

The Impact of Marriage on Women's Employment in the Middle East and North Africa

Online Appendix

1. Probability Models in the Presence of Binary Endogenous Variables

In order to both test for the endogeneity of marriage timing to work decisions and account for it, we estimate a series of models linking the probability of marriage by the median age to the probability of currently or ever being in various work states. We start by estimating simple probit models for the various work outcomes that assume that marriage timing is exogenous (Wooldridge, 2010):

$$y = 1[\mathbf{x}\boldsymbol{\beta} + e > 0]$$

where the observed binary employment outcome is y , which is determined by the indicator function $1[\cdot]$ and the underlying latent function $y^* = \mathbf{x}\boldsymbol{\beta} + e$ based on covariates x .

Since we are concerned about the endogeneity of one the variables in x , namely the binary regressor for marriage by the median age, the second model we estimate is a bivariate probit model (Wooldridge, 2010):

$$y_1 = 1[\mathbf{z}_1\boldsymbol{\delta}_1 + \alpha_1 y_2 + u_1 > 0]$$

$$y_2 = 1[\mathbf{z}_2\boldsymbol{\delta}_2 + v_2 > 0]$$

where y_2 is our potentially endogenous binary regressor, whether the individual is married by the median age, and \mathbf{z}_1 and \mathbf{z}_2 are vectors of exogenous regressors. The potential endogeneity of y_2 in the first equation is captured by the possible correlation of the disturbance terms in the two equations, that is, if $\rho = \text{Corr}(u_1, v_2) \neq 0$. To address this endogeneity, we include some instrumental variables in \mathbf{z}_2 that are excluded from \mathbf{z}_1 and estimate the two equations simultaneously using full information maximum likelihood.

In this bivariate probit model, both the marriage by the median age and employment equations are non-linear, potentially allowing the model to be identified by functional form alone. While Wooldridge (2010) suggests such a bivariate probit specification when the endogenous regressor is binary, this specification may violate the “forbidden regression” rule of Angrist and Pischke (2009), which states that non-linear first stages are not appropriate in IV estimation. Therefore, we also present results from an IV probit model where the first stage is specified as a linear probability model and the second stage is a probit (Newey, 1987):

$$y_1 = 1[\mathbf{z}_1\boldsymbol{\delta}_1 + \alpha_1 y_2 + u_1 > 0]$$

$$y_2 = \mathbf{z}_2\boldsymbol{\delta}_2 + v_2$$

The problem with this approach is that a linear first stage may be inconsistent when the endogenous regressor is a binary variable, as is the case here (Terza, Basu, & Rathouz, 2008; Wooldridge, 2015). When both endogenous treatment and outcome variables are binary, bivariate probit models are more efficient and more robust to departures from normality, particularly when the average probability of the dependent variable is close to one or zero (Bhattacharya, Goldman, & McCaffrey, 2006), as is the case with women’s post-marital employment in MENA.

Given the unsettled nature of this debate, we present results from both IV probit and bivariate probit models. Models are estimated separately for each country. For our endogeneity-corrected IV probit and bivariate probit estimates, we report the recommended bootstrapped standard errors with 400 replications (Chiburis, Das, & Lokshin, 2012). All standard errors are clustered at the local level, i.e., at the geographic level at which our instruments are computed, which differs by country.

2. Discrete time hazard model

We use a discrete time hazard model to estimate the impact of marriage on exiting work as follows. Consider t to be years since first starting work and T to be the number of years after start that a woman exits work.¹ The probability of exiting work at a particular duration (t) can be characterized through a discrete time hazard, h_{it} , as (Jenkins, 1995):

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

This hazard can be modeled in a multivariate context with a discrete time proportional odds model, the logit model with covariates X_{it} and a baseline hazard of $\theta(t)$:

$$\ln\left(\frac{h_{it}}{1 - h_{it}}\right) = \theta(t) + \beta X_{it}$$

The baseline hazard captures how the hazard of exit varies depending on the time women spent in the labor market. The baseline hazard is specified by including separate duration dummies for each duration since starting work.²

3. Construction of instruments

The first instrumental variable we use to instrument for marriage by the median age is the local sex ratio, calculated as the ratio of females in the woman's five-year birth cohort to males born in the preceding five-year birth cohort in the woman's location of birth.³ We shifted the

¹ Our outcome is exit from work for the first time. We do not consider multiple spells of employment, as they are quite rare among women in these countries.

² Spells of work that are seven years or longer are aggregated into a single dummy variable to ensure adequate cell sizes.

³ We calculate these local sex ratios at the most detailed geographic level for which we can obtain data, using population census microdata for each country. For Egypt this is the second level of administrative geography (the

male cohort by five years because this is approximately the average age gap between spouses in the three countries.⁴ We hypothesize that a higher ratio of females to males, defined in this way, will delay women's marriage due to the shortage of potential marriage partners. This instrument has been shown in a global context to shape marriage markets and age at marriage (Angrist 2002), and although selective migration is a concern, a focus on area of birth can help alleviate that concern along with our controls for migration (for Egypt).⁵

The second set of instruments relates to the structure of the natal household. We use as instruments the ratio of female siblings (including the woman) to all siblings in the natal household and whether the individual is the eldest among her female siblings. Our hypothesis is that a higher ratio of female siblings to all siblings will delay marriage as younger siblings wait

district level), for Jordan it is the third level (the sub-district level), and for Tunisia, it is the first level (the governorate), but in that case we calculate the ratios separately for the urban and rural portions of the governorate. To construct these sex ratios, we draw on census microdata from the IPUMS-International repository for Egypt (1996) and Jordan (2004) (Minnesota Population Center, 2015), and census data from the Tunisian National Institute of Statistics (INS) for the 2004 Tunisian census. We merge the sex ratios obtained from census data into our LMPS data, matching each woman to the sex ratio of her five-year age cohort in her locality of birth, this being either a district, sub-district or the urban/rural component of her governorate, depending on the country. In the few cases where the administrative geography has changed between the relevant population census and the LMPS survey, we substitute the sex ratio of the nearest geographic unit with the same urban/rural classification. In the case of Jordan, we are unable to distinguish between urban and rural for the region of birth.

⁴ It is nearly seven years in Egypt (Assaad & Krafft, 2015a), six years in Jordan (Salem, 2014), and between five and six years in Tunisia (Assaad, Ghazouani, & Krafft, 2018a).

⁵ In the cases of villages/neighborhoods where the proportion of male migrants to male population is unknown, we substitute its average at the district level.

for the older siblings to marry. Previous research has indicated that there is a significant association between number of sisters and age at marriage in Egypt (Krafft & Assaad, 2020).⁶ We also hypothesize that being the eldest daughter tends to speed up marriage, due to the demographic pressures of younger siblings. For these to be valid instruments, we must further assume that they are exogenous to both the marriage and employment decisions and that they only affect employment through the timing of marriage (the so-called exclusion restriction).

3.1 First Stage Results and Tests

Here, we discuss the first-stage estimates of the probability of being married by the median age and the various tests of the validity of our instruments.⁷ The first-stage results are shown in Appendix Table 7 for Egypt, Appendix Table 8 for Jordan, and Appendix Table 9 for Tunisia. As shown in Appendix Table 7, two of the instruments – being an eldest sister and the share of female siblings to total number of siblings in the natal household – are statistically significant at the 5 percent level for Egypt and have the expected sign. Only the sex ratio in the place of birth is not statistically significant. As shown in column (1) of Appendix Table 5, the F-statistic of joint significance of the instruments is 8.13 in the case of Egypt (p-value <0.0001).⁸ The test statistic should be compared to the “rule of thumb” critical values provided by Stock and

⁶ Our instrument is superior to number of siblings as it removes endogenous fertility aspects by looking at the ratio, rather than number, of females.

⁷ Note that a few observations were lost due to missing data on the instruments, leading to a smaller working sample in the instrumental variable (IV) models. Thus, the non-IV models have a slightly larger sample size than the IV models.

⁸ The test is computed using clustered and heteroscedastic-robust standard errors on a two-stage least square specification of the model, which specifies both stages as linear probability models.

Yogo (2005) for each desired level of relative bias of IV to OLS estimates. IV estimates are always biased in the case of weak instruments, but they are less biased than OLS. A F-statistic of 8.13 is lower than the threshold of 9.08 associated with a 10 percent maximal bias of IV relative to OLS, but exceeds 6.46, the threshold associated with a 20 percent relative bias. This suggests that the IV estimates for Egypt have potentially reduced the bias associated with OLS by somewhere between 80 to 90 percent. Over-identification tests, namely the Hansen J statistic, which is comparable to the Sargan statistic but robust to heteroscedasticity,⁹ are presented in column (2) of Appendix Table 5. These tests show that the null hypothesis of instruments being uncorrelated with errors cannot be rejected, suggesting that the instruments are excludable from the first stage. The only exception is the case of non-wage work in Egypt as well as market work and wage work in Tunisia, where the test is marginally significant at the 5 percent level.

The first stage results for Jordan, shown in Appendix Table 8, indicate that the three instruments are not statistically significant except for few cases (extended work and non-wage work). As shown in column (1) of Appendix Table 5, the F-statistic for Jordan is just 1.9 (p-value 0.14), which is well below the acceptable levels for bias reduction. The first stage results for Tunisia, shown in Appendix Table 9, indicate that one of the instruments – being the eldest sister– is significant at the 5 percent level in some of the models, but not all, while the share of female siblings and sex ratio (with one exception) had no significant effect. The F-statistic, shown in Appendix Table 5, ranges from 3.392 to 4.151 (p-value 0.04 to 0.02), depending on the outcome variable, which is still below the 5.39 critical value associated with a 70 percent bias reduction relative to OLS. However, as we saw, the results from the probit, IV probit and

⁹ This test is computed using the “ivreg2” command options in STATA.

bivariate probit estimators are very close to each other in magnitude, sign, and statistical significance for all three countries, suggesting that any bias due to endogeneity should be fairly limited.

We also undertook a set of tests to ascertain whether our potentially endogenous regressor – being married by the median age – is indeed endogenous. The test we use is a version of Wooldridge’s robust score test (1995) that uses a clustered and heteroscedastic-robust covariance matrix.¹⁰ The test aims to check whether the first stage estimated residuals are significant when included in the main outcome equation. A failure to reject the null hypothesis means that the exogeneity of the potentially endogenous regressor cannot be rejected. Like the weak instruments test, this test is conducted on a two-stage least squares version of the model, where both stages are linear probability models. The test produces a chi-square statistic with one degree of freedom, which is shown in column (3) of Appendix Table 5. With this test, we are only able to reject the null hypothesis of exogeneity in the case of private wage work in Egypt and Jordan, and that of non-wage work in Jordan. These results suggest that the endogeneity of marriage by the median age must be considered a possibility at least in the case of private wage employment, whereas women’s decisions on marriage timing could potentially be considered exogenous to public sector and non-wage employment (only in Egypt) according to this test. This is likely due to public sector and non-wage employment being inherently more reconcilable

¹⁰ This test is computed using the “ivreg2” command options in STATA. The ivreg2 routine reports a different variance-covariance matrix than the ivregress routine. The latter reports the standard (heteroscedastic) robust standard errors while ivreg2 reports the cluster-robust standard errors when requested in the model. Since our estimated standard errors are clustered at the local level, we opt for using the ivreg2 command to ensure that we are reporting the correct variance covariance matrix.

with marriage, in line with Figure 7, making the potential tradeoff between market hours and domestic hours less challenging in these types of work. Another way to test endogeneity in the context of the bivariate probit model is to test the significance of the correlation of the disturbances across the marriage by the median age equation and the work outcome equation. These correlation coefficients, shown in Appendix Table 6, are almost always statistically significant and positive in the case of Egypt (except for subsistence work and public wage work). These results suggest that endogeneity is present and that unobservables that lead women to marry before the median age are positively associated with unobservables that lead women to engage in work. The exception is non-wage work in Egypt, where the correlation coefficient is negative. In Tunisia, the correlation coefficients are positive and significant only for private wage work, whereas it is negative and significant for subsistence work.¹¹

¹¹ To test our exclusion restriction, we conducted a falsification test by estimating simple probit models for all our employment outcomes for the sample of unmarried women including all the instruments and tested whether the instruments were jointly insignificant. We estimated these probit models for two samples of unmarried women: those aged 18 and older, and those aged 22 and older. The same set of covariates for each country were included, in addition to the instruments. The results show that the instruments are jointly insignificant for almost all the types of work across the subsamples in all three countries.

4. Appendix references

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5. Additional Tables

Appendix Table 1
Summary Statistics of Outcome, Control and Instrumental Variables

	Egypt (22-39)			Jordan (23-39)			Tunisia (27-39)			Total
	Not Married by Median Age	Married by Median Age	Total	Not Married by Median Age	Married by Median Age	Total	Not Married by Median Age	Married by Median Age	Total	
Outcomes										
Work: Extended definition	0.336	0.297	0.313	0.281	0.099	0.188	0.389	0.240	0.316	
Work: Market work	0.263	0.137	0.189	0.278	0.093	0.183	0.357	0.184	0.273	
Wage work	0.233	0.070	0.138	0.272	0.088	0.177	0.302	0.126	0.215	
Private wage work	0.072	0.026	0.045	0.153	0.040	0.095	0.189	0.072	0.131	
Public wage work	0.161	0.044	0.093	0.119	0.049	0.083	0.101	0.053	0.077	
Non-wage work	0.029	0.067	0.051	0.005	0.004	0.005	0.032	0.046	0.039	
Subsistence work	0.074	0.160	0.124	0.003	0.007	0.005	0.041	0.056	0.048	
Ever work	0.378	0.213	0.282	0.336	0.114	0.222	0.480	0.339	0.411	
Ever engaged in wage work	0.347	0.136	0.224	0.332	0.109	0.218	0.401	0.248	0.327	
Ever engaged in private wage work	0.175	0.083	0.122	0.205	0.055	0.128	0.268	0.173	0.222	
Ever engaged in public wage work	0.196	0.057	0.115	0.137	0.055	0.095	0.105	0.056	0.082	
Ever engaged in non-wage work	0.042	0.087	0.068	0.005	0.006	0.006	0.046	0.058	0.052	
Covariates										
Age	29.575 (4.898)	29.026 (4.832)	29.256 (4.867)	29.909 (4.780)	30.358 (5.043)	30.140 (4.921)	32.434 (3.592)	32.878 (3.771)	32.649 (3.685)	
Age squared/100	8.987 (2.950)	8.658 (2.899)	8.796 (2.925)	9.174 (2.926)	9.470 (3.107)	9.326 (3.024)	10.649 (2.355)	10.951 (2.492)	10.795 (2.426)	
Education Level										
Illiterate or read and write	0.157	0.303	0.242	0.101	0.216	0.160	0.266	0.311	0.288	
Below secondary	0.073	0.165	0.127	0.177	0.318	0.249	0.335	0.420	0.376	
Secondary	0.375	0.447	0.417	0.294	0.283	0.288	0.210	0.184	0.197	
Above secondary	0.395	0.085	0.215	0.429	0.183	0.303	0.189	0.085	0.139	
Father's Education										

	Egypt (22-39)			Jordan (23-39)			Tunisia (27-39)			Total
	Not Married by		Total	Not Married by		Total	Not Married by		Total	
	Median Age	Median Age		Median Age	Median Age		Median Age	Median Age		
Illiterate or read & write	0.532	0.775	0.673	0.491	0.530	0.511	0.656	0.529	0.595	
Below secondary	0.163	0.100	0.127	0.191	0.228	0.210	0.244	0.333	0.287	
Secondary and above	0.305	0.125	0.200	0.318	0.243	0.279	0.100	0.138	0.118	
Mother's Education										
Illiterate or read & write	0.706	0.895	0.816	0.579	0.649	0.615	0.862	0.745	0.806	
Below secondary	0.102	0.052	0.073	0.188	0.171	0.179	0.106	0.184	0.144	
Secondary and above	0.193	0.053	0.112	0.233	0.180	0.206	0.032	0.071	0.050	
Father's Employment Sector/Status										
Public	0.435	0.322	0.369	0.352	0.381	0.367	0.156	0.164	0.160	
Private WW	0.248	0.326	0.293	0.183	0.237	0.211	0.370	0.446	0.406	
Non-wage	0.270	0.342	0.312	0.161	0.159	0.160	0.216	0.280	0.247	
No Job/DK/missing	0.047	0.010	0.026	0.304	0.223	0.263	0.258	0.111	0.187	
Mother ever worked (when resp. was 15)	0.178	0.120	0.144	0.070	0.042	0.055	0.077	0.082	0.079	
Region of Birth										
Egypt-Gr. Cairo	0.265	0.104	0.171							
Egypt-Alx, Sz C.	0.102	0.053	0.073							
Egypt-Urb. Lwr.	0.124	0.093	0.106							
Egypt-Urb. Upp.	0.094	0.069	0.079							
Egypt-Rur. Lwr.	0.243	0.368	0.316							
Egypt-Rur. Upp.	0.173	0.313	0.255							
Jordan-Middle				0.576	0.601	0.589				
Jordan-North				0.304	0.302	0.303				
Jordan-South				0.120	0.097	0.108				
Tunisia-Urb. North							0.384	0.413	0.398	
Tunisia-Rur. North							0.140	0.143	0.141	
Tunisia-Urb. West							0.089	0.090	0.089	
Tunisia-Rur. West							0.183	0.181	0.182	
Tunisia-Urb. South							0.144	0.127	0.135	
Tunisia-Rur. South							0.061	0.046	0.054	

	Egypt (22-39)			Jordan (23-39)		Tunisia (27-39)			Total
	Not Married by Median Age	Married by Median Age	Total	Not Married by Median Age	Married by Median Age	Not Married by Median Age	Married by Median Age	Total	
Ratio of male migrants to male population	1.302 (1.962)	1.590 (2.412)	1.470 (2.239)						
Instruments									
Sex ratio (%)	108.910 (16.75)	109.548 (15.80)	109.281 (16.21)	105.991 (12.47)	105.652 (11.35)	105.818 (11.91)	119.243 (17.70)	119.128 (17.14)	119.188 (17.43)
Ratio of female siblings to all siblings (%)	62.829 (20.70)	58.735 (19.51)	60.447 (20.12)	57.093 (17.40)	56.677 (16.45)	56.880 (16.92)	62.318 (19.70)	60.357 (19.12)	61.362 (19.43)
Eldest sister	0.405	0.388	0.395	0.319	0.274	0.296	0.293	0.332	0.312
Endogenous Regressor									
Married by median Age			0.582			0.513			0.484
N	3154	4240	7394	1773	1701	3474	649	649	1298

Source: Authors' calculations based on ELMPS 2012, JLMPS 2016 and TLMPS 2014.

Appendix Table 2

Sensitivity Analysis for Choice of Cutoff Age and the Effect of Being Married by that Age (22/24/26) on Various Employment Outcomes for Females (22/24/26-39), Egypt 2012

Outcome Variable		Egypt (22-39)			Egypt (24-39)			Egypt (26-39)		
		Reference Probability	Marginal Effects+	N	Reference Probability	Marginal Effects+	N	Reference Probability	Marginal Effects+	N
Work: Extended Definition	Probit	0.309	-0.004	7356	0.343	-0.033*	6240	0.351	-0.023	5040
			(0.012)			(0.015)			(0.016)	
	IVprobit	0.308	-0.004	7331	0.343	-0.032*	6219	0.351	-0.022	5021
			(0.013)		(0.014)			(0.016)		
	Biv. Probit	0.303	0.001	7331	0.324	-0.018	6219	0.334	-0.009	5021
			(0.013)			-0.018			-0.009	
Work: Market Definition	Probit	0.206	-0.033***	7356	0.243	-0.057***	6240	0.248	-0.047***	5040
			(0.009)			(0.011)			(0.012)	
	IVprobit	0.205	-0.032**	7331	0.241	-0.056***	6219	0.246	-0.045***	5021
			(0.010)		(0.011)			(0.012)		
	Biv. Probit	0.202	-0.030**	7331	0.231	-0.051***	6219	0.234	-0.038**	5021
			(0.010)		(0.012)			(0.013)		
Wage work	Probit	0.161	-0.053***	7356	0.193	-0.066***	6240	0.196	-0.060***	5040
			(0.007)			(0.009)			(0.009)	
	IVprobit	0.161	-0.052***	7331	0.192	-0.066***	6219	0.195	-0.059***	5021
			(0.008)		(0.009)			(0.010)		
	Biv. Probit	0.159	-0.052***	7331	0.189	-0.069***	6219	0.192	-0.060***	5021
			(0.008)		(0.010)			(0.010)		
Private wage work	Probit	0.051	-0.021***	7356	0.066	-0.034***	6240	0.062	-0.029***	5040
			(0.005)			(0.006)			(0.006)	
	IVprobit	0.050	-0.020***	7331	0.064	-0.033***	6219	0.061	-0.028***	5021
			(0.005)		(0.006)			(0.006)		
	Biv. Probit	0.048	-0.021***	7331	0.057	-0.032***	6219	0.053	-0.026***	5021
			(0.005)		(0.007)			(0.006)		
Public wage work	Probit	0.110	-0.033***	7356	0.127	-0.034***	6240	0.134	-0.032***	5040
			(0.007)			(0.008)			(0.008)	
	IVprobit	0.110	-0.033***	7331	0.127	-0.034***	6219	0.134	-0.032***	5021

Outcome Variable	Egypt (22-39)			Egypt (24-39)			Egypt (26-39)			
	Reference Probability	Marginal Effects+	N	Reference Probability	Marginal Effects+	N	Reference Probability	Marginal Effects+	N	
		(0.007)			(0.008)			(0.009)		
	Biv. Probit	0.109	-0.032***	7331	0.127	-0.035***	6219	0.134	-0.033***	5021
			(0.007)			(0.009)			(0.009)	
Non-wage work	Probit	0.039	0.020**	7356	0.039	0.022**	6240	0.042	0.025**	5040
			(0.006)			(0.007)			(0.008)	
	IVprobit	0.039	0.021**	7331	0.039	0.023**	6219	0.041	0.027**	5021
			(0.007)			(0.008)			(0.009)	
	Biv. Probit	0.038	0.020**	7331	0.038	0.022***	6219	0.039	0.025***	5021
			(0.006)			(0.006)			(0.007)	
Subsistence work	Probit	0.097	0.032***	7356	0.086	0.043***	6240	0.091	0.040***	5040
			(0.007)			(0.010)			(0.011)	
	IVprobit	0.098	0.031***	7331	0.086	0.042***	6219	0.091	0.038***	5021
			(0.008)			(0.010)			(0.011)	
	Biv. Probit	0.098	0.031***	7331	0.088	0.038***	6219	0.093	0.035***	5021
			(0.006)			(0.009)			(0.010)	

Notes: (i) *p<0.05; **p<0.01; ***p<0.001 (ii) Standard errors in parentheses are clustered by the district of birth. (iii) Reference probabilities are calculated for women who were not married by the respective reference age used in each set of estimations at the observed level of all other covariates. (iv) Controls are included.

+ Bootstrapped clustered standard errors, with 400 replications for Egypt.

Appendix Table 3

Sensitivity Analysis for Choice of Cutoff Age and the Effect of Being Married by that Age (22/24/26) on Various Employment Outcomes for Females (23/24/26-39), Jordan 2016

Outcome Variable		(1)			(2)			(3)		
		Jordan (23-39)			Jordan (24-39)			Jordan (26-39)		
		Reference Probability	Marginal Effects+	N	Reference Probability	Marginal Effects+	N	Reference Probability	Marginal Effects+	N
Work: Extended Definition	Probit	0.239	-0.106***	3472	0.253	-0.102***	3183	0.276	-0.094***	2638
			(0.011)			(0.010)			(0.012)	
	IVprobit	0.238	-0.105***	3472	0.253	-0.101***	3183	0.275	-0.094***	2638
			(0.012)			(0.011)			(0.012)	
	Biv. Probit	0.237	-0.105***	3472	0.252	-0.104***	3183	0.274	-0.099***	2638
			(0.013)			(0.012)			(0.014)	
Work: Market Definition	Probit	0.231	-0.110***	3472	0.245	-0.104***	3183	0.267	-0.094***	2638
			(0.011)			(0.010)			(0.012)	
	IVprobit	0.230	-0.109***	3472	0.245	-0.104***	3183	0.266	-0.093***	2638
			(0.012)			(0.011)			(0.011)	
	Biv. Probit	0.229	-0.109***	3472	0.244	-0.107***	3183	0.265	-0.099***	2638
			(0.011)			(0.011)			(0.013)	
Wage work	Probit	0.224	-0.107***	3472	0.238	-0.101***	3183	0.259	-0.092***	2638
			(0.011)			(0.010)			(0.011)	
	IVprobit	0.224	-0.106***	3472	0.238	-0.101***	3183	0.259	-0.092***	2638
			(0.011)			(0.011)			(0.011)	
	Biv. Probit	0.223	-0.106***	3472	0.237	-0.104***	3183	0.258	-0.098***	2638
			(0.011)			(0.011)			(0.013)	
Private wage work	Probit	0.105	-0.062***	3472	0.111	-0.060***	3183	0.129	-0.070***	2638
			(0.010)			(0.009)			(0.010)	
	IVprobit	0.105	-0.062***	3472	0.111	-0.060***	3183	0.128	-0.069***	2638
			(0.010)			(0.010)			(0.011)	
	Biv. Probit	0.104	-0.059***	3472	0.110	-0.060***	3183	0.128	-0.077***	2638
			(0.010)			(0.010)			(0.014)	
Public wage work	Probit	0.117	-0.046***	3472	0.125	-0.040***	3183	0.128	-0.016	2638
			(0.009)			(0.009)			(0.010)	

Outcome Variable	(1)			(2)			(3)			
	Jordan (23-39)			Jordan (24-39)			Jordan (26-39)			
	Reference Probability	Marginal Effects+	N	Reference Probability	Marginal Effects+	N	Reference Probability	Marginal Effects+	N	
	IVprobit	0.118	-0.046*** (0.009)	3472	0.125	-0.041*** (0.010)	3183	0.128	-0.017 (0.011)	2638
	Biv. Probit	0.117	-0.044*** (0.008)	3472	0.124	-0.040*** (0.010)	3183	0.127	-0.017 (0.011)	2638
Non-wage work	Probit	0.009	-0.004 (0.003)	2265	0.010	-0.005 (0.003)	2094	0.011	-0.004 (0.004)	1756
	IVprobit	0.008	-0.003 (0.010)	2265	0.010	-0.003 (0.011)	2094	0.010	-0.002 (0.008)	1756
	Biv. Probit	0.006	-0.003 (0.006)	3472	0.006	-0.003 (0.003)	3472	0.006	-0.001*** (0.000)	2638
Subsistence work	Probit	0.009	0.004 (0.003)	2700	0.009	0.003 (0.004)	2506	0.015	-0.001 (0.005)	1689
	IVprobit	0.008	0.004 (0.024)	2700	0.009	0.003 (0.062)	2506	0.015	-0.001 (0.152)	1689
	Biv. Probit	0.007	0.003** (0.001)	3472	0.007	0.001 (0.003)	3472	0.009	-0.001 (0.000)	2638

Notes: (i) *p<0.05; **p<0.01; ***p<0.001 (ii) Standard errors in parentheses are clustered by the sub-district of birth. (iii). Reference probabilities are calculated for women who were not married by the respective reference age used in each set of estimations, at the observed level of all other covariates. (iv) Controls are included.

+ Bootstrapped clustered standard errors, with 400 replications.

Appendix Table 4

Sensitivity Analysis for Choice of Cutoff Age and the Effect of Being Married by that Age (22/24/26) on Various Employment Outcomes for Females (22/24/27-39), Tunisia 2014

		(1)			(2)			(3)		
		Tunisia (22-39)			Tunisia (24-39)			Tunisia (27-39)		
Outcome Variable		Reference Probability	Marginal Effects+	N	Reference Probability	Marginal Effects+	N	Reference Probability	Marginal Effects+	N
Work: Extended Definition	Probit	0.393	-0.087*	996	0.356	-0.057	1190	0.333	-0.046	1358
	IVprobit	0.391	(0.037) -0.083*	981	0.355	(0.032) -0.055	1171	0.334	(0.033) -0.048	1337
	Biv. Probit	0.387	(0.036) -0.083*	981	0.352	(0.031) -0.044	1171	0.333	(0.035) -0.037	1337
Work: Market Definition	Probit	0.292	(0.039) -0.090**	997	0.260	-0.069*	1194	0.247	-0.076*	1363
	IVprobit	0.292	(0.034) -0.087*	982	0.261	(0.030) -0.069*	1174	0.248	(0.034) -0.078*	1341
	Biv. Probit	0.280	(0.036) -0.086*	982	0.251	(0.031) -0.055	1174	0.248	(0.035) -0.090	1341
Wage work	Probit	0.226	(0.034) -0.108***	976	0.194	(0.033) -0.096***	1169	0.182	(0.052) -0.120***	1337
	IVprobit	0.228	(0.029) -0.110***	961	0.193	(0.027) -0.097**	1149	0.183	(0.025) -0.125***	1315
	Biv. Probit	0.227	(0.030) -0.114***	961	0.187	(0.031) -0.089**	1149	0.175	(0.026) -0.054*	1315
Private wage work	Probit	0.144	(0.032) -0.077**	975	0.128	(0.028) -0.069***	1168	0.126	(0.025) -0.094***	1336
	IVprobit	0.145	(0.025) -0.078**	960	0.127	(0.020) -0.069**	1148	0.127	(0.021) -0.099***	1314
	Biv. Probit	0.145	(0.027) -0.079**	960	0.127	(0.023) -0.066**	1148	0.127	(0.025) -0.085***	1314
Public wage work	Probit	0.083	(0.029) -0.034*	975	0.066	(0.022) -0.028*	1168	0.057	(0.020) -0.037*	1336
			(0.013)			(0.013)			(0.017)	

Outcome Variable	(1)			(2)			(3)		
	Tunisia (22-39)			Tunisia (24-39)			Tunisia (27-39)		
	Reference Probability	Marginal Effects+	N	Reference Probability	Marginal Effects+	N	Reference Probability	Marginal Effects+	N
IVprobit	0.083	-0.034* (0.015)	960	0.066	-0.028* (0.014)	1148	0.057	-0.038 (0.020)	1314
Biv. Probit	0.081	-0.031* (0.015)	960	0.066	-0.025 (0.013)	1148	0.058	-0.029* (0.014)	1314
Non-wage work									
Probit	0.051	0.032 (0.018)	876	0.051	0.020 (0.011)	1135	0.052	0.017 (0.014)	1336
IVprobit	0.050	0.036 (0.022)	864	0.051	0.022 (0.012)	1116	0.052	0.020 (0.016)	1314
Biv. Probit	0.043	0.031 (0.016)	961	0.048	0.020 (0.013)	1149	0.050	0.023 (0.024)	1314
Subsistence work									
Probit	0.102	0.002 (0.020)	969	0.098	0.008 (0.016)	1154	0.089	0.017 (0.015)	1336
IVprobit	0.109	0.005 (0.024)	864	0.098	0.009 (0.020)	1029	0.089	0.018 (0.019)	1314
Biv. Probit	0.092	0.005 (0.019)	980	0.092	0.007 (0.016)	1170	0.084	0.018 (0.021)	1314

Notes: (i) *p<0.05; **p<0.01; ***p<0.001 (ii) Standard errors in parentheses are clustered by urban/rural components of the governorate of birth. (iii). Reference probabilities are calculated for women who were not married by the respective reference age used in each set of estimations at the observed level of all other covariates. (iv) Controls are included.

+ Bootstrapped clustered standard errors with 400 replications.

Appendix Table 5
Tests for (1) strength of instruments (F-test) (2) over-identification and (3) endogeneity (chi-squared test)

Country	Outcomes	(1) Joint significance F-test for strength of instruments	(2) Over- identification test	(3) Chi-squared test of endogeneity
Egypt	Work: Extended Definition	8.133***	0.0571	1.057
	Work: Market Definition	8.133***	2.240	1.130
	Wage work	8.133***	2.029	1.758
	Private wage work	8.133***	1.723	5.847*
	Public wage work	8.133***	1.818	0.251
	Non-wage work	8.133***	8.935*	0.00682
	Subsistence work	8.133***	2.884	0.0132
Jordan	Work: Extended Definition	1.901	1.707	0.904
	Work: Market Definition	1.901	1.733	0.552
	Wage work	1.901	2.769	0.0748
	Private wage work	1.901	1.170	4.321*
	Public wage work	1.901	1.359	1.383
		1.901	0.414	5.310*
	Subsistence work	1.901	0.294	1.138
Tunisia	Work: Extended Definition	3.403*	1.951	2.055
	Work: Market Definition	3.824*	5.848	2.643
	Wage work	4.074*	2.946	0.971
	Private wage work	4.151*	3.154	0.179
	Public wage work	4.151*	0.164	0.589
	Non-wage work	4.074*	2.027	2.008
	Subsistence work	3.392*	3.100	0.0160

Notes: (i) *p<0.05; **p<0.01; ***p<0.001 (ii) The instruments are sex ratio by birth-cohort at the local level taking into account urban and rural divisions, birth order (eldest sibling), and ratio of female siblings to all siblings.

Appendix Table 6
Estimates of the Correlation Coefficients (rho) of the Two Disturbance Terms in the Bivariate Probit Model, Egypt, Jordan, Tunisia.

	Rho		
	Egypt	Jordan	Tunisia
Work: Extended Definition	0.597** (3.17)	0.544** (3.01)	0.729* (2.01)
Work: Market Definition	0.628*** (6.00)	0.372 (1.48)	1.000 ⁺ (.)
Wage work	0.528*** (4.45)	0.284 (0.98)	0.565 (1.42)
Private wage work	0.649*** (5.63)	0.267 (0.96)	0.835*** (4.48)
Public wage work	0.312 (1.60)	0.0605 (0.13)	0.150 (0.37)
Non-wage work	-0.737*** (-9.46)	1.000 (.)	0.448 (0.90)
Subsistence work	-0.00742 (-0.03)	0.442 (0.53)	-0.775*** (-4.27)

Notes: (i) t-statistics are shown in parentheses. (ii) *p<0.05; **p<0.01; ***p<0.001. ⁺ The estimated arc-hyperbolic tangent of the correlation of the two disturbance terms of marriage by the median age and market work is large and insignificant for Tunisia.

Appendix Table 7

First-stage regression coefficients for the probability of being married by the median age, Egypt 2012 (22-39)

Variables/Outcomes	Extended work		Market work		Wage work		Private wage work		Public wage work		Non-wage work		Subsistence work	
	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate
Instruments														
Eldest sister	0.042*** (0.011)	0.125*** (0.034)	0.042*** (0.012)	0.128*** (0.033)	0.038** (0.013)	0.122*** (0.035)	0.040*** (0.011)	0.131*** (0.034)	0.042*** (0.012)	0.121*** (0.036)	0.044*** (0.013)	0.093* (0.037)	0.042*** (0.012)	0.127*** (0.035)
Share of female sib. to all sib.	-0.001* (0.000)	-0.002* (0.001)	-0.001 (0.000)	-0.002* (0.001)	-0.001** (0.000)	-0.002** (0.001)	-0.001** (0.000)	-0.002** (0.001)	-0.001* (0.000)	-0.002* (0.001)	-0.001 (0.001)	-0.003** (0.001)	-0.001* (0.001)	-0.002* (0.001)
Sex ratio	0.000 (0.001)	0.000 (0.002)	0.000 (0.001)	0.001 (0.002)	0.000 (0.001)	0.000 (0.002)	0.000 (0.000)	0.001 (0.002)	0.000 (0.001)	0.000 (0.002)	0.000 (0.001)	-0.000 (0.002)	0.000 (0.001)	0.000 (0.002)
Covariates														
Age	-0.074*** (0.016)	-0.218*** (0.050)	-0.079*** (0.017)	-0.230*** (0.050)	-0.077*** (0.016)	-0.232*** (0.050)	-0.079*** (0.016)	-0.231*** (0.050)	-0.074*** (0.017)	-0.225*** (0.050)	-0.075*** (0.018)	-0.214*** (0.049)	-0.074*** (0.018)	-0.225*** (0.052)
Age squared	0.109*** (0.026)	0.320*** (0.079)	0.116*** (0.027)	0.339*** (0.078)	0.113*** (0.026)	0.342*** (0.079)	0.116*** (0.025)	0.342*** (0.079)	0.108*** (0.026)	0.331*** (0.079)	0.110*** (0.028)	0.314*** (0.077)	0.109*** (0.028)	0.331*** (0.081)
Education (illiterate/Read and Write omit.)														
Less than secondary	0.053** (0.019)	0.155** (0.057)	0.053** (0.019)	0.136* (0.060)	0.053** (0.019)	0.155** (0.058)	0.053** (0.019)	0.154** (0.058)	0.053** (0.019)	0.165** (0.059)	0.053** (0.019)	0.169** (0.059)	0.053** (0.019)	0.166** (0.060)
secondary	-0.065*** (0.016)	-0.188*** (0.046)	-0.065*** (0.016)	-0.192*** (0.045)	-0.064*** (0.016)	-0.185*** (0.045)	-0.064*** (0.016)	-0.187*** (0.045)	-0.065*** (0.016)	-0.179*** (0.045)	-0.065*** (0.016)	-0.178*** (0.045)	-0.064*** (0.016)	-0.180*** (0.045)
University and above	-0.374*** (0.023)	-1.038*** (0.068)	-0.374*** (0.023)	-1.047*** (0.069)	-0.373*** (0.023)	-1.047*** (0.069)	-0.374*** (0.023)	-1.037*** (0.068)	-0.374*** (0.022)	-1.040*** (0.069)	-0.374*** (0.023)	-1.041*** (0.068)	-0.374*** (0.023)	-1.036*** (0.069)
Father's education (illiterate/Read and Write omit.)														
Below secondary	-0.065*** (0.018)	-0.188*** (0.051)	-0.065*** (0.018)	-0.187*** (0.050)	-0.065*** (0.018)	-0.187*** (0.051)	-0.065*** (0.018)	-0.188*** (0.050)	-0.065*** (0.018)	-0.188*** (0.051)	-0.065*** (0.018)	-0.186*** (0.050)	-0.065*** (0.017)	-0.187*** (0.051)
Secondary and above	-0.040 (0.022)	-0.123 (0.063)	-0.041 (0.022)	-0.124* (0.062)	-0.040 (0.022)	-0.117 (0.062)	-0.040 (0.022)	-0.120 (0.063)	-0.040 (0.022)	-0.111 (0.062)	-0.041 (0.023)	-0.104 (0.062)	-0.040 (0.022)	-0.112 (0.063)
Mother's education (illiterate/Read and Write omit.)														
Below secondary	-0.066** (0.024)	-0.191** (0.070)	-0.066** (0.024)	-0.194** (0.070)	-0.065** (0.023)	-0.193** (0.070)	-0.066** (0.023)	-0.185** (0.071)	-0.066** (0.024)	-0.194** (0.070)	-0.066** (0.024)	-0.179** (0.069)	-0.066** (0.024)	-0.190** (0.070)
Secondary and above	-0.058* (0.023)	-0.169* (0.070)	-0.057* (0.023)	-0.171* (0.070)	-0.056* (0.023)	-0.171* (0.071)	-0.057* (0.023)	-0.165* (0.072)	-0.058* (0.023)	-0.178* (0.071)	-0.058* (0.023)	-0.182* (0.071)	-0.057* (0.023)	-0.177* (0.071)
Above secondary*father's secondary+	0.007 (0.030)	0.012 (0.093)	0.007 (0.030)	0.006 (0.089)	0.007 (0.030)	-0.001 (0.090)	0.007 (0.030)	-0.013 (0.092)	0.007 (0.030)	-0.006 (0.091)	0.007 (0.030)	-0.009 (0.090)	0.007 (0.030)	-0.012 (0.092)
Father's emp. stat./sector (private WW omit.)														
Public	0.007	0.030	0.007	0.034	0.007	0.028	0.007	0.031	0.007	0.028	0.007	0.028	0.007	0.029

Variables/Outcomes	Extended work		Market work		Wage work		Private wage work		Public wage work		Non-wage work		Subsistence work	
	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate
Non-wage	(0.017)	(0.049)	(0.017)	(0.050)	(0.017)	(0.050)	(0.017)	(0.050)	(0.017)	(0.050)	(0.017)	(0.050)	(0.017)	(0.050)
	0.001	0.010	0.002	0.016	0.001	0.005	0.001	0.000	0.001	0.006	0.002	0.002	0.001	0.004
	(0.014)	(0.041)	(0.014)	(0.042)	(0.014)	(0.041)	(0.014)	(0.041)	(0.014)	(0.041)	(0.014)	(0.041)	(0.014)	(0.041)
No Job/DK/missing	-0.262***	-0.809***	-0.261***	-0.807***	-0.261***	-0.827***	-0.261***	-0.824***	-0.262***	-0.845***	-0.262***	-0.836***	-0.262***	-0.847***
Mom ever worked (when resp. was 15)	(0.030)	(0.109)	(0.030)	(0.106)	(0.030)	(0.108)	(0.030)	(0.109)	(0.030)	(0.110)	(0.030)	(0.111)	(0.030)	(0.111)
	0.031	0.093	0.032	0.100	0.032	0.095	0.032	0.096	0.031	0.098	0.031	0.102	0.031	0.098
Region (Gr. Cairo omit.)	(0.019)	(0.061)	(0.019)	(0.063)	(0.019)	(0.060)	(0.019)	(0.062)	(0.019)	(0.061)	(0.019)	(0.061)	(0.019)	(0.062)
Alex & Sz C.	0.015	0.042	0.013	0.040	0.014	0.048	0.013	0.034	0.015	0.049	0.014	0.059	0.015	0.045
	(0.031)	(0.094)	(0.031)	(0.097)	(0.031)	(0.099)	(0.031)	(0.095)	(0.031)	(0.099)	(0.031)	(0.098)	(0.031)	(0.098)
Urban Lower Egypt	0.118***	0.351***	0.116***	0.355***	0.117***	0.362***	0.116***	0.352***	0.119***	0.358***	0.118***	0.370***	0.118***	0.354***
	(0.031)	(0.093)	(0.031)	(0.094)	(0.031)	(0.095)	(0.031)	(0.092)	(0.031)	(0.094)	(0.031)	(0.093)	(0.032)	(0.094)
Urban Upper Egypt	0.085**	0.262**	0.083**	0.260**	0.083**	0.264**	0.083**	0.249**	0.086**	0.264**	0.085**	0.275**	0.085**	0.258**
	(0.030)	(0.086)	(0.029)	(0.086)	(0.030)	(0.088)	(0.029)	(0.086)	(0.030)	(0.089)	(0.030)	(0.089)	(0.030)	(0.089)
Rural Lower Egypt	0.209***	0.611***	0.207***	0.604***	0.207***	0.615***	0.206***	0.603***	0.209***	0.613***	0.209***	0.622***	0.209***	0.609***
	(0.025)	(0.076)	(0.025)	(0.075)	(0.025)	(0.077)	(0.025)	(0.075)	(0.025)	(0.077)	(0.025)	(0.077)	(0.026)	(0.077)
Rural Upper Egypt	0.180***	0.526***	0.178***	0.529***	0.178***	0.527***	0.177***	0.520***	0.181***	0.528***	0.180***	0.536***	0.180***	0.525***
	(0.028)	(0.083)	(0.028)	(0.084)	(0.028)	(0.085)	(0.028)	(0.083)	(0.028)	(0.085)	(0.028)	(0.084)	(0.029)	(0.085)
Male migrants to pop	0.001	0.001	0.000	0.001	0.001	0.001	0.001	-0.000	0.001	0.001	0.001	0.002	0.001	0.001
	(0.003)	(0.009)	(0.003)	(0.009)	(0.003)	(0.009)	(0.003)	(0.009)	(0.003)	(0.009)	(0.003)	(0.009)	(0.003)	(0.009)
Constant	1.786***	3.744***	1.829***	3.870***	1.823***	3.943***	1.836***	3.921***	1.779***	3.857***	1.789***	3.763***	1.788***	3.855***
	(0.222)	(0.696)	(0.228)	(0.686)	(0.224)	(0.696)	(0.216)	(0.697)	(0.226)	(0.693)	(0.228)	(0.680)	(0.233)	(0.708)
N	7359	7359	7359	7359	7359	7359	7359	7359	7359	7359	7359	7359	7359	7359

Notes: (i) *p<0.05; **p<0.01; ***p<0.001 (ii) Standard errors in parentheses are clustered by the governorate and district of birth.

Appendix Table 8

First-stage regression coefficients for the probability of being married by the median age, Jordan 2016 (23-39)

Variables/Outcomes	Extended work		Market work		Wage work		Private wage work		Public wage work		Non-wage work		Subsistence work	
	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate
Instruments														
Eldest sister	-0.022 (0.014)	-0.058 (0.042)	-0.022 (0.015)	-0.061 (0.041)	-0.021 (0.016)	-0.060 (0.041)	-0.015 (0.014)	-0.060 (0.040)	-0.010 (0.018)	-0.060 (0.039)	-0.049** (0.016)	-0.051*** (0.015)	-0.032 (0.018)	-0.059 (0.039)
Share of female sib. to all sib.	-0.001* (0.000)	-0.002 (0.001)	-0.001* (0.000)	-0.002 (0.001)	-0.001 (0.001)	-0.002 (0.001)	-0.001 (0.000)	-0.002 (0.001)	0.000 (0.001)	-0.002 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.001)	-0.002 (0.001)
Sex ratio	-0.001 (0.001)	-0.004 (0.002)	-0.001 (0.001)	-0.004 (0.002)	-0.001 (0.001)	-0.004 (0.002)	-0.001* (0.001)	-0.004 (0.002)	-0.001 (0.001)	-0.004 (0.003)	-0.002* (0.001)	-0.003*** (0.001)	-0.001 (0.001)	-0.004 (0.002)
Covariates														
Age	-0.070** (0.023)	-0.187** (0.062)	-0.070** (0.023)	-0.188** (0.061)	-0.070** (0.023)	-0.189** (0.061)	-0.070** (0.022)	-0.189** (0.061)	-0.070** (0.023)	-0.190** (0.061)	-0.068** (0.026)	-0.190** (0.061)	-0.107*** (0.025)	-0.190** (0.061)
Age squared	0.106** (0.037)	0.281** (0.100)	0.106** (0.037)	0.284** (0.099)	0.106** (0.037)	0.285** (0.099)	0.106** (0.036)	0.286** (0.099)	0.106** (0.037)	0.288** (0.099)	0.106** (0.041)	0.289** (0.100)	0.166*** (0.040)	0.287** (0.098)
Education (illiterate/Read and Write omit.)														
Less than secondary	-0.071* (0.029)	-0.204* (0.080)	-0.071* (0.029)	-0.197* (0.079)	-0.071* (0.029)	-0.195* (0.079)	-0.071* (0.029)	-0.194* (0.079)	-0.071* (0.029)	-0.195* (0.079)	-0.073* (0.037)	-0.194** (0.075)	-0.078** (0.029)	-0.195* (0.079)
secondary	-0.190*** (0.028)	-0.510*** (0.078)	-0.190*** (0.028)	-0.504*** (0.078)	-0.190*** (0.028)	-0.503*** (0.077)	-0.191*** (0.028)	-0.502*** (0.077)	-0.191*** (0.028)	-0.503*** (0.077)	-0.181*** (0.039)	-0.495*** (0.077)	-0.187*** (0.031)	-0.504*** (0.077)
University and above	-0.325*** (0.033)	-0.868*** (0.095)	-0.325*** (0.034)	-0.861*** (0.095)	-0.325*** (0.033)	-0.860*** (0.095)	-0.326*** (0.034)	-0.857*** (0.094)	-0.327*** (0.034)	-0.859*** (0.094)	-0.315*** (0.046)	-0.851*** (0.092)	-0.314*** (0.035)	-0.860*** (0.094)
Father's education (illiterate/Read and Write omit.)														
Below secondary	0.018 (0.026)	0.041 (0.071)	0.018 (0.026)	0.044 (0.072)	0.018 (0.026)	0.044 (0.072)	0.017 (0.027)	0.046 (0.072)	0.016 (0.027)	0.045 (0.072)	0.000 (.)	0.038 (0.072)	0.031 (0.028)	0.046 (0.072)
Secondary and above	0.048 (0.032)	0.120 (0.086)	0.048 (0.032)	0.124 (0.086)	0.048 (0.032)	0.125 (0.086)	0.047 (0.032)	0.124 (0.086)	0.045 (0.032)	0.124 (0.086)	0.079* (0.036)	0.103 (0.082)	0.042 (0.032)	0.121 (0.087)
Mother's education (illiterate/Read and Write omit.)														
Below secondary	-0.028 (0.039)	-0.074 (0.106)	-0.028 (0.039)	-0.073 (0.106)	-0.028 (0.039)	-0.073 (0.106)	-0.029 (0.039)	-0.075 (0.106)	-0.029 (0.039)	-0.073 (0.106)	-0.045 (0.048)	-0.063 (0.102)	-0.041 (0.040)	-0.073 (0.106)
Secondary and above	-0.019 (0.035)	-0.051 (0.098)	-0.020 (0.035)	-0.053 (0.098)	-0.020 (0.035)	-0.055 (0.098)	-0.021 (0.035)	-0.054 (0.098)	-0.022 (0.036)	-0.057 (0.099)	-0.017 (0.043)	-0.059 (0.097)	0.000 (.)	-0.056 (0.098)
Above secondary*father's secondary+	-0.131** (0.040)	-0.356** (0.112)	-0.131** (0.040)	-0.360** (0.112)	-0.131** (0.040)	-0.360** (0.112)	-0.130** (0.041)	-0.361** (0.111)	-0.128** (0.041)	-0.361** (0.111)	-0.163*** (0.048)	-0.354** (0.110)	0.000 (.)	-0.359** (0.112)
Father's emp. stat./sector (private WW omit.)														
Public	0.017 (0.020)	0.048 (0.054)	0.017 (0.020)	0.048 (0.054)	0.017 (0.020)	0.048 (0.054)	0.017 (0.020)	0.048 (0.055)	0.019 (0.020)	0.049 (0.054)	0.005 (0.028)	0.067 (0.052)	0.001 (0.026)	0.048 (0.055)
Non-wage	-0.035 (0.027)	-0.099 (0.073)	-0.035 (0.027)	-0.095 (0.074)	-0.035 (0.027)	-0.095 (0.074)	-0.034 (0.027)	-0.094 (0.074)	-0.033 (0.027)	-0.094 (0.074)	-0.064 (0.037)	-0.075 (0.072)	-0.021 (0.028)	-0.099 (0.078)

Variables/Outcomes	Extended work		Market work		Wage work		Private wage work		Public wage work		Non-wage work		Subsistence work	
	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate
No Job/DK/missing	-0.110*** (0.023)	-0.301*** (0.064)	-0.110*** (0.023)	-0.299*** (0.064)	-0.110*** (0.023)	-0.299*** (0.064)	-0.110*** (0.023)	-0.297*** (0.064)	-0.108*** (0.023)	-0.299*** (0.064)	-0.094*** (0.028)	-0.290*** (0.061)	-0.099*** (0.024)	-0.299*** (0.064)
Mom ever worked (when resp. was 15)	-0.069 (0.037)	-0.216 (0.113)	-0.069 (0.037)	-0.209 (0.112)	-0.069 (0.037)	-0.205 (0.111)	-0.071 (0.036)	-0.206 (0.109)	-0.072* (0.037)	-0.197 (0.108)	-0.088* (0.040)	-0.204 (0.108)	-0.069 (0.084)	-0.198 (0.108)
Region of birth (middle omit.)														
North	0.000 (0.027)	0.005 (0.074)	0.000 (0.027)	0.007 (0.074)	0.000 (0.027)	0.007 (0.073)	0.002 (0.027)	0.006 (0.073)	0.003 (0.027)	0.007 (0.073)	0.007 (0.027)	0.001 (0.072)	-0.026 (0.033)	0.006 (0.073)
South	-0.047 (0.030)	-0.120 (0.081)	-0.047 (0.030)	-0.119 (0.081)	-0.047 (0.030)	-0.119 (0.081)	-0.045 (0.030)	-0.117 (0.081)	-0.045 (0.030)	-0.118 (0.081)	0.000 (.)	-0.124 (0.080)	-0.059 (0.032)	-0.116 (0.082)
Constant	2.006*** (0.367)	4.092*** (0.988)	2.008*** (0.365)	4.105*** (0.982)	2.008*** (0.365)	4.099*** (0.982)	2.022*** (0.358)	4.131*** (0.980)	1.978*** (0.389)	4.108*** (0.983)	2.041*** (0.422)	3.926*** (0.929)	2.603*** (0.388)	4.121*** (0.976)
N	3472	3472	3472	3472	3472	3472	3472	3472	3472	3472	2265	3472	2700	3472

Notes: (i) *p<0.05; **p<0.01; ***p<0.001. (ii) Standard errors in parentheses are clustered by the governorate, district and sub-district of birth.

Appendix Table 9

First-stage regression coefficients for the probability of being married by the median age, Tunisia 2014 (27-39)

Variables/Outcomes	Extended work		Market work		Wage work		Private wage work		Public wage work		Non-wage work		Subsistence work	
	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate
Instruments														
Eldest sister	-0.151 (0.095)	-0.417 (0.306)	-0.227*** (0.068)	-0.468* (0.204)	-0.207* (0.100)	-0.538* (0.226)	-0.203 (0.136)	-0.553* (0.215)	-0.173* (0.079)	-0.485* (0.225)	-0.205** (0.072)	-0.517* (0.222)	-0.241*** (0.072)	-0.726** (0.241)
Share of female sib. to all sib.	-0.006 (0.037)	-0.003 (0.102)	-0.011 (0.020)	-0.021 (0.065)	0.014 (0.044)	0.048 (0.093)	0.020 (0.048)	0.061 (0.085)	0.024 (0.029)	0.068 (0.084)	0.008 (0.038)	0.055 (0.088)	0.016 (0.029)	0.032 (0.078)
Sex ratio	-0.000 (0.001)	0.000 (0.003)	0.002** (0.001)	0.003 (0.002)	0.001 (0.002)	0.003 (0.003)	0.001 (0.003)	0.003 (0.003)	0.000 (0.001)	0.001 (0.003)	0.001 (0.001)	0.002 (0.003)	0.002 (0.001)	0.007 (0.005)
Covariates														
Age	-0.077 (0.089)	-0.197 (0.245)	-0.077 (0.087)	-0.276 (0.272)	-0.061 (0.093)	-0.157 (0.248)	-0.060 (0.097)	-0.175 (0.256)	-0.066 (0.093)	-0.191 (0.248)	-0.057 (0.098)	-0.217 (0.269)	-0.065 (0.099)	-0.169 (0.222)
Age squared	0.119 (0.138)	0.308 (0.378)	0.116 (0.135)	0.428 (0.420)	0.096 (0.142)	0.248 (0.380)	0.094 (0.146)	0.271 (0.391)	0.101 (0.142)	0.293 (0.380)	0.087 (0.150)	0.331 (0.412)	0.107 (0.151)	0.274 (0.345)
Education (illiterate/Read and Write omit.)														
Less than secondary	-0.021 (0.039)	-0.063 (0.109)	-0.020 (0.039)	-0.108 (0.107)	-0.008 (0.036)	-0.031 (0.099)	-0.008 (0.040)	-0.021 (0.095)	-0.006 (0.036)	-0.021 (0.095)	-0.010 (0.038)	-0.031 (0.098)	-0.015 (0.038)	-0.048 (0.098)
secondary	-0.192*** (0.047)	-0.507*** (0.127)	-0.191*** (0.046)	-0.516*** (0.127)	-0.183*** (0.050)	-0.504*** (0.133)	-0.186** (0.059)	-0.498*** (0.131)	-0.182*** (0.047)	-0.494*** (0.120)	-0.201*** (0.052)	-0.494*** (0.134)	-0.203*** (0.047)	-0.487*** (0.135)
University and above	-0.200** (0.069)	-0.531** (0.188)	-0.199** (0.069)	-0.558** (0.187)	-0.194** (0.068)	-0.508** (0.184)	-0.196** (0.068)	-0.517** (0.188)	-0.196** (0.067)	-0.530** (0.181)	-0.162* (0.068)	-0.510** (0.194)	-0.180* (0.074)	-0.502** (0.190)
Father's education (illiterate/Read and Write omit.)														
Below secondary	0.066 (0.048)	0.171 (0.124)	0.065 (0.049)	0.145 (0.103)	0.062 (0.052)	0.163 (0.134)	0.065 (0.054)	0.171 (0.131)	0.064 (0.049)	0.171 (0.130)	0.066 (0.050)	0.145 (0.125)	0.059 (0.052)	0.193 (0.130)
Secondary and above	0.188* (0.082)	0.538* (0.251)	0.175* (0.081)	0.333 (0.189)	0.171* (0.085)	0.521* (0.250)	0.173* (0.087)	0.500* (0.248)	0.169* (0.081)	0.478* (0.240)	0.166 (0.099)	0.460 (0.249)	0.201* (0.087)	0.595* (0.250)
Mother's education (illiterate/Read and Write omit.)														
Below secondary	0.165** (0.058)	0.464** (0.165)	0.163** (0.059)	0.505*** (0.144)	0.156* (0.061)	0.437** (0.162)	0.153* (0.060)	0.427* (0.166)	0.155** (0.058)	0.428** (0.166)	0.182** (0.057)	0.452** (0.164)	0.179** (0.059)	0.405* (0.168)
Secondary and above	0.362*** (0.075)	1.055*** (0.269)	0.367*** (0.076)	1.052*** (0.217)	0.351*** (0.079)	1.066*** (0.323)	0.346*** (0.077)	1.069*** (0.319)	0.351*** (0.076)	1.059*** (0.283)	0.000 (.)	1.081*** (0.303)	0.415*** (0.073)	1.036*** (0.309)
Above secondary*father's secondary+	-0.200 (0.134)	-0.580 (0.394)	-0.198 (0.137)	-0.323 (0.358)	-0.188 (0.134)	-0.603 (0.417)	-0.187 (0.138)	-0.582 (0.407)	-0.183 (0.133)	-0.520 (0.410)	0.000 (.)	-0.574 (0.420)	0.000 (.)	-0.619 (0.398)
Father's emp. stat./sector (private WW omit.)														
Public	-0.083 (0.050)	-0.225 (0.134)	-0.082 (0.051)	-0.228 (0.135)	-0.082 (0.050)	-0.248 (0.173)	-0.081 (0.050)	-0.228 (0.137)	-0.083 (0.049)	-0.244 (0.136)	-0.105 (0.054)	-0.238 (0.138)	-0.070 (0.056)	-0.236 (0.135)
Other	-0.047 (0.035)	-0.121 (0.095)	-0.045 (0.035)	-0.082 (0.098)	-0.036 (0.034)	-0.091 (0.097)	-0.033 (0.034)	-0.094 (0.093)	-0.034 (0.035)	-0.091 (0.096)	-0.045 (0.037)	-0.107 (0.093)	-0.052 (0.036)	-0.127 (0.091)
Mother ever worked	-0.083 (0.046)	-0.238 (0.136)	-0.082 (0.048)	-0.220 (0.126)	-0.081 (0.052)	-0.192 (0.135)	-0.083 (0.058)	-0.208 (0.135)	-0.079 (0.048)	-0.219 (0.129)	-0.081 (0.052)	-0.199 (0.124)	-0.069 (0.048)	-0.250* (0.126)
Region of Birth (North Urban omit.)														

Variables/Outcomes	Extended work		Market work		Wage work		Private wage work		Public wage work		Non-wage work		Subsistence work	
	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate	IV	Bivariate
Tunisia-North Rural	0.039 (0.047)	0.130 (0.157)	0.016 (0.046)	0.097 (0.138)	0.042 (0.072)	0.125 (0.209)	0.043 (0.086)	0.086 (0.130)	0.030 (0.046)	0.099 (0.120)	0.019 (0.042)	0.027 (0.124)	0.046 (0.049)	0.166 (0.133)
Tunisia-West Urban	0.107 (0.063)	0.265 (0.160)	0.086 (0.059)	0.203 (0.146)	0.101 (0.081)	0.285 (0.214)	0.102 (0.094)	0.248 (0.167)	0.089 (0.059)	0.248 (0.167)	0.000 (.)	0.209 (0.152)	0.112 (0.064)	0.313 (0.181)
Tunisia-West Rural	0.042 (0.059)	0.126 (0.191)	0.001 (0.063)	0.101 (0.162)	0.039 (0.116)	0.102 (0.224)	0.044 (0.158)	0.053 (0.172)	0.018 (0.057)	0.045 (0.152)	0.000 (0.048)	-0.011 (0.154)	0.060 (0.060)	0.223 (0.174)
Tunisia-South Urban	-0.022 (0.058)	-0.049 (0.165)	-0.048 (0.060)	-0.022 (0.170)	-0.014 (0.088)	-0.019 (0.242)	-0.010 (0.116)	-0.073 (0.145)	-0.029 (0.051)	-0.074 (0.135)	-0.037 (0.046)	-0.147 (0.136)	0.000 (.)	0.013 (0.156)
Tunisia-South Rural	-0.155* (0.072)	-0.394 (0.238)	-0.232** (0.071)	-0.453** (0.171)	-0.158 (0.186)	-0.411 (0.354)	-0.146 (0.265)	-0.495* (0.236)	-0.191** (0.065)	-0.538** (0.177)	-0.244*** (0.056)	-0.594** (0.184)	-0.143* (0.071)	-0.237 (0.209)
Constant	1.991 (1.420)	3.847 (3.890)	1.760 (1.388)	4.532 (4.285)	1.728 (1.448)	3.200 (3.917)	1.737 (1.482)	3.423 (4.009)	1.774 (1.462)	3.500 (3.970)	1.500 (1.569)	3.947 (4.257)	1.680 (1.542)	3.723 (3.540)
N	981	981	982	982	961	961	960	960	960	960	864	961	864	980

Notes: (i) *p<0.05; **p<0.01; ***p<0.001 (ii) Standard errors in parentheses are clustered by the governorate of birth by urban/rural.