life and employment are difficult to reconcile for women. Particularly for men, the role of migration in enabling or delaying marriage merits further research. How the assets individuals bring to marriage, and their bargaining positions and processes in negotiating the marriage contract affect bargaining power and gender roles within the marriage has important implications, particularly for the wellbeing of women and children. Overall, marriage represents the most important transition and transaction in young people's lives and shapes their economic and social trajectory. To date, there has been only a little, primarily descriptive research on the economics of marriage. While we have added substantially to this body of knowledge, much more needs to be done to understand the economics of marriage in North Africa.

## Figures and Tables

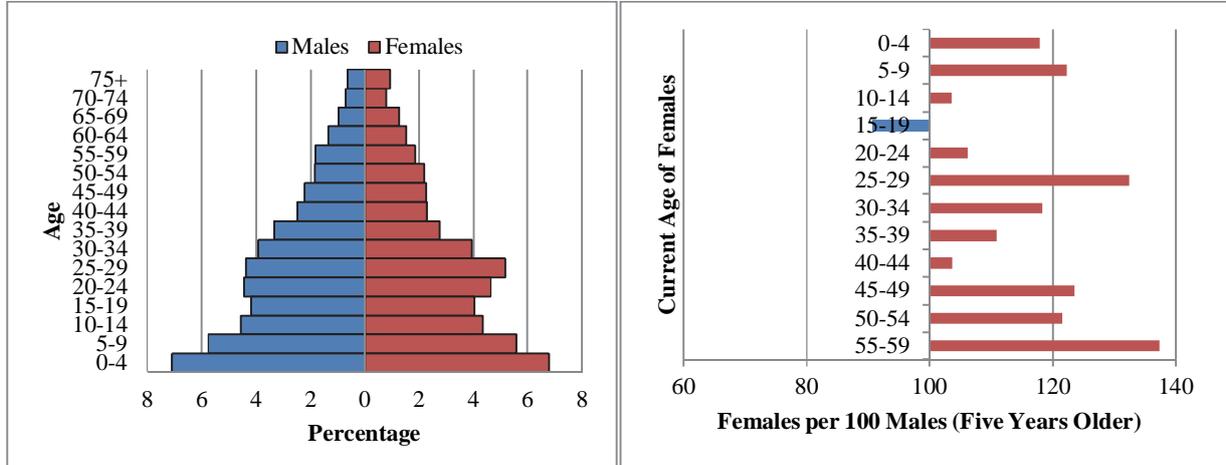
Figure 1: Proportion married by selected ages and year of birth



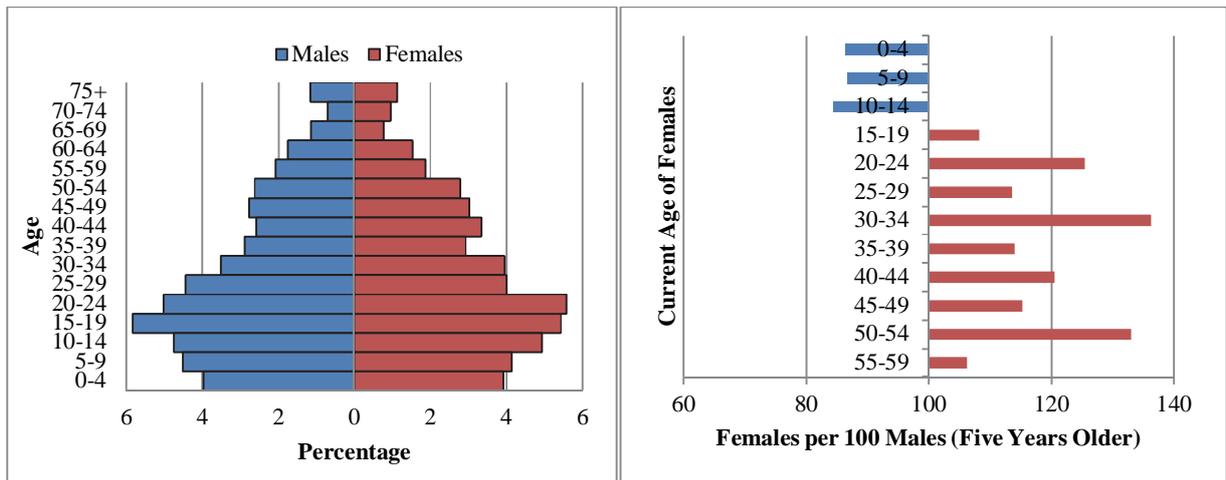
Source: Authors' calculations based on ELMPS (2012); MHYS (World Bank, 2010); NSHY (n.d.).

Figure 2: Population pyramid and ratio of females to males (5 yrs older) by age group, Egypt, Morocco, and Tunisia (urban)

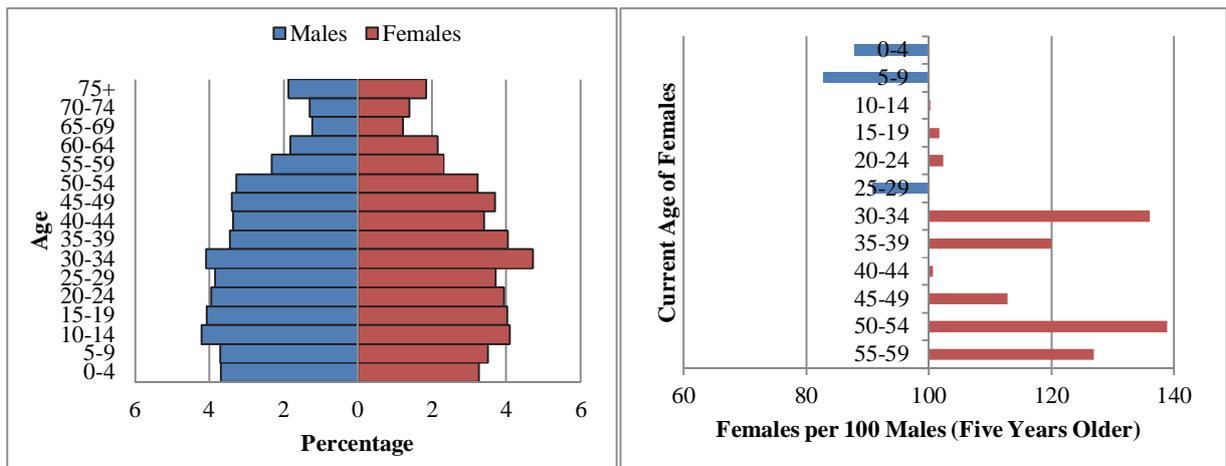
Egypt



Morocco

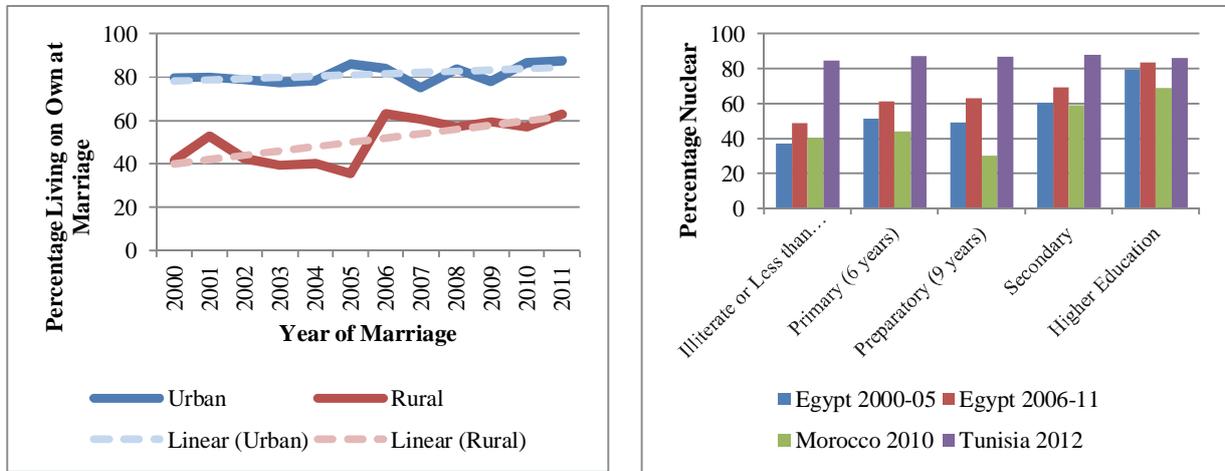


Tunisia



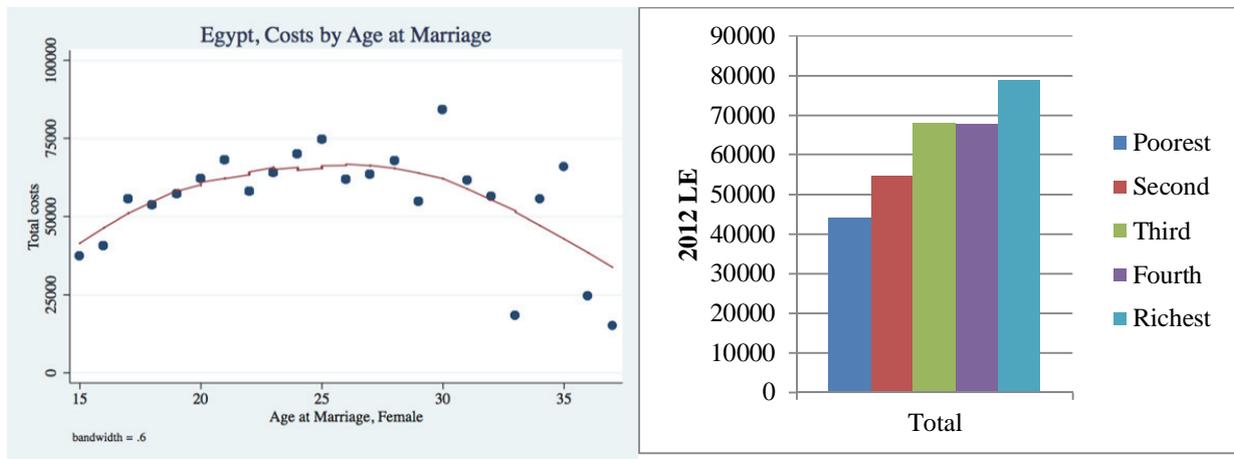
Source: Authors' calculations based on ELMPS (2012); MHYS (World Bank, 2010); NSHY (n.d.).

Figure 3: Residence after marriage by years of marriage and urban/rural Egypt, ever married females 18–39, and residence after marriage by education, females 18–39, married in past five years



Source: Authors' calculations based on ELMPS (2012 for 2006–11; 2006 for 2000–06); MHYS (World Bank, 2010); NSHY (n.d.).

Figure 4: Total costs of marriage in 2012 by females' age at marriage and by parental wealth in 2006, females 18–39, married in 2009–11, Egypt



Source: Authors' calculations based on ELMPS (2012).

Table 1: Hypotheses on the relationship between females' characteristics and marriage outcomes and correlations between marriage outcomes

Female characteristics	Age at marriage	Consanguinity	Nuclear residence	Total costs	Bride share	Age difference
Own education	+	-	+	+	?	-
Cohort	+	-	+	+	+	-
Parents' education	+ then -	-	+	+	+	-
Father's employment	+ then -	-	+	+	+	-
Parental wealth	+ then -	-	+	+	+	-
Rental housing	-	-	+	-	?	?
Expected correlations between marriage outcomes						
Age at marriage		-	+	+ then -	+	-
Consanguinity			-	-	?	-
Nuclear				+	+	?
Total costs					+	?
Bride share						-

Source: See text.

Table 2: Cox proportional hazard models for time to marriage, Egypt

	Exog		Endog		W/ marr outcomes	
	Females	Males	Females	Males	Females	Males
Own education (illiteracy omitted)						
R&W	0.872 (0.075)	0.917 (0.061)	0.902 (0.071)	0.895 (0.057)	0.990 (0.088)	0.999 (0.098)
Primary	1.006 (0.052)	0.885* (0.044)	1.026 (0.048)	0.825*** (0.040)	1.012 (0.059)	0.915 (0.060)
Preparatory	0.978 (0.064)	0.742*** (0.053)	1.116 (0.074)	0.713*** (0.047)	1.222** (0.083)	0.822* (0.079)
Secondary	0.773*** (0.025)	0.712*** (0.028)	1.049 (0.037)	0.689*** (0.026)	0.959 (0.044)	0.721*** (0.044)
Post-secondary inst	0.604*** (0.033)	0.694*** (0.045)	0.852* (0.059)	0.684*** (0.046)	0.711*** (0.063)	0.745** (0.074)
University & above	0.504*** (0.020)	0.571*** (0.025)	0.769*** (0.035)	0.606*** (0.028)	0.624*** (0.035)	0.608*** (0.046)
Birth region (Greater Cairo omitted)						
Alexandria and Suez Canal	1.036 (0.046)	0.973 (0.057)	1.042 (0.050)	0.959 (0.058)	1.132 (0.076)	1.067 (0.082)
Urban Lower Egypt	1.196*** (0.056)	1.222*** (0.064)	1.075 (0.069)	1.061 (0.081)	1.155 (0.091)	1.185 (0.108)
Urban Upper Egypt	1.199*** (0.056)	1.126* (0.060)	1.085 (0.070)	0.973 (0.077)	1.052 (0.086)	0.892 (0.086)
Rural Lower Egypt	1.372*** (0.057)	1.438*** (0.069)	1.195* (0.085)	1.189* (0.100)	1.264** (0.111)	1.225* (0.125)
Rural Upper Egypt	1.503*** (0.071)	1.459*** (0.080)	1.376*** (0.100)	1.266** (0.110)	1.185 (0.107)	1.024 (0.109)
No. of sisters	0.997 (0.007)	1.017* (0.008)	0.997 (0.007)	1.017* (0.008)	1.001 (0.008)	1.005 (0.010)
No. of brothers	1.015 (0.008)	0.991 (0.008)	1.014 (0.008)	0.990 (0.008)	1.003 (0.010)	1.006 (0.011)
Mother's education (illiteracy omitted)						
Read and write	1.101* (0.044)	0.938 (0.045)	1.130** (0.048)	0.928 (0.045)	1.071 (0.060)	1.004 (0.055)
Less than intermediate	0.947 (0.048)	0.806*** (0.046)	0.966 (0.052)	0.818*** (0.046)	0.964 (0.052)	0.984 (0.063)
Intermediate and above	1.042 (0.057)	0.962 (0.065)	1.020 (0.062)	0.973 (0.068)	1.049 (0.054)	1.129 (0.079)
Father's education (illiteracy omitted)						
Read and write	0.960 (0.033)	0.965 (0.035)	0.967 (0.033)	0.960 (0.034)	0.979 (0.045)	0.973 (0.044)
Less than intermediate	0.909* (0.040)	0.838*** (0.038)	0.915* (0.041)	0.837*** (0.038)	0.963 (0.049)	0.894 (0.058)
Intermediate	0.970 (0.052)	0.922 (0.055)	0.958 (0.054)	0.913 (0.055)	0.944 (0.059)	0.864 (0.068)
Higher education	0.902 (0.061)	0.791** (0.059)	0.904 (0.065)	0.792** (0.060)	0.959 (0.075)	0.890 (0.081)
Father's work (public wage omitted)						
Private wage	0.988 (0.036)	0.913* (0.036)	0.997 (0.036)	0.929 (0.037)	0.931 (0.038)	0.986 (0.048)
Self-employed/employer	1.047 (0.037)	0.996 (0.039)	1.042 (0.037)	1.000 (0.039)	0.990 (0.040)	1.050 (0.048)
Unpaid FW/no job	1.473 (0.346)	1.112 (0.193)	1.445 (0.306)	1.257 (0.163)	0.940 (0.246)	1.118 (0.161)
Father's occupation (manager omitted)						
Clerical/sales	0.950 (0.049)	0.983 (0.051)	0.939 (0.048)	0.961 (0.050)	0.915 (0.057)	1.057 (0.062)
Production, non-agricultural	1.012 (0.037)	0.961 (0.039)	0.990 (0.037)	0.945 (0.038)	0.979 (0.044)	1.001 (0.049)
Agricultural	0.998 (0.040)	1.069 (0.044)	0.982 (0.039)	1.039 (0.042)	1.028 (0.051)	0.914 (0.049)

Table 2 continues

Table 2: Cox proportional hazard models for time to marriage, Egypt (continued)

	Exog		Endog		W/ marr outcomes	
	Females	Males	Females	Males	Females	Males
64-Age	0.979*** (0.005)	0.972*** (0.005)	0.980*** (0.005)	0.976*** (0.005)	0.837*** (0.030)	0.645*** (0.030)
Square of 64-Age / 100	1.054*** (0.011)	1.088*** (0.013)	1.045*** (0.011)	1.078*** (0.013)	1.453*** (0.071)	2.446*** (0.172)
Females per 100 males (5 yrs older)	0.999 (0.001)	0.997* (0.001)	0.998 (0.001)	0.996** (0.001)	0.998 (0.001)	0.996* (0.001)
Rental housing						
% of rent in all housing and M born 1972+ F born 1977+ (SD)			1.074* (0.038)	1.111* (0.046)	1.148 (0.088)	1.107** (0.042)
% of new in rent and M born 1972+ F born 1977+ (SD)			1.108** (0.036)	1.094* (0.041)	1.180* (0.083)	1.102*** (0.028)
% of new in rent (SD)			1.046 (0.025)	1.044 (0.030)	0.901 (0.062)	
% of rent in all housing (SD)			0.979 (0.030)	0.930* (0.034)	0.887 (0.067)	
Employed			1.073 (0.043)	3.131*** (0.259)	1.017 (0.046)	3.016*** (0.381)
Employed in a good job			1.158** (0.061)	1.281*** (0.039)	1.245*** (0.077)	1.145*** (0.042)
In school			0.250*** (0.015)	0.766*** (0.054)	0.416*** (0.025)	0.853 (0.083)
Duration of migration (months)				1.003 (0.006)		1.011 (0.015)
Returned migrant				0.705*** (0.045)		0.641*** (0.072)
Spouse education (same omitted)						
Spouse less educated					0.903** (0.031)	1.101* (0.044)
Spouse more educated					0.966 (0.037)	0.732*** (0.033)
Spouse ed. miss.					0.991 (0.048)	0.771 (0.168)
Father's rel. education (same omitted)						
Own father less educated					0.978 (0.035)	0.962 (0.035)
Own father more educated					1.060 (0.043)	1.017 (0.049)
Marriage outcomes						
Nuclear residence					0.861*** (0.026)	0.817*** (0.029)
Consanguineous					1.202*** (0.037)	1.151*** (0.042)
Bride share					0.999 (0.001)	0.997* (0.001)
Christian					0.904 (0.053)	1.024 (0.078)
Log of total costs					0.875*** (0.014)	0.819*** (0.016)
Household wealth score						
Value of livestock						
Value of land						

Source: Authors' calculations based on ELMPS (2012).

Table 3: Cox proportional hazard models for time to marriage, Morocco

	Exog		W/ marr outcomes	
	Females	Males	Females	Males
Own education (illiteracy omitted)				
Less than primary	0.714*** (0.055)	0.887 (0.063)	0.843* (0.060)	0.848* (0.065)
Primary	0.692*** (0.065)	0.645*** (0.057)	0.740*** (0.057)	0.643*** (0.059)
College	0.535*** (0.051)	0.643*** (0.066)	0.605*** (0.053)	0.682*** (0.071)
Secondary	0.488*** (0.063)	0.622** (0.091)	0.528*** (0.048)	0.680** (0.081)
Higher education	0.423*** (0.068)	0.638** (0.097)	0.445*** (0.078)	0.577*** (0.086)
Rural	1.165* (0.071)	1.645*** (0.104)	1.215** (0.072)	1.238*** (0.078)
64-Age	1.004 (0.011)	0.984 (0.011)	0.975* (0.012)	0.940*** (0.012)
Square of 64-Age / 100	0.913*** (0.024)	0.937* (0.026)	1.062* (0.028)	1.199*** (0.035)
Spouse's education (same omitted)				
Spouse less educated			0.925 (0.113)	1.215** (0.085)
Spouse more educated			0.754** (0.070)	0.789** (0.064)
Spouse ed. miss.			0.902 (0.066)	0.965 (0.108)

Source: Authors' calculations based on MHYS (World Bank, 2010).

Table 4: Cox proportional hazard models for time to marriage, Tunisia (urban)

	Exog		w/ Marr outcomes	
	Females	Males	Females	Males
Own education (illiteracy omitted)				
Read and write	1.011 (0.084)	1.113 (0.114)	0.954 (0.083)	0.900 (0.094)
Six years of primary	1.193** (0.074)	1.108 (0.088)	1.109 (0.070)	0.890 (0.077)
Nine years of primary	1.131 (0.073)	0.997 (0.083)	0.969 (0.064)	0.725*** (0.070)
Institute	1.019 (0.080)	1.108 (0.092)	0.949 (0.065)	0.721*** (0.063)
Higher education	0.793*** (0.046)	0.952 (0.078)	0.734*** (0.044)	0.668*** (0.062)
Region (Tunis omitted)				
North East	1.240*** (0.074)	1.070 (0.070)	1.154* (0.064)	1.000 (0.065)
North West	0.885 (0.059)	1.038 (0.074)	0.942 (0.061)	1.012 (0.074)
Central	1.176* (0.085)	1.265** (0.098)	1.213** (0.079)	1.249** (0.094)
Sahel	1.173** (0.072)	1.378*** (0.092)	1.076 (0.063)	1.257** (0.089)
South	1.133* (0.064)	1.095 (0.066)	1.220*** (0.068)	1.110 (0.066)
64-Age	0.975** (0.008)	0.989 (0.011)	0.948*** (0.008)	0.941*** (0.013)
Square of 64-Age / 100	0.974 (0.018)	0.907*** (0.025)	1.124*** (0.022)	1.194*** (0.043)
Spouse's education (same omitted)				
Spouse less educated			0.939 (0.048)	1.185** (0.065)
Spouse more educated			1.082 (0.053)	0.810*** (0.051)
Spouse ed. miss.			0.884 (0.069)	0.771** (0.073)

Source: Authors' calculations based on NSHY.

Table 5: Marriage outcomes in Egypt

	Consanguinity		Nuclear residence		Log total costs		Bride's share		Female age difference	
	Exog.	Endog.	Exog.	Endog.	Exog.	Endog.	Exog.	Endog.	Exog.	Endog.
Christian	-0.029 (0.133)	0.090 (0.138)	0.261 (0.136)	0.317* (0.142)	-0.097 (0.097)	-0.104 (0.093)	-0.609 (2.018)	-1.289 (1.974)	0.017 (0.549)	0.196 (0.539)
Own education (illiteracy omitted)										
Read and write	-0.126 (0.191)	-0.157 (0.212)	-0.128 (0.188)	-0.220 (0.208)	0.076 (0.128)	0.094 (0.129)	1.961 (2.335)	1.882 (2.560)	-0.155 (1.076)	0.177 (1.027)
Primary	0.173 (0.131)	0.126 (0.135)	0.147 (0.131)	0.172 (0.139)	0.225* (0.097)	0.263** (0.098)	0.931 (1.447)	0.937 (1.582)	-0.617 (0.677)	-0.814 (0.621)
Preparatory	0.126 (0.135)	0.064 (0.143)	0.274* (0.119)	0.218 (0.132)	0.362*** (0.092)	0.391*** (0.095)	3.267* (1.441)	3.176* (1.577)	0.384 (0.566)	-0.011 (0.519)
Secondary	0.073 (0.089)	0.088 (0.113)	0.303*** (0.089)	0.317** (0.107)	0.478*** (0.066)	0.524*** (0.074)	1.505 (1.050)	2.102 (1.254)	-0.651 (0.496)	-0.223 (0.530)
Post-Secondary institution	0.039 (0.160)	-0.077 (0.191)	0.229 (0.156)	0.105 (0.184)	0.580*** (0.110)	0.645*** (0.120)	3.878* (1.685)	3.591* (1.789)	-2.123*** (0.621)	-1.119 (0.657)
University and above	-0.237* (0.114)	-0.138 (0.153)	0.515*** (0.112)	0.457** (0.140)	0.659*** (0.072)	0.713*** (0.086)	1.857 (1.270)	2.402 (1.625)	-1.445** (0.535)	-0.382 (0.639)
Birth region (Greater Cairo omitted)										
Alexandria and Suez Canal	0.055 (0.157)	0.059 (0.170)	0.029 (0.169)	0.076 (0.187)	-0.047 (0.087)	-0.105 (0.091)	-2.761* (1.343)	-1.628 (1.447)	-0.664 (0.481)	-0.600 (0.454)
Urban Lower	-0.059 (0.143)	-0.289 (0.197)	-0.221 (0.140)	-0.068 (0.221)	0.017 (0.081)	-0.050 (0.105)	0.418 (1.334)	3.826 (2.026)	-0.716 (0.504)	-0.856 (0.490)
Urban Upper	0.412** (0.139)	0.089 (0.201)	-0.463*** (0.139)	-0.231 (0.223)	-0.360*** (0.093)	-0.450*** (0.114)	-3.732* (1.572)	0.015 (2.460)	0.897 (0.583)	0.846 (0.570)
Rural Lower	0.231 (0.121)	-0.210 (0.214)	-0.485*** (0.122)	-0.273 (0.238)	0.175* (0.074)	0.079 (0.111)	-0.843 (1.225)	3.854 (2.265)	0.000 (0.467)	-0.117 (0.441)
Rural Upper	0.757*** (0.131)	0.309 (0.217)	-0.976*** (0.128)	-0.731** (0.238)	-0.363*** (0.083)	-0.472*** (0.122)	-7.994*** (1.250)	-3.190 (2.340)	0.497 (0.553)	0.426 (0.564)
No. of sister	-0.013 (0.018)	0.001 (0.019)	0.003 (0.019)	-0.007 (0.020)	-0.011 (0.012)	-0.013 (0.012)	-0.070 (0.217)	-0.050 (0.221)	-0.034 (0.084)	-0.016 (0.082)
No. of brothers	0.021 (0.021)	0.029 (0.023)	0.010 (0.020)	0.021 (0.022)	0.016 (0.013)	0.014 (0.012)	0.037 (0.242)	0.230 (0.247)	-0.018 (0.089)	0.028 (0.086)
Mother's education (illiteracy omitted)										
Read and write	0.087 (0.113)	0.104 (0.121)	-0.015 (0.113)	0.043 (0.120)	0.050 (0.078)	0.023 (0.074)	2.232* (1.086)	2.835* (1.135)	-0.100 (0.357)	-0.083 (0.360)
Less than intermediate.	-0.036 (0.123)	-0.025 (0.135)	-0.334** (0.126)	-0.303* (0.134)	0.145* (0.069)	0.124 (0.069)	2.254 (1.190)	2.589* (1.269)	0.554 (0.365)	0.756* (0.372)
Intermediate and above	-0.082 (0.130)	-0.093 (0.135)	0.132 (0.121)	0.182 (0.131)	0.155* (0.071)	0.129 (0.069)	1.502 (1.361)	1.767 (1.424)	0.895* (0.446)	0.889* (0.434)

Table 5 continues

Table 5: Marriage outcomes in Egypt (continued)

	Consanguinity		Nuclear residence		Log total costs		Bride's share		Female age difference	
	Exog.	Endog.	Exog.	Endog.	Exog.	Endog.	Exog.	Endog.	Exog.	Endog.
Father's education (illiteracy omitted)										
Read and write	0.059 (0.084)	0.129 (0.098)	0.032 (0.083)	0.070 (0.098)	-0.002 (0.063)	0.020 (0.062)	-0.163 (0.894)	-0.749 (1.016)	0.176 (0.330)	0.067 (0.339)
Less than intermediate.	0.053 (0.114)	0.133 (0.137)	0.157 (0.099)	0.201 (0.122)	0.041 (0.069)	0.092 (0.079)	0.201 (1.129)	0.520 (1.343)	-0.450 (0.345)	-0.469 (0.404)
Intermediate	0.123 (0.121)	0.146 (0.145)	0.193 (0.122)	0.191 (0.142)	0.054 (0.077)	0.093 (0.086)	-1.144 (1.367)	-0.434 (1.600)	-0.259 (0.399)	-0.470 (0.469)
Higher education	0.072 (0.164)	0.127 (0.192)	0.552** (0.170)	0.530** (0.197)	0.249* (0.102)	0.306** (0.104)	1.138 (1.914)	1.313 (1.875)	-0.098 (0.706)	-0.460 (0.804)
Father's work (public wage omitted)										
Private wage	0.149 (0.088)	0.183* (0.093)	0.077 (0.088)	0.091 (0.095)	-0.035 (0.055)	-0.035 (0.053)	-0.642 (0.982)	-1.193 (0.950)	-0.088 (0.328)	-0.070 (0.319)
Self-employed/employer	0.173* (0.085)	0.159 (0.091)	0.153 (0.089)	0.132 (0.096)	0.044 (0.055)	0.039 (0.054)	0.605 (1.138)	-0.185 (0.960)	0.024 (0.324)	-0.012 (0.317)
Father unpaid FW/no job	0.320 (0.495)	0.384 (0.549)	-0.134 (0.519)	-0.263 (0.594)	0.093 (0.272)	0.125 (0.291)	0.746 (6.559)	-3.486 (6.202)	0.448 (1.172)	0.916 (0.916)
Father's occupation (manager omitted)										
Clerical/sales	0.047 (0.120)	0.068 (0.127)	0.022 (0.129)	-0.006 (0.138)	0.042 (0.068)	0.036 (0.067)	-0.406 (1.234)	-0.236 (1.292)	1.851* (0.885)	1.912* (0.869)
Production, non-agricultural	-0.063 (0.095)	-0.132 (0.102)	0.051 (0.101)	0.029 (0.108)	-0.046 (0.059)	-0.049 (0.057)	-1.155 (1.072)	-0.636 (1.114)	0.446 (0.432)	0.481 (0.428)
Agricultural	0.067 (0.103)	-0.008 (0.110)	-0.153 (0.106)	-0.114 (0.114)	-0.057 (0.065)	-0.064 (0.063)	-2.326* (1.158)	-1.959 (1.187)	0.072 (0.519)	0.082 (0.517)
Females per 100 males (5 yrs older)	0.009*** (0.002)	0.005 (0.003)	-0.004 (0.002)	-0.003 (0.003)	0.002 (0.002)	0.002 (0.002)	-0.065 (0.035)	-0.052 (0.033)	0.012 (0.011)	0.006 (0.011)
Nuclear residence		-0.280*** (0.069)				0.094* (0.043)		0.288 (0.761)		1.163*** (0.250)
Bride share		-0.001 (0.002)		0.001 (0.002)		-0.001 (0.001)				-0.002 (0.008)
Log total costs		0.030 (0.041)		0.089* (0.039)				-0.491 (0.439)		
Age at marriage		-0.167* (0.071)				0.160** (0.049)		-0.845 (0.834)		-2.332*** (0.374)
Age at marr. sq/100		0.267 (0.149)				-0.345*** (0.104)		1.688 (1.781)		4.622*** (0.846)

25

Table 5 continues

Table 5: Marriage outcomes in Egypt (continued)

	Consanguinity		Nuclear residence		Log total costs		Bride's share		Female age difference	
	Exog.	Endog.	Exog.	Endog.	Exog.	Endog.	Exog.	Endog.	Exog.	Endog.
% of rent in all housing and M born 1972+ F born 1977+ (SD)		-0.761 (0.395)		0.275 (0.276)		0.126 (0.278)		-3.621 (4.242)		
% of new in rent and M born 1972+ F born 1977+ (SD)		-0.289 (0.373)		0.616* (0.309)		0.211 (0.311)		-3.195 (5.043)		
% of new in rent (SD)		0.328 (0.372)		-0.578 (0.308)		-0.249 (0.310)		2.618 (5.035)		
% of rent in all housing (SD)		0.592 (0.395)		-0.180 (0.278)		-0.209 (0.279)		5.273 (4.195)		
Spouse's education (same omitted)										
Spouse less educated		0.202* (0.080)		0.103 (0.078)		-0.065 (0.050)		0.266 (0.901)		-0.142 (0.274)
Spouse more educated		0.035 (0.091)		0.135 (0.089)		0.162** (0.055)		0.949 (0.946)		-0.008 (0.368)
Spouse ed. miss.		0.018 (0.110)		-0.246* (0.113)		0.097 (0.072)		-0.557 (1.112)		4.264* (1.703)
Father's rel. ed. (same omitted)										
Own father less educated		-0.022 (0.086)		-0.015 (0.085)		0.074 (0.050)		-0.940 (0.889)		-0.645* (0.278)
Own father more educated		-0.032 (0.099)		-0.014 (0.097)		-0.084 (0.060)		-0.799 (1.042)		-0.229 (0.339)
Consanguinity				-0.312*** (0.069)		0.029 (0.044)		-0.567 (0.748)		-0.596* (0.232)
Constant	-2.188*** (0.316)	0.690 (0.971)	1.096*** (0.323)	-0.119 (0.561)	9.983*** (0.219)	8.174*** (0.604)	45.481*** (4.541)	55.249*** (11.419)	4.547** (1.750)	32.652*** (4.316)
N (Observations)	3396	2985	3396	2985	2985	2985	3396	2985	3098	3098
Pseudo R-Squared	0.081	0.114	0.120	0.145						
R-Squared					0.216	0.238	0.082	0.086	0.036	0.089

Source: Authors' calculations based on ELMPS 2012

Table 6: Marriage outcomes, Morocco

	Female age difference		Nuclear residence
	Exog.	w/ Marr outcomes	Exog.
Own education (illiteracy omitted)			
Less than primary	0.791 (0.494)	0.840 (0.498)	-0.100 (0.191)
Primary	1.842** (0.622)	1.817** (0.629)	-0.031 (0.214)
College	0.696 (0.710)	0.613 (0.732)	-0.445 (0.254)
Secondary	-1.047 (1.095)	-1.176 (1.103)	0.173 (0.352)
Higher education	-1.354 (1.483)	-1.502 (1.500)	0.306 (0.596)
Rural	-0.868* (0.379)	-0.797* (0.384)	-0.326* (0.163)
64-Age	-0.531** (0.188)	-0.515** (0.188)	-0.063 (0.082)
Square of 64-Age / 100	0.516 (0.379)	0.490 (0.379)	0.159 (0.155)
Spouse's education (same omitted)			
Spouse less educated		0.249 (1.045)	
Spouse more educated		-1.217* (0.606)	
Constant	16.885*** (2.276)	16.690*** (2.279)	0.887 (1.115)
N (Observations)	1411	1411	316
Pseudo R-squared			0.032
R-squared	0.054	0.057	

Source: Authors' calculations based on MHYS (World Bank, 2010).

Table 7: Marriage outcomes, Tunisia (urban)

	Female age difference		Nuclear residence	
	Exog	w/ Marr outcomes	Exog	w/ Marr outcomes
Own education (illiteracy omitted)				
R&W	-0.909*	-0.824*	0.566	1.119
	(0.371)	(0.373)	(0.405)	(0.653)
Six years of primary	-0.241	-0.355	0.108	0.545
	(0.275)	(0.280)	(0.267)	(0.339)
Nine years of primary	-0.179	-0.374	0.012	0.014
	(0.299)	(0.312)	(0.258)	(0.306)
Institute	0.578	0.389	-0.003	0.216
	(0.387)	(0.396)	(0.301)	(0.374)
Higher education	-0.160	-0.671	-0.053	0.208
	(0.319)	(0.344)	(0.243)	(0.316)
Region (Tunis omitted)				
North East	1.088***	1.050**	-0.374	-0.675*
	(0.330)	(0.329)	(0.264)	(0.326)
North West	0.881*	0.799*	-0.635*	-0.828*
	(0.356)	(0.356)	(0.269)	(0.337)
Central	-0.543	-0.473	-0.579*	-0.716*
	(0.360)	(0.359)	(0.268)	(0.349)
Sahel	-0.185	-0.253	-0.510*	-0.394
	(0.294)	(0.294)	(0.229)	(0.301)
South	0.577*	0.546	-0.555*	-0.770**
	(0.291)	(0.290)	(0.226)	(0.288)
Age at marriage	-1.421***	-1.419***	0.126	0.114
	(0.112)	(0.111)	(0.075)	(0.093)
Age at marriage Sq/100	2.190***	2.180***	-0.204	-0.153
	(0.205)	(0.205)	(0.118)	(0.149)
Spouse's education (same omitted)				
Spouse less educated		-0.038		-0.404*
		(0.264)		(0.204)
Spouse more educated		-0.945***		0.064
		(0.231)		(0.251)
Spouse ed. miss.		-1.744		-3.125***
		(1.384)		(0.343)
Constant	26.926***	27.501***	-0.405	-0.057
	(1.472)	(1.475)	(1.164)	(1.447)
N (Observations)	2926	2926	526	526
Pseudo R-squared			0.037	0.378
R-squared	0.109	0.115		

Source: Authors' calculations based on NSHY.

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