THE DETERMINANTS OF YOUNG WOMEN'S VALUE IN THE MARRIAGE MARKET: THE ROLE OF EDUCATION

Dina Abdel Fattah*

Working Paper no. 197
September 2018

*Assistant Professor, Department of Economics, the American University in Cairo.

Abstract

The unique nature of marriage in the Arab region has generated a range of stylized facts that may not be very pertinent to Western societies. An example of which is the importance of marriage itself, the problematic delay in marriage as well as the costs accompanying marriage. These issues have all been relevant to the Arab world but not as germane to most of the Western world. The analysis in this paper reinforces the role of the marriage market in explaining the low participation of females in the labour market, in addition to the role of the socially popular phenomena of circumcision and kinship marriage.

ملخص

أدت الطبيعة الفريدة للزواج في المنطقة العربية إلى خلق مجموعة من الحقائق الخاصة بها التي قد لا تكون ذات صلة بالمجتمعات الغربية. ومن أمثلة ذلك، أهمية الزواج نفسه، والتأخر الإشكالي في الزواج، فضلا عن التكاليف المرتبطة به. جميع هذه القضايا ترتبط بالعالم العربي ولكنها ليست وثيقة الصلة بمعظم العالم الغربي. في هذا الإطار، تؤكد هذه الدراسة على الدور الذي يلعبه سوق الزواج في تفسير تدني مشاركة الإناث في سوق العمل، بالإضافة إلى دور الظواهر الاجتماعية الشعبية متمثلة في الختان وزواج الأقارب.

Keywords: Egypt, Young women, marriage, returns to education

JEL classifications: I26, J12,

1. INTRODUCTION

The unique nature of marriage in the Arab region has generated a range of stylized facts that may not be very pertinent to Western societies. An example of which is the importance of marriage itself, the problematic delay in marriage as well as the costs accompanying marriage. These issues have all been relevant to the Arab world but not as germane to most of the Western world.

The cost of marriage is one particular aspect relevant to marriages in the Arab region and Egypt in specific. The different costs of marriage comprise the cost of housing, the bride-price "The Mahr," the accommodation furnishings, the ceremonies and the jewellery. Any increase or decrease in the value of the different components should automatically be reflected in the overall cost of marriage.

The cost of jewellery is one of the most unique components of the overall cost of marriage. Other components of the cost of marriage (e.g., the cost of housing, furnishings and ceremonies) can all be shared between the families of the groom and the bride. The couple could live with their in-laws to avoid housing costs.[1] Moreover, the families could agree to forgo the Mahr to reduce the overall cost of marriage.[2]

Jewellery is considered a gift by the groom to the bride, where the former determines its value. The families of the bride and the groom are equally proud of the amount of money invested in the jewellery gift and they socially share it with friends and family, and even strangers. On the one hand, the amount of money invested in the jewellery presented to the bride is a reflection of the financial and social status of the groom. On the other hand, this amount of money and accordingly the value of the jewellery, presented for the direct use of the bride, is a reflection of how much the groom values the bride. The value of the Jewellery can increase or decrease, depending on a number of factors among which are the financial ability of the groom, the social class of both the groom and the bride, and how much the groom values the bride.

The cost of marriage, including the jewellery cost, has been interpreted in the economic literature for the Middle East as a factor delaying marriage. Accordingly, the mainly descriptive literature has for long treated it as an important determining variable explaining

[1] Thirty-five percent of the entire sample of married females live with parents or in-laws in the current data

[2] Avoiding the Mahr is socially acceptable if the cost of furnishings and ceremonies is shared between the couples and their families or if the Mahr is substituted by a larger investment allocated to the other components.

the “delayed” marriage for men in the Arab region. Another dimension well covered in the available literature on the cost of marriage in Egypt, are the attributes of a groom to be or a bride to be, as opposed to their parents, which determines their own proportional contribution to the cost of marriage.

However, little research attention has been devoted to the overall, as well as the different components of the marriage costs. In particular, none has attempted to explain the determinants of the cost of jewellery, being the most unavoidable component of the total cost of marriage. Several factors play a role in determining the value of jewellery, one of which is how the husband values the bride. Therefore, it is believed that the cost of jewellery is a determinant of the valuation of the female in the marriage market.

This paper explores the attributes and the characteristics of females that increase or decrease this cost of jewellery at marriage, and consequently women's value in the marriage market. In other words, it aims to determine what makes a young female an attractive proposition in the Egyptian marriage market as reflected in the value of jewellery offered by the groom.

Attempting to find responses to the above question, the Survey of Young People in Egypt (SYPE09)[3] is used to analyse the determinants of the cost of jewellery (COJ) using the reported real cost of jewellery, focusing on a sample of young females, aged 15-29 years.[4] The selected subset starts with those aged 15 years, even though young people are defined as individuals from the age of ten, but a female under the age of 15 is socially considered not marriageable due to her young age.

The analysis investigates first the determinants of the marriage prospects of young women moving on to their marriage valuation. The main focus of this analysis is the degree of comparability between the marriage market and the labour market for young women. Are there returns to human capital in the marriage market for women and how do they compare to the returns in the labour market? Investments in human capital are considered rewarding if they bring returns in the labour market and the size of expected earnings. However, parents

[3] The 2009 Survey of Young People in Egypt (SYPE09) is the first Egyptian survey tailored for young people. SYPE is a nationally representative survey of young people in Egypt between the ages of 10 and 29. The survey was carried out by the National Population Council, Central Agency for Public Mobilization and Statistics (CAPMAS) and the Information and Decision Support Centre (IDSC).

[4] Even though the legal age at marriage for females has been raised in 2008 to 18 years, child marriage is still prevalent in Egypt, and a number of females presented in the survey between the ages of 15 and 18 are already married.

invest in their daughters' education despite of the low level of participation in the labour market. There has to be another form of realised rewards for the females and their parents. Therefore, comparing the returns to investments in females' human capital in the marriage market and the labour market gives an insight into the degree of substitutability or complementarity between the two markets for females.

Using available data and empirical results, calculation of returns to investments in education in the marriage market is allowed. Although the estimated model does not allow for the calculation of similar returns in the labour market, the Egyptian labour market literature is very rich in this topic, and therefore the numbers are extracted from most recent work on the topic in Egypt and the rates of return to investments in education in the two markets are compared.

Another important focus is on validating the social beliefs regarding the marriage valuation of young women in addition to the relationship between kinship marriage as well as circumcision on the marriage prospects of young women.

The estimated model adds to the available literature on the economics of young people, and more specifically young women as it provides insights into the the degree of substitutability/complementarity between the labour and the marriage markets. This explains the equal attractiveness of the marriage market and the labour market to females.

This paper is divided into six sections. Section 2 presents the literature review and Section 3 discusses the data used, variables definition and summary statistics. Section 4 then outlines the methodology. Section 5 details the empirical results and Section 6 concludes.

2. LITERATURE REVIEW

Economic theories have long focused on the probability of marriage and factors determining that probability. Applying economic theories to the institution of marriage originally started with the work of Becker in 1973.[5] Prior to that, marriage was mostly studied from a sociological or anthropological perspective.

Beyond Becker's contribution, theorists started to discover economic explanations linked to marriage. They attempt to explain how economic resources will either ease or hinder the process (for example see: Paul Glick's (1988) on the 'marriage squeeze'). They further

[5] Becker's theories are considered among the first economic theories of marriage concerned with couple formation and dissolution.

discuss how wage opportunities drive female preferences for the labour market over the marriage market.

A different strand of literature discusses the costs of marriage, specifically in the context of cohabitation and exit from marriage. Wydick (2004), Chiappori, iyigun, and weiss (2005) and Dnes and Rowthorn (2002) have discussed how the costs of exiting a marriage play a significant role in the decision to choose between marriage and cohabitation.

The cost of marriage comprises a number of components including the bride price (*mahr*) and the jewellery. The burden of the costs and sharing it between the families of the brides and the grooms is highly guided by culture. Bride prices, the transfer of costs from the family of the groom to the family of the bride, is the more prevailing form of marriage transfers in the Egyptian culture.

Among the determinants of bride price vs dowry is the role of women in the society. Historically, bride price has been more common in societies with active role of women in agriculture (Anderson 2007). These transfers from the groom and his family to the bride and her family are common in societies where polygyny and divorce are allowed.

More ancient literature on the study of bride prices show that the value of the bride price is culturally linked to the "right to labour and reproductive capabilities" (Anderson 2007). Quale (1988) and Goody (1973) further argue that the size of the marital transfer is related to the number of rights acquired at marriage rather than the wealth of the families. Further characteristics of the marriage and the bride that affect the size of the marital transfer is the marriage to a paternal cousin vs a distant relative, in addition to the expected number of children a woman will bear (Bianquis 1996).

Anderson (2007) further classifies bride price into transfers from the groom's family going to the bride's family (bride price) and those going to the bride herself (dower). The dower remains under the ownership of the couple but are considered a formal property of the wife throughout the marriage.

Bishai and Grossbard (2007) show that a strong determinant of the bride price is wife's fidelity at marriage and the lack of non-marital sexual relationships. Therefore, the wife's qualities are considered the main determinants of the size of the bride price. Anderson (2007) further shows that the wife's characteristics further determines the size of the dower being the direct transfer to the property of the wife herself.

In the Egyptian culture, a main and direct component of a dower is the value of the jewelry that remains the property of the wife throughout marriage. Anderson (2007) links the transfers from the grooms' families to the brides' or their families, in the form of dower and bride price, respectively, to the value of the brides' productivity and contribution to marriage reflecting on women's welfare.

Despite the existing availability of empirical research dealing with marriage outcomes in the Arab world at large and Egypt in particular, similar empirical work on the marriage costs is scarce. There is generally only descriptive analysis available on this topic.

Abdel Kader, Mohamed, and Nuwar (2006) argue that savings for marriage is a major component of the budgets of the working young, particularly women. Using the Egyptian Labour Market Panel Survey (ELMPS[6]), Assaad and Krafft (2014) note that married couples spend an average of LE 4,000 (approximately 570 USD) on the jewellery given to the bride from the groom on their engagement. The jewellery varies from gold to diamonds depending on the social class and the characteristics of the bride as well as the financial capacity of the groom's family.[7]

Arab and Egyptian literature focuses more on the relationship between education and marriage, rather than cost. For instance, El Badawy (2007) suggests that better marriage prospects guide the decision to invest in the education of female children. The impact of education on postponing marriage has been widely discussed in the Egyptian literature (for example see Binzel and Assaad (2008), Rose (2001), Yabiku (2005) and Ghimire et al. (2006)).

In the previous context, education is expected to impact marriage costs through matching with the prospect of a husband with higher income (for example see Rose (2001) and El Badawy (2007)). Families of educated women aim for costlier marriages, believing that education has improved the value of the female in the marriage market. Assaad and Barsoum (2007) suggest that this is one of the main reasons for the increasing number of single educated females.

[6] ELMPS is a labour market survey by the Economic Research Forum (ERF) which started in 1988, with follow up rounds in 1998 and 2006 and lately in 2012. The ELMPS is representative of all Egyptian society with respect to age ranges. Therefore, the representation of young people in the sample is more limited compared to SYPE09.

[7] In the case of gold shabka, it is usually formed of a gold engagement ring, bracelets, necklaces and earrings. The diamonds shabka is made of a five stone engagement ring in addition to the main stone diamond ring. Depending on the social class, the jewellery is either gold or diamonds and within both groups the size and the value differs greatly.

On the other hand, the relationship between work and marriage, and how they interact, affect the transition of females to adulthood through marriage (Sieverding 2012). Whether or not employment improves the female marriage outcome has implications for their incentives to work and commit to the labour market. When employment opportunities for women are scarce, many of them look at marriage as the best road to economic security. Amin and Al Bassusi (2003) have discussed the role of female employment in expediting the marriage process. The financial contribution of a working female to the overall marriage cost is therefore one of the main incentives for female labour market participation.

Additionally, sorting and mating are believed to have an impact on costs of marriage. For example, kinship marriages, being popular among Arabs compared to Western societies (Hamamy 2012), are assumed to reduce the pressure on marriage costs. Assaad and Kraft (2014) show that kinship marriages remain popular, especially in rural areas,[8] given "the enforced stability and the higher compatibility between the couples and their families" (Hamamy 2012). Given the reduced uncertainties associated with the groom's financial position, kinship marriages are believed to reduce transaction costs of marriage and therefore expedite the process of marriage.

In contrast, Assaad and Kraft (2014) argue that it was not demonstrated empirically that "consanguineous marriages substantially shift the marriage cost" (p. 10). The trust, accompanying these marriages, allows for some of the household formation expenses to be deferred thus reducing the transaction cost of marriage. On the other hand, kinship marriages may contribute to increasing the cost of marriage due to the matching of the social and economic backgrounds between the two families. Therefore, the impact of consanguinity on the overall cost of marriage is unpredictable, with a strong assumption that it is likely to reduce the marriage cost.

Another important factor germane to the cost of marriage relates to the competition within the marriage market itself as captured by the sex ratio. Rao (1993) emphasizes the relationship between the demographic population growth and the marriage squeeze on the size and the inflation of the marital transfers. Using the ELMPS and discrete time duration models, Binzel and Assaad (2008) conclude that an increase in the sex ratios within a geographical area reduces the hazard of marrying (i.e., exiting the state of spinsterhood/ singlehood).

[8] In rural areas of Egypt, kinship marriages are so prevalent within some families, especially among families with shared businesses, that as soon as a girl is born, an agreement is entered into by her father that she would be wedded to someone among her uncles' sons.

Finally, the existing empirical literature on the cost of marriage (for example see El Badawy (2007), Hendy (2011) and Sieverding (2012)) has emphasized the importance of taking the selection into marriage into consideration.

The above discussion of the international and Egyptian literature suggests a dearth of empirical work on marriage and jewellery costs in the Arab world. This also represents a research gap and therefore lays the foundation for the main research questions that this analysis addresses.

3. DATA SAMPLE

The SYPE09, being the most comprehensive survey of young people in Egypt to date, collects data on young males and females aged 10-29. However, specific sections on marriage have only been administered to those married females aged 15-29. Although the legal age of marriage in Egypt is 18 years,[9] a considerable number of Egyptian females get married prior to that age (30 percent of the married females in the sample married before the age of 18). Therefore, the selected sample is inclusive of females marrying before the age of 18. Early marriages, although technically illegal, are taken into consideration here in the empirical analysis given their prevalence in Egypt.

The data has been thoroughly investigated in line with the available literature to identify the variable(s) responsible for reflecting the true value of women in the marriage market. The data mirrored the expectations regarding the public sharing of the different components of the cost of marriage. The variables on the cost of housing, furniture, mahr and other components were suffering from a great deal of missing values. The cost of jewellery, however, was largely present allowing for its use in the econometric model. This reasserts the willingness to share the cost of jewellery by both families due to the sense of pride it gives both families of the groom and the bride. Accordingly, both theoretical implications and data availability allow for the use of the cost of jewellery as the true reflection of the value of the young woman in the marriage market.

With a sample of size 7,559 females aged between 15 and 29 years, 7,021 of them report on their marital status and therefore classified as either married or unmarried. The selected sample only includes females in their first marriages.[1] The data reveal that only

[9] The legal marriage age in Egypt was 16 years old until the year 2008 when it was raised to 18. It is socially acceptable that females get married as soon as they hit puberty, and average puberty age for females in Egypt is between 12 and 15 years.

[1] Second and third marriages, if any, usually happen at an older age.

2,905 females have ever been married. Missing observations on a number of key variables (e.g., religion, employment and education at the time of marriage), as well as the jewellery costs, reduce the full sample to 6,121, with 2,288 of them married woman.

4. METHODOLOGY

The primary aim of the current analysis is to study the determinants of the valuation placed on young Egyptian females in the marriage market, using the log of the real cost of jewellery as a proxy. Given the continuous nature of the dependent variable, Ordinary Least Squares (OLS) is used for the purposes of modelling.

The selected sample includes females who have ever been married, including currently married or have been married in the past and are now either divorced or widowed. Therefore, the cost of jewellery is reported for these women.

The cost of jewellery is only realised for the married females who have already received their jewellery. For females who are not married, at the time of the survey, the cost of jewellery variable has missing values. Therefore, the impact of the different characteristics of the females on the jewellery cost can be estimated for the married females only. However, the main aim of the analysis, is to analyse the impact of the characteristics of the females on her realised marriage value as measured by jewellery costs.

Selection into marriage may be a potential source of bias for the empirical analysis, thus prompting our concern to correct for selection bias. In an attempt to estimate the cost of jewellery model for the whole range of young females, whether married or not, selection into marriage is taken into consideration. The variables impacting the probability of getting married could be the same explaining the variations in the cost of jewellery. Accordingly, sample selection could be present and therefore, the results could be subject to bias. Selection models rely on the existence of observable characteristics of females having an impact on the marriage probability but not the cost of jewellery, which are used as identifiers. In search for identifiers for the selection model, female circumcision is used. Female circumcision is found to significantly shift the marriage probability but not the log real cost of jewellery, hence its statistical suitability as an identifier in the current application.

Heckman's[1] (1974, 1978, 1979) two step estimation procedure for a continuous variable is used to incorporate the cost of jewellery paid with the decision to join marriage. The model assumes a correlation between the unobservables determining the decision to marry and those determining the cost of jewellery, where ρ represents the correlation between the unobservables in the selection and outcome equations. If $\rho \neq 0$, standard regression techniques applied to the regression equation yield biased results and this provides the central test for selection bias.

The Heckman's two-step estimation procedure comprises a probit first step selection equation for the marriage decision and a second step OLS outcome equation for the cost of jewellery, taking into consideration information regarding the selection into marriage from the previous first step of the procedure. The Inverse Mills Ratio (IMR), generally denoted by the term λ, is therefore a key factor in Heckman's sample selection model. The IMR represents the pseudo residuals from the marriage probit model.

The Heckman two-step procedure is described as follows:

Step 1: selection equation

$$Pr[Married=1]=\Phi(Z`\boldsymbol{\gamma})$$

where $\Phi(.)$ is the Cumulative Density Function (CDF) operator, Z is a vector of explanatory variables, γ is a vector of unknown parameters.

The estimated residuals from this probit model are then generated to construct the inverse Mills ratio (IMR or λ) term, which is used for testing for selection bias in the second stage outcome equation.

The cost of jewellery is observed only if the selection equation equals one (i.e., the marriage occurs). The second-stage regression model is estimated using OLS and contains a set of explanatory variables and the IMR from the selection equation. Therefore, the second stage provides the regression model with the estimated pseudo-residuals included as an

[1] The Maximum Likelihood Estimates (MLE) and the Heckman two-step procedure are the most common econometric methods used in such cases. The results for both methods have been calculated. However, for greater robustness of the results, the Heckman two-step procedure will be preferred over the MLE, given the procedure is generally found to be more stable.

explanatory variable to control for truncation. The significance of this selection term is the main indicator of any bias in the results resulting specifically from non-random selection into marriage based on unobservables.

Step 2: Outcome equation

$$\text{Log(Real COJ)} = \beta' X_i + \delta\lambda_i + e \qquad e \sim N(0, \sigma^2)$$

The estimation of the Heckman two stage models requires unique identifying variable(s) that shift the selection equation but not the outcome equation.

Given the nature of the dependant variable and what it represents (the real cost of jewellery), the residuals may be characterized by deviations from normality. If non-normality in the OLS residuals is detected, then a Quantile Median Regression (QMR) potentially provides a more appropriate empirical method.[1] [2]

5. VARIABLES AND SUMMARY STATISTICS

5-1 Dependant variable

Given the objective of this paper, the log of real cost of jewellery is the key dependent variable under study reflecting the real value of the young female in the marriage market.[1] Different factors play a role in identifying that cost, among which is the social status of the couples, the financial ability of the husband together with how the groom values the bride.

5-2 Independent variables

The list of independent variables used for modelling the cost of jewellery could be grouped into socioeconomic and demographic variables as well as marriage related variables. Variables reflecting the education level and the employment status of females are measured at the time of marriage for the married females. However, level of education and employment status for the unmarried females are measured as of current status at the time of the survey. With the exclusion of current students from the selected sample, females in the sample have either received no education at all or have received education in the past.

---

[1] The results for the QMR are reported for robustness checks.

[1] As previously discussed, the cost of jewellery is considered a significant unavoidable component of the overall cost of marriage.

The employment variable is constructed as a binary variable capturing whether the married and unmarried females were employed in the labour market at the time of marriage or at the time of the survey, respectively. A common feature in Egypt is the exceptionally low labour force participation of women. The key concern here is whether the female is employed or not employed (including the unemployed and the out of labour force).[1] 4

An educated female is generally considered a challenging match for grooms. In this context, education is expected to reduce the chances of a female in the marriage market, negatively affecting her marriage outcome. Rashad, Osman, and Roudi-Fahimi (2005) reveal that, recently, education has been associated with later marriages in Egypt. On the contrary, a groom appreciating the education outcome of the prospective bride, values her highly as compared to an uneducated or a lower educated bride, and thus increasing the value of the jewellery. Employment of a female, on the other hand, is less socially accepted in the Egyptian society. Therefore, it is expected to negatively impact both the marriage probability and the cost of jewellery.

The age of a female is believed to affect the value of the female in marriage, either through determining her chances of finding a husband or in determining her value at marriage. A female remaining outside of marriage for a longer period, regardless of the reasons, is confronted by different marriage circumstances.[1] 5

Sex ratios are calculated as the ratio of males to females at a certain place and point in time through information provided by the Egypt 2006 population census.[1] A buoyant marriage market with an abundance of males should present different marriage outcomes and costs resulting from competition between possible suitors. The variable is expected to have a positive impact on the marriage outcome and the value of the female in the marriage market. The existence of outliers is expected to affect the estimated results, therefore, the variable is log transformed to smooth the impact of any outliers on the estimation. This impact is mediated through increasing the chances of finding a suitor and increasing the competition between suitors, respectively. 6

[1] Accounting for the sector of employment has generated a small percentage in each separate group.

[1] Females usually postpone marriage for reasons that are related to education or career advancement.

[1] Population censuses take place every 10 years. It is believed that sex ratios don't show much change during the time between one census and the next. Therefore, the 2006 census sex ratios are representative for the 2009 period of the survey.

In the case that young people are currently residing at the same household with the parents, SYPE09 provides the background demographic and social characteristics on the parents. However, if young individuals, and females to be more specific, move to a different household especially upon marriage, information on the parents is lost. With a significant percentage of married females living on their own (65 percent), demographic information on the parents is therefore lost.

One of the survey variables, however, provides insights into different conditions confronting the parents, namely the nursery/ preschool enrolment for the female. The role of nursery/preschool enrolment is to capture parental opinions regarding a woman's future employment.

A mother, who is financially able to send her kids to nursery/ preschool, reflects two possible outcomes. First, a mother is concerned with early child development and encourages her daughter to continue education in order to avail of labour market job opportunities in the future. Second, the financial capacity signals the ability to pay for the fees of a nursery/ preschool (mostly private sector nursery/ preschools are dominating in Egypt) and may thus reflect an income effect. Consequently, this variable could either provide background information on parental attitudes or reflect the socio-economic status of the parents.

Another nation-wide phenomenon that is of high relevance to females and marriage in Egypt is circumcision. Female circumcision is a widespread phenomenon, where it is commonly believed that circumcision reduces the sexual desire of a female and thus is designed to preserve her virginity. Therefore, potential grooms and their mothers[1] may be looking for a circumcised woman to guarantee virginity and loyalty upon marriage. In this context, circumcision is expected to improve the chances of a female getting married. Its impact on the cost of jewellery, however, is ambiguous.

In addition to the cost of marriage in the Arab world, marriages in the Arab world are characterised by another unique feature in the matching process. In this sense, kinship marriages appear to be a prevalent form of marriage in the Arab world. The kinship marriage variable in the survey is represented by the degree of relationship (by blood) between the bride and the groom. The different relationships are first cousin, from either the mother's or father's side, or a distant relative. The available literature on kinship marriages review the

[1] In the case of an arranged marriage, the main factor that would convince the mother to introduce a potential bride to her son is if she is circumcised. Otherwise the mother may not even think she is a potential bride for her son.

presumed popularity of this form of marriage based on the contribution it has to lowering marriage risks and therefore costs (e.g., see Assaad and Kraft 2014; Hamamy 2012). Therefore, it is socially believed that kinship marriages have an impact on the transaction costs of marriage. However, no empirical work has previously investigated this relationship. Therefore, in the current context, kinship marriages are irrelevant in the marriage probability model. However, they are expected to negatively impact the cost of jewellery given their impact on transaction costs.

5-3 Summary statistics

Upon selecting the sample and the list of covariates of interest, some descriptive analysis is undertaken. Table 2 below provides the definitions and the data summary for the selected variables of interest for the full and the married samples of females separately. Table 1 reports the correlation coefficient between the different variables, the marriage probability and the cost of jewellery.

Human capital variables, defined in terms of education and employment are assumed to impact both the marriage outcome and the cost of jewellery. Females with a university degree are least likely to get married. However, they have the highest average cost of jewellery compared to other educational levels. This reveals either some sort of difficulty in finding good marriage opportunities, or in choosing to remain single and postpone marriage for career development. Nevertheless, once a marriage decision is taken, they are highly valued as compared to the other levels of education. A positive significant correlation between education and the marriage probability and a negative one with the cost of jewellery, supports a relationship between education, on the one hand, and marriage probability and cost of jewellery on the other.

In addition to education, the data show that females who are not employed or who are either unemployed or out of the labour force, are the most likely to get married. In a society that frowns upon female employment, non-employed females (88 percent of the sample) have a better chance of finding a suitor.

Kinship marriages are popular with around one-third of the females married to relatives. Nearly 60 percent of these are married to their first cousins from either parents' side. The data confirm Osman and Girgis (2009) observation, that kinship marriages are more popular in rural (38 percent) as opposed to urban areas (26 percent). Despite this, the cost of jewellery does not yield a significant difference between the different categories of kinship marriages.

Table A.2 indicates that the average cost of jewellery is relatively similar (Chi-squared value of 1.2) for females married to their first cousins, distant relatives or unrelated spouses. Given an insignificant correlation between the two variables, the statistical results reveal a lack of relationship between kinship marriage and the cost of jewellery.

Table 1. Correlation Coefficients of the Marriage Probability and the Cost of Jewellery with the Selected List of Variables

Variables	Married	Ln (real COJ)
No education	0.07***	-0.13***
Less than secondary	0.01	-0.13***
Secondary	0.04**	0.07***
Post-secondary	-0.13***	0.22***
Employed	-0.12***	-0.02
Urban	-0.06***	-0.02
Sex ratios	0.04***	0.03
Age	-0.25***	0.04**
Nursery	-0.02	0.1***
Muslm	0.03**	-0.03
Circumcised	0.23***	-
Kinship	-	-0.02

Source: Author's own calculations from SYPE09.

SYPE09 confirms the continued prevalence of female circumcision among the group of females (15-29), where 87.8 percent of Egyptian females in this age group are circumcised, with a highest occurrence in rural areas (63 percent). The negative significant (at the 1 percent level) correlation between circumcision and the age at marriage (for married females) and a positive with the current age of females (for the unmarried ones) suggests that circumcision was more important for marriage (in general) in the past, with the impact perhaps decreasing over time. This emphasises the role of the different NGOs and awareness campaigns against the presumed role of circumcision in expediting and securing marriages.

Sex ratios are assumed to be fairly constant from one population census to the next with an average close to 1.05. The distribution of sex ratios reveals two outlying governorates, which will be discussed later in this study. Looking at the average sex ratios with and without outliers, no significant difference in the average sex ratios is reported (1.05 and 1.04, respectively). A positive significant (at the 1 percent level) correlation with the marriage probability and insignificant correlation with the cost of jewellery, suggests a strong association with a marriage probability and an ambiguous one with the cost of jewellery.

About one-quarter of the interviewed females have previously been enrolled in a nursery or a preschool at some point during their earlier years. Around two-thirds of the females who have ever enrolled in nursery/ preschool reside in urban areas. Close to one-fifth (18 percent) of females previously enrolled in nursery/preschool are active members of the labour market and more than 40 percent of them have completed post-secondary or university education (as opposed to 14 percent for the females not enrolled in pre-education). This gives an impression that the families willing to send their daughters to nursery/preschool at a young age are the same ones willing to accept their daughter's participation in the labour market and achieving higher levels of education. A negative significant correlation and a Chi-squared value of 1.2 suggest a lack of a statistical relationship between nursery enrolment and the marriage outcome. On the other hand, a positive significant (at the 1 percent level) correlation and a Chi-squared value of 447.9 shows the strong statistical relationship with the cost of jewellery.

The descriptive analysis concludes different opposing impacts of education attainment on the marriage outcome and the cost of jewellery. Higher levels of education exert a lower impact on the marriage outcome and an upward one on the cost of jewellery. Additionally, an ambiguous relationship between the cost of jewellery, and circumcision and kinship marriages has been detected. The descriptive statistics have laid the foundation for an econometric analysis that permits the control of a variety of different factors when modelling the jewellery costs.

Table 2. Variables Definition and Summary Statistics

Variable	Description	Full sample	Married
		Mean	Mean
Log(real COJ)	The log of the real cost of jewellery (deflated by the GDP deflator for each year)	n/a	7.08 (0.81)
Married	=1 if the female was ever married, divorced, separated or widowed, =0 otherwise	0.45	1
Urban	=1 if the female lives in urban areas, =0 otherwise	0.44	0.37
Education			
No education	= 1 if the female has no education, =0 otherwise.	0.14	0.2
Less than secondary	=1 if the female has less than secondary degree, =0 otherwise.	0.31	0.28
Secondary	=1 if the female has a secondary degree[1] , =0 otherwise. [8]	0.33	0.4
Post-secondary	=1 if the female has post-secondary[1] , =0 otherwise. [9]	0.21	0.13
Employed at marriage	=1 if the female was employed at the time of marriage, =0 otherwise.	0.9	0.08
Circumcised	=1 if the female was circumcised as a child, =0 otherwise.	0.83	0.91
Sex ratios	The natural log of the ratio of males to females in each governorate, using the population census for the years 1986, 1996, and 2006	0.05 (0.05)	0.05 (0.05)
Nursery	=1 if the female was ever sent to a nursery/preschool, =0 otherwise.	0.32	0.23
Muslim	=1 if the female is Muslim, =0 otherwise.	0.97	0.97
Kinship	=1 if the female is married to a relative (direct cousin/distant relative) , =0 otherwise.	n/a	0.34
N		6121	2288

Notes: (a) The variables Ln real cost of jewellery and kinship marriage are only realised for the married females, therefore not available for the full sample (including the unmarried). (b) Standard deviations are only reported for the non-binary variables in the dataset.

[1] Secondary degree involves general secondary, Azhar secondary, international secondary or vocational secondary.

[1] A post-secondary degree is university, or post-graduate degree.

6. RESULTS

Following close examination of the data, variables that shift the marriage outcome but not the cost of jewellery have been explored and the circumcision variable is used for that purpose.[2]

6-1 Marriage Probit Models

The existing empirical work highlighted the role of economic and non-economic variables in shaping marriage probabilities in the Arab world. However, the role of society in mediating the relationship between the marriage probability, on the one hand, and economic and non-economic variables, on the other, has not been developed. Many variables appear to exert a direct impact on marriage probabilities.

The marriage selection model is informative of the determinants of marriage outcome for females aged between 15-29 years. The estimated results presented in Table 3 are generally in agreement with the hypothesised relationships between marriage outcome and the variables defining this choice.

Sex ratios and circumcision both significantly determine the marriage outcome. Both variables increase the probability of getting married for young Egyptian females. Education, at the lower and the higher levels of education, the probability of marriage falls as opposed to no education.

Table 3. The Probit Marriage Model

Variables	Probit Selection
Constant	-0.13 (0.108)
Less than secondary	-0.6*** (0.05)
Secondary	-0.34*** (0.05)
Post-secondary	-0.79*** (0.06)
Urban	0.04

[2] Attempts to look for other identifying variables among district level and demographic variables involved the use of female labour force participation rate at the governorate level, family size, and sibling number. These variables were found to be statistically insignificant in both the selection and the cost of marriage equations.

[2] See Table A.2 for the marginal and impact effects.

	(0.04)
Sex ratios	1.08***
	(0.29)
Nursery	-0.23***
	(0.04)
Muslim	0.07
	(0.09)
Circumcised	0.49***
	(0.05)
R-squared	0.06
N	6121
LR test	Chi2(8)=543.06

Note: (a) SE in parentheses and below their relevant coefficients. (b) Statistical significance level 10 percent *, 5 percent ** and 1 percent***.

Driven by the socially accepted relationship between circumcision and marriage, and motivated by tradition more than religion, is a further explanation for the statistical relationship with the marriage probability. The empirical relationship confirms the statistical one with a positive and significant circumcision effect at the 1 percent level. Circumcision is found to increase the probability of getting married by 19 percentage points, on average and *ceteris paribus*. Families choose to circumcise their daughters for a number of reasons, among which is to improve her marriageability. The common perception is that a circumcised female is a well-protected and well-raised one. She is thus shielded by her family against any unapproved out-of-marriage relationships and this largely explains the sizeable positive impact of circumcision on the probability of marriage.

The contribution of circumcision to the marriage probability of young females explains its high prevalence in the Egyptian society. The previously discussed statistical relationship between age and circumcision shows a decline overtime in the incidence of the phenomenon. However, with its close association with marriage, it continues to be an instrument for increasing female marriage incidence.

Moving on to the impact of economic variables on the marriage prospects of women. Jointly, the estimated coefficients for education are significant in determining the marriage outcome.[2] However, only the estimates for the less than secondary and

[2] With a Chi-squared value of χ^2 164.44 and three degrees of freedom.

the post-secondary education categories are found to be significant. Less than secondary education reduces the marriage probability by almost eighteen percentage points compared to uneducated females, whereas post-secondary education reduces the probability by 29 percentage points. However, secondary level of education shows no significant impact on the marriage probability relative to this base. This means that having lower education or higher education are both worse than having no education at all.

The results of the probit selection model shows the negative impact of education on marriage prospects. Female education acts as a deterrent to the entry into marriage. The more educated a female is the less are her chances to get married and therefore postpones her entry into the marriage state.

Furthermore, the results for circumcision further highlights its impact on marriage prospects and the entry into marriage. This emphasises the role of circumcision in increasing the marriageability of women and allow a faster entry into the marriage state.

The results serve the purpose of understanding the marriageability of women and what determinants contribute to a higher probability of marriage. The next section then uses these results for the selection equation into understanding the determinants of the marriage costs.

6-2 Heckman Two Step Model for Jewellery Costs

The cost of jewellery, as previously mentioned, is a variable only defined for young females, aged 15-29, who have ever been married. Upon estimating the marriage outcome model, the evaluation of the significance of the selection bias follows.[2] The IMR variable is constructed using the estimates of the marriage

[2] A number of variants of the Heckman two-step model has been estimated, the results of which are not all reported here. For example, variables referring to sexual harassment, wearing the veil, parental attitude towards the employment and the education of females, different categories of the kinship marriages were also experimented with. In addition, the role of district level variables in the form of marriage and divorce rates at the governorate level, female unemployment rates, gold prices prevalent at the time of marriage and a set of interaction variables were also investigated. In general, the estimated effects of this array of variables were found to be statistically insignificant in the different specifications in both the cost of jewellery model and the selection model.

selection equation, and is subsequently used as an extra variable in the cost of jewellery equation.

The absence of a significant selection effect, as indicated by the insignificant IMR in the Heckman OLS model, suggests no evidence of selection bias here.

Table 4. Heckman OLS

Variables	Heckman OLS
Constant	6.93
	(0.16)
Less than secondary	0.03
	(0.07)
Secondary	0.27***
	(0.05)
Post-secondary	0.69***
	(0.1)
Employed	-0.15**
	(0.06)
Urban	-0.16***
	(0.03)
Sex ratios	0.69**
	(0.31)
Nursery	0.06
	(0.05)
Muslim	-0.1
	(0.1)
Kinship	0.002
	(0.03)
N	2288
R-squared	0.09
IMR	0.08
	(0.15)
Wald test	Chi2(9)=152.28

Note: (a) Robust SE in parentheses and below their relevant coefficients. (b) Statistical significance level 10percent *, 5 percent ** and 1 percent***.

The uncorrected Ordinary Least Squares estimation of the cost of jewellery model yields results that are similar (sign and significance) to the Heckman two-step outcome model estimation in Table 4 above. Therefore, for interpretational purposes, the estimates for the cost of jewellery model using the OLS method provide the focus of our discussion.

Table 5. Uncorrected OLS Estimates

Variables	OLS
Constant	7
	(0.11)
Less than secondary	0.06
	(0.05)
Secondary	0.29***
	(0.05)
Post-secondary	0.74***
	(0.06)
Employed	-0.15**
	(0.06)
Urban	-0.16***
	(0.03)
Sex ratios	0.65**
	(0.29)
Nursery	0.07*
	(0.04)
Muslim	-0.12
	(0.09)
Kinship	0.002
	(0.03)
N	2288
R-squared	0.08
Wald test	F(9,2278)=25.65

Note: (a) Robust SE in parentheses and below their relevant coefficients. (b) Statistical significance level 10 percent *, 5 percent ** and 1 percent*** (c) Heteroskedasticity test on the OLS model report chi2(1)=28.72, significant at the 1 percent level.

Returns to investments in human capital

Female education provides some interesting effects in their relationship with the cost of jewellery. The higher the female's education level, the higher is the value of the cost of jewellery. This suggests that once a female enters the marriage market,

education, beyond the basic level of less than secondary education, increases the value of that female in the marriage market. In the absence of a clear significant relationship with the marriage probability, education provides a platform for explaining issues of interest in Egyptian society. The prevalence of the investments of families in the education of their daughters despite the low chances of employment gives rise to the question of returns to these investments in education. Are the returns to investing in female education realised in a different market other than the labour market?

Using the Mincerian wage equation returns to the different levels of education and the additional investments in each extra level of education is measured with respect to the wages earned in the labour market. In this context, collective returns to education in the labour market have been studied in Egypt. However, the gender aspects of the determinants of these returns in the labour market have received less attention. Said (2008), Salehi- Isfahani (2009) and more recently Rizk (2016) were among the few papers studying returns to education in the Egyptian labour market. Different measures at different points in time provide a number of results and a pattern is noticed in this regard. Said (2008) shows that returns to female education is high (as compared to males) due to self-selection out of low pay jobs generally practised by women. Salehi-Isfahani (2009) further adds that more able women participate in the labour market. Despite the high returns to female education in the labour market, female participation still remains low and selective (Said (2008), Salehi- Isfahani (2009), Rizk (2016)). An explanation widely available in the limited research on female returns to education in the labour market is the existence of another market where women derive rewarding returns to their investment in education.

The current analysis allows the study of returns to female education in the alternative (marriage) market at the time of marriage through the value of the jewellery received on marriage. A wider definition of the returns to female's education in the marriage market includes the household or the husband's stream of future income. However, in context of the current analysis, and focusing on the female's characteristics only, the value of the jewellery could serve the purpose of quantifying the returns to education. These returns to education are measured with respect to her value in the marriage market determined, among other things, by the value of the jewellery received on marriage.

Returns to education in the labour market is measured against the log earnings of females and in the marriage market against the log real cost of jewellery received on marriage. Following the same methodology applied for the calculation of the labour market returns to investments in education, returns in the marriage market are calculated. The returns for the investments in the secondary education and university and above levels of education respectively are as follows

$r_{marriage}$ (secondary vs less than secondary)$= \frac{\beta s - \beta ls}{Ss - Sls}$

$r_{marriage}$(post-secondary and above vs secondary$= \frac{\beta ps - \beta s}{Sps - Ss}$

where r stands for returns to education in marriage and S stands for the number of years of schooling at each successive level of education (ls = less than secondary, s= secondary and ps= post-secondary).

The similarity in the method of calculation allows for the comparison between the rates in the marriage market and the labour market, making use of the most recent estimates for Egypt provided by Rizk (2016). The returns to education in the labour market found in Rizk (2016) are very similar to the rates reported in Psachararopoulos and Patrinos (2004) work on returns to education. Table 6 below contains the returns to different levels of education, and the corresponding standard errors, in the labour market, based on Rizk (2016) and the marriage market at the mean level.

Table 6. Returns to Education in the Labour and Marriage Markets

Level of education	Labour market	Marriage market	t-test
Secondary	0.069	0.077	0.178
	(0.025)	(0.038)	
Post-secondary	0.075	0.0925	0.265
	(0.028)	(0.06)	

Notes: (a) Returns to female education in the labour market have been calculated based on results presented in the most recent Rizk (2016). (b) Returns to education in the marriage market are based on author calculation given the results in Table 6 (c) The calculations were based on 8 years for less than secondary education and 4, 5 and 6 years for post-secondary/ university education.

The returns to education for the secondary level is measured based on three years of education. Post-secondary and university education average 4-6 years based on the chosen field of study. Therefore, the returns to post- secondary and university education have been calculated for 4, 5 and 6 years separately, and the average is

reported. In the three cases, the returns to female education in the marriage market measured by the change in the real cost of jewelry is still significantly comparable to the returns to the same level of education in the labour market. Less than secondary education appears to have an insignificant impact on the cost of jewellery. Therefore, the returns to female less than secondary education have not been calculated. Therefore, the choice between the labour market and the marriage market for the lower levels of education depends on factors unrelated to investments in education, unlike the higher levels of education.

Statistical t-tests comparing the significance of the equality of the two values for the returns to education at each level of education is computed based on data provided in Table 6 above. The t-tests do not reject the null hypothesis of equal returns to the labour market and the marriage market for all levels of education at the 99 percent level of significance. Investments in education are equally fruitful in the marriage market as compared to the labour market. This highlights the comparability of both markets and the indifference in choosing between the two of them. Given declining opportunities in the public sector and the private sector being not highly suitable for married women, women prefer to exit the labour market and enter the marriage market given the comparable returns to their investments in education. Having an educated wife and mother and improving her value in the marriage market highlight the interest of parents in investing in the education of their female children. This partially explains the inclination of females to the marriage market as opposed to the labour market, creating a degree of non-complementarity between the two markets.

Further results

Revisiting further research questions, circumcision appears to play no significant role in predicting the marriage valuation of women. This result is supported by the uncorrected OLS model including the circumcision variable as an independent variable (results are not reported here). However, with a t-test value of -0.41 on the circumcision variable, it appears to play no significant role in determining the value of women in the marriage market. This result further asserts the use of the circumcision variable as an identifier in the Heckman two-step model. It can then be concluded that female circumcision plays a significant role in determining the marriage prospects of women, but an insignificant role in their marriage valuation.

Kinship marriages, popular in the Arab society, are believed to ease the financial constraints on marriage, lowering transaction costs. Uncertainties regarding the family background, social class or financial ability are non-existent in kinship marriages.

Table 6 above, however, reports an insignificant impact of kinship marriages on the log of real cost of jewellery. The estimated results show that, empirically for young females, kinship marriages do not significantly affect the cost of jewellery, and other variables play larger roles in determining the cost. For further robustness check of this result, different groups of kinship relationships have been used instead of the compiled binary variable. Groups of kinship from mother's side, kinship from father's side versus non kinship, also first cousins from either mother's or father's side, distant relative from either mother's or father's side versus non kinship. Using the different groups, the lack of significance holds and no changes have been observed in the results.

Additionally, Table A.1 shows that real cost of jewellery is similar for kinship and non-kinship marriages. This implies that kinship marriages are popular for reasons beyond the expected lower transaction marriage costs. Moreover, the use of the cost of jewellery as a specific unavoidable component of the overall cost of marriage may affect the results. Kinship marriage may have a significant impact on other more negotiable components of the overall cost of marriage. Therefore, it cannot be concluded, based on this current analysis, that kinship marriages have no impact on the overall cost of marriage. More analysis, based on other components of the cost of marriage, is required before drawing such a general conclusion.

The empirical results of the OLS model show a significant impact of sex ratios in log form on the log real cost of jewellery at the mean level. This implies that the more competitive the marriage market is, reflected by the relatively limited number of females to males of marriage age at a certain point in time in a particular governorate, the higher the value of the female in the marriage market. This result provides a demographic dimension to the determinants of female valuation in marriage.

Given the non-normal distribution of the residuals of the uncorrected OLS model (with a Chi2(2) =314.7), the cost of jewellery is also estimated using QMR (Quantile Median Regression) at the median observation for robustness checks. Table

7 below reports the coefficients and bootstrapped standard errors of the Quantile Median Regression. In comparison to the Heckman selection correction and the uncorrected OLS, the results of the QMR are very similar. One exception is the sex ratios significance. Estimating the model at the median values of the dependant variable, the sex ratios variable no longer becomes significant.

As mentioned earlier, two governorates in Egypt (namely Red Sea and South Sinai) are considered outliers in their values of sex ratios. Dropping these two governorates from the analysis, changes the significance of the sex ratios variable. Excluding the outliers, the sex ratios appear to be significant again. Therefore, estimating the impact of the marriage markets on the real cost of jewellery both at the mean and the median values (excluding the outliers), conclusion is drawn on the role of the marriage markets in improving the women value in the marriage market.

Table 7. QMR

Variables	Q(0.50) 4.8.1	Q(0.50) 4.8.2
Constant	7.11 (0.08)	7.03 (0.11)
Less than secondary	0.02 (0.05)	0.04 (0.06)
Secondary	0.23*** (0.4)	0.26*** (0.05)
Post-secondary	0.65*** (0.06)	0.67*** (0.06)
Employed	-0.21*** (0.05)	-0.24*** (0.07)
Urban	-0.18*** (0.05)	-0.19*** (0.04)
Sex ratios	0.77** (0.34)	2.06** (1.03)
Nursery	0.02 (0.05)	0.01 (0.05)
Muslim	-0.09 (0.08)	-0.08 (0.09)
Kinship	-0.01 (0.03)	-0.02 (0.04)
N	2288	2258
R-squared	0.049	0.049

Note: (a) Model 4.8.2 is estimated excluding the Red Sea and South Sinai governorates (b) Bootstrapped SE in parentheses and below their relevant coefficients. (c) Statistical significance level 10% *, 5% ** and 1%***

Further results show that the employment of young females in the labour market contributes to a lower marriage probability, as previously mentioned, in addition to a lower value in the marriage market. The estimated impact of employment in the labour market is a decline in the value of the female in the marriage market by about 13 percent ceteris paribus. The taboos imposed by Egyptian society on females, one of which is that participation in the labour market is discouraged, surfaced while studying the marriage market for females. As previously mentioned, an employed female is viewed as an undesired female in marriage terms due to the fact it reflects autonomy and independence, which further negatively affects her value in the marriage market.

Enrolment in nursery/ preschool at a younger age, signals, among other things, the economic background of the family. It is considered a proxy for the socio-economic background of the parents. The enrolment in a nursery/ preschool in the early years, signalling either a higher social class of the parents or greater concern with early child development, significantly increases the cost of jewellery by 9 percent ceteris paribus. Both variables contribute significantly to increasing the value of the female in the marriage market.

7. CONCLUSIONS

The main objective of this paper is to investigate the determinants of the marriage valuation of young women. The estimated models in this paper have gone beyond the determinants of the marriage outcome and have actually focused on the value of the female in the marriage market in Egypt.

The analysis aims to investigate the degree of substitutability between the marriage market and the labour market for young educated women driven by the comparison of the rate of returns to investments in education in both markets.

This lack of complementarity between the marriage market and the labour market for young women, has forced women to choose one market over the other. Given social pressures, we see women highly represented in the marriage market as opposed to the labour market. This decision has its demographic and economic consequences on the country at large. The involvement of women in the marriage

market as opposed to the labour market reduces the opportunity cost of having children, therefore giving rise to the new baby boom Egypt is currently experiencing. On the other hand, with women forming approximately half the Egyptian population, and with a very low economic activity and labour participation rate, a pressure is exerted on the economic growth of the country. The more economically active participation of a larger proportion of the population, the higher the expected economic growth of the country at large

Overall, the analysis in this paper reinforces the role of the marriage market in explaining the low participation of females in the labour market, in addition to the role of the socially popular phenomena of circumcision and kinship marriage. However, whether the results on the kinship marriage will hold for the entire transaction cost of marriage requires further investigation using different categories of the overall cost of marriage.

APPENDIX

Table A.1. Summary of Cost of Jewellery by Kinship Groups

Kinship	Mean (St. deviation)	25th percentile	50th Percentile	75th Percentile
Non kinship	7.1 (0.81)	6.71	7.19	7.63
Kinship	7.04 (0.83)	6.47	7.19	7.65
Mother cousin	7.03 (0.76)	6.5	7.12	7.51
Father cousin	7.04 (0.83)	6.48	7.19	7.65
Other relative	7.06 (0.85)	6.69	7.16	7.58

Table A.2. Marginal and Impact Effects of the Probit Selection Model

Variable	Marginal/impact Effect (st. error)
Less than secondary	-0.23*** (0.02)
Secondary	-0.13*** (0.02)
Post-secondary	-0.29*** (0.02)
Urban	0.017 (0.01)
Sex ratios	0.43*** (0.11)
Nursery	-0.09*** (0.02)
Muslim	0.03 (0.04)
Circumcised	0.19*** (0.02)

Table A.3. Different Specifications for the Probit Selection Equation

Variables	Model 1.1	Model 1.2	Model 1.3	Model 1.4
Constant	0.37	0.25	-0.09	-0.13
	(0.04)	(0.1)	(0.1)	(0.1)
Less than secondary	-0.76***	-0.65***	-0.61***	-0.61***
	(0.05)	(0.05)	(0.05)	(0.05)
Secondary	-0.36***	-0.38***	-0.35***	-0.34***
	(0.05)	(0.05)	(0.05)	(0.05)
Post-secondary	-1.04***	-0.94***	-0.8***	-0.79***
	(0.05)	(0.06)	(0.06)	(0.06)
Urban		-0.09**	0.05	0.04
		(0.03)	(0.04)	(0.04)
Muslim		0.21**	0.09	0.07
		(0.09)	(0.09)	(0.09)
Sex ratios				1.08***
				(0.29)
Nursery			-0.22***	-0.23***
			(0.04)	(0.04)
Circumcised			0.5***	0.49***
			(0.05)	(0.05)
R-squared	0.05	0.04	0.06	0.06
LR test	Chi2(3)=509.7	Chi2(5)=371.5	Chi2(7)=529.1	Chi2(8)=543.1

Table A.4. Heckman OLS Cost of Jewellery

Variables	Model 2.1	Model 2.2	Model 2.3
Constant	6.7 (0.19)	6.9 (0.16)	6.75 (0.19)
Less than secondary	0.04 (0.07)	0.04 (0.07)	0.04 (0.07)
Secondary	0.29*** (0.05)	0.27*** (0.05)	0.29*** (0.05)
Post-secondary	0.69*** (0.09)	0.7*** (0.1)	0.69*** (0.09)
Employed	-0.15** (0.06)	-0.15** (0.06)	-0.15** (0.06)
Urban	-0.17*** (0.04)	-0.16*** (0.04)	-0.17*** (0.04)
Sex ratios	4.3*** (1.19)	0.69** (0.3)	4.3*** (1.2)
Nursery	0.04 (0.05)	0.06 (0.05)	0.04 (0.05)
Muslim	-0.09 (0.11)	-0.1 (0.11)	-0.09 (0.1)
Kinship	0.008 (0.04)		
Mother cousin		-0.05 (0.07)	-0.03 (0.07)
Father cousin		0.004 (0.06)	0.017 (0.06)
Other relative		0.01 (0.05)	0.008 (0.05)
Mills	0.09 (0.14)	0.08 (0.15)	0.09 (0.14)
Chi2	Chi2(9)=186.1	Chi2(11)=152.8	Chi2(11)=186.58
N	2258	2288	2258

Notes: Model 2.1 drops the two governorates with the extreme value of sex ratios (The Red Sea and South Sinai). Model 2.2 uses the different groups for the kinship marriage. Model 2.3 combines both, dropping the Red Sea and using groups for kinship.

References

Abdel Kader, Magda, Abdul-ghani Mohamed, and Leila Nuwar. 2006. OwDa'a aatjaahat al-she-baab fi misr (Attitudes of Youth in Egypt). Cairo: Cairo Demographic Center.

Anderson, Siwan. 2007. "The economics of dowry and brideprice." *Journal of Economic Perspectives*. Vol. 21, 151-174.

Amin, S. and N. H. Al-Bassusi. 2003. "Wage Work and Marriage: Perspectives of Egyptian Working Women." *Population Council Policy Research Division Working Paper*, 171.

Assaad, R. and Ghada Barsoum. 2007. "Youth Exclusion in Egypt: In Search of Second Chances." Middle East Youth Initiative working paper, September 2007, 2. Washington, DC: Wolfensohn Center for Development at Brookings and Dubai: Dubai School of Government.

Assaad R., and C. Krafft. 2014. "The Economics of Marriage in North Africa." World Institute for Development Economic Research working paper 2014/067.

Becker, G. S. 1973. 'A Theory of Marriage: Part I'. *Journal of Political Economy*, (Becker) 81(4): 813–46.

Bianquis, Thierry. 1996. "The Family in Arab Islam." In A History of the Family. Vol 1 of Distant Worlds, Ancient Worlds, ed. Andre´ Burguie` re, Christiane Klapisch- Zuber, Martine Segalen, and Francoise Zonabend, 601– 47. Cambridge: Polity Press.

Binzel, Christine and Ragui Assaad. 2008. "Pathways to Marriage in Egypt: How Young Men's Marriage Trajectories Are Constrained by their Labour Market Experiences." Economic Research Forum Conference Paper no 152008024.

Bishai, David and Shoshana Grossbard. 2007. "Far above Rubies: The Association between bride price and extramarital sexual relations in Uganda." The Institute for the Study of Labour. Discussion paper No. 2982.

Chiappori, P. A., M. Iyigun and Y. Weiss. 2005. "Spousal Matching, Marriage Contracts and Property Division in Divorce," mimeo Columbia University.

Dnes, A. W. and R. Rowthorn. 2002. "The Law and Economics of Marriage and Divorce." Cambridge: Cambridge University Press.

El Badawy, A. 2007. "Education Returns in the Marriage Market: Does Female Education Investment Improve the Quality of Future Husbands in Egypt?" Cairo: Population Council. Mimeo.

Glick, P. 1988. "Fifty years of family demography: A record of social change." Journal of Marriage and the Family 50:861–873.

Ghimire, D. J. and W. G. Axinn, S. T. Yabiku, A. Thornton. 2006. "Social Change, Premarital Nonfamily Experience, and Spouse Choice in an Arranged Marriage Society." *American Journal of Sociology*, 111(4), 1181-1218.

Goody, Jack. 1973. "Bridewealth and Dowry in Africa and Eurasia." In Bridewealth and Dowry,

ed. Jack Goody and Stanley J. Tambiah, 1–58. Cambridge: Cambridge University Press.

Hamamy, Hanan. 2012. “Consanguineous marriages.” *Journal of Community Genetics* (2012) 3:185-192.

Heckman, James. 1974. “Shadow Prices, Market Wages, and Labor Supply.” *Econometrica*, 42, issue 4, p. 679-94.

———. 1978. “Dummy Endogenous Variables in a Simultaneous Equation System.” *Econometrica*, 46, issue 4, p. 931-59.

———. 1979. “Sample selection bias as a specification error,” *Econometrica*, Vol. 47 (1), pp. 153-161.

Hendy, R. (2011). Rethinking the Time Allocation of Egyptian Females: A Matching Analysis. Gender and World in the MENA Region Working Paper Series: Poverty, Job Quality and Labor Market Dynamics. Population Council 17.

Quale, Robina G. 1988. “A History of Marriage Systems.” New York: Greenwood Press.

Rao, Vijayendra. 2006. “The economics of dowries in India.” Oxford Companion to Economics.

Rashad, Hoda, Magued Osman and Farzaneh Roudi-Fahimi. 2005. “Marriage in the Arab World.” Washington D.C.: Population Reference Bureau.

Rizk, Reham. (2016). “Returns to Education: An Updated Comparison from Arab Countries.” ERF working papers series number 986

Rose, Elaina. 2001. “Marriage and Assortative Mating: How Have the Patterns Changed?” University of Washington

Salehi-isfahani, Djavad. (2009). “Education and Earnings in the Middle East: A Comparative Study of Returns to Schooling.” *Economic Research Forum Working Paper* (No.504).

Said, Mona. (2008). "Returns to Education in the Egyptian Labor Market, with a focus on Technical and Vocational Education, 1998-2006", World Bank Human Development, Education and Social Protection Sector Report.(Washington D.C: World Bank)

Sieverding, M. 2012. Gender and Generational Change in Egypt. Berkeley: University of California.

Yabiku, S. T. 2005. “The effect of non-family experiences on age of marriage in a setting of rapid social change.” *Population Studies*, 59(3), 339-54.

Wydick. B. 2004. “Repeated Games, Marriage and the Rise of Cohabitation.” mimeo University of San Francisco.