The Effects of Compulsory Schooling Laws on Teenage Marriage and Births in Turkey

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Aim

Estimate the effect of the extension of compulsory schooling from 5 to 8 years in 1997 on the marriage and first-birth decisions for teenage women in Turkey.

In particular, for the teenage years, we examine the effect of the education policy on

i)   The probability of getting married by age
ii)   The probability of giving birth by age
iii)   Time to first-birth after marriage
iv)   Time to marriage
v)   Time to first-birth

Teenage marriage and births remain at significant levels in Turkey. According to 2008 DHS: 25-49 year- olds
43% married before age 20
25% married before age 18
5% married before age 15
29% given birth to first child before age 20

A rigid sequence of events of completion of education, marriage, and the birth of first child in Turkey—as reported in other countries (Blossfeld and de Rose, 1992; Marini, 1984).

Turkey is an excellent context for studying the effect of education on marriage and the effect of education on the time until first-birth after marriage because marriage is nearly universal and out of wedlock births are very rare.

Consequences of Early Marriage and Childbearing

Developed Countries: (causal effects of early childbearing)

- Worse educational outcomes (Levine and Painter, 2003; Holmund 2005)

- Worse labor market outcomes (Klepinger et al. 1999; Chevalier and Viitanen, 2003; Fletcher and Wolfe, 2009)

- Adverse health outcomes (Webbink et al. 2008)

- Adverse intergenerational effects (Francesconi, 2008; Hunt, 2006)

- Child health outcomes – mixed results (Rosenzweig and Wolpin, 1995; Wolpin, 2001)

Developing Countries:

- Poorer mother and child health outcomes (Alam, 2000; Raj et al. 2009, 2010)

- Worse educational outcomes (Lloyd and Mensch, 2008; **Field and Ambrus, 2008**)

- Higher probability of domestic violence (Unicef, 2005; Edirne et al. 2010)

Mechanisms:

Education affects marriage by

1) Institution effect (incarceration effect)

Student and spousal roles are incompatible (Thornton et al., 1995; Black et al., 2008).

2) Human capital effect

Opportunity cost of marriage and child bearing (Becker, 1991 - theory of specialization and gains from marriage)

Changes in preferences (Axinn and Barber, 2001)

Education affects fertility by

- delaying the entry time to risk of marriage due to longer schooling years

- opportunity cost of raising children (Willis, 1973; Becker, 1991)

- better knowledge of contraceptive methods (Rosenzweig and Schultz, 1985,1989; Schultz, 1994)

- higher bargaining power in fertility decisions for more educated women (Mason, 1986)

Literature on Impact of Education on Marriage and Fertility

Lefgren and McIntyre (2006), US: no causal impact on probability of marriage.

Breierova and Duflo (2004), Indonesia: delay age at first-marriage and birth. Decrease in number of children.

Skirbekk, Kohler and Prskawetz (2004), Sweden: delay age at first-marriage and birth.

Monstad, Propper and Salvanes (2008), Norway: delay age at first-birth.

Amin and Behrman (2011), US: delay age at first-birth, reduce number of children.

Osili and Long (2007), Nigeria: Decrease in number of children.

Lavy and Zablotsky (2011), Israel: Decrease in fertility, no effect on age at marriage.

Ozier (2011), US: teenage pregnancy reduced.

Silles (2011), Great Britain and Ireland: teenage pregnancy reduced.

Black, Devereux and Salvanes (2008): education reduces teenage childbearing both in the U.S. and Norway. (Instrument: state and year variation in compulsory schooling)

Literature in Turkey Using the Change in the Compulsory Schooling Law

Kırdar et al. (2015) and Yüret (2009) = Schooling outcomes due to the extension

Aydemir and Kırdar (2013) and Mocan (2013): estimate the returns to schooling using the change in the law as an instrument.

Dinçer et al. (2014) and Güneş (2015, 2013): examine women's fertility and child health

Cesur et al. (2014): examine women's health outcomes

Cesur and Mocan (2013) and Güleşçi and Meyersson (2013): study changes in religiosity and lifestyles as a result of the extension of secular compulsory schooling.

Education System in Turkey and the New Policy

- Primary School: Grades 1-5

- Secondary School: Grades 6-8

- High School: Grades 9-11

- Before the new policy, enacted in the summer of 1997, only primary school was compulsory. The new policy combined primary and secondary schools and made the attendance of grades 1-8 mandatory.

- Two groups of children = those affected by policy and those who are not based on date of birth

Data and Methodology

Data: 2008 and 2013 Demographic and Health Survey
for Turkey.

Women ages 15-64; 1959 to 1998 birth cohorts = 20,552 obs.

Advantage of this data set over others:

-Timing of marriage, timing of first birth

- Highest grade level completed

- First part of study on level of marriage and fertility:

Construct histories of ever-married status and ever-given birth status from age 10 to age 19 (or latest age observed in data). Analysis by age.

- Second part of the study on timing of marriage and fertility:

Use duration analysis.

Construct event histories: women enter the risk set at age 12 and exit when they get married/give birth. If they don't, they constitute the right censored observations.

141,622 person-age obs in time-to-marriage

149,444 person-age obs in time-to-first-birth.

Identification:

Variation in the exposure to policy across birth-cohorts.

<u>Timing of policy:</u>
First implemented in the 1997-98 school-year, affects children who finished grade 4 or a lower grade by end 1996-97 school year.

<u>Groups affected:</u>
Children who started school in or after the 1993-94 school-year.

Assuming children start school at age 6:
Children born in or after 1987 = affected by policy

Due to late/early starters, slow implementation, exclude 1986 and 1987 birth-cohorts from analysis.

Estimation: Regression Discontinuity Design

1) Level Effects

A separate logit regression run by age, where the dependent variable is "ever married" or "ever given birth".

Allow for time-trends – polynomials up to 4th order.

Standard errors clustered at level of birth-year.

$$Y_i = f(x_i) + \rho D_i + \eta_i$$

Y=outcome variable; D=treatment variable (xi>= 1987)

ρ =causal effect

In certain specification, allow the time trend to differ before and after policy.

2) Timing Effects - using Duration Analysis

The waiting time concept is age.

Piece-wise constant baseline hazard, which is interacted with the policy variable to examine the age-varying impact of the policy.

Logistic functional form for the baseline hazard.

$$\log\left[\frac{h_{it}}{1-h_{it}}\right] = b(t) + f_t(x_i) + \rho_t D_i.$$

t waiting time concept, age

h_{it} discrete time hazard rate

b(t) baseline hazard rate

Robustness Checks:

- Use different time windows:
10 years before, 10 years after
5 years before, 5 years after

- Include other covariates:
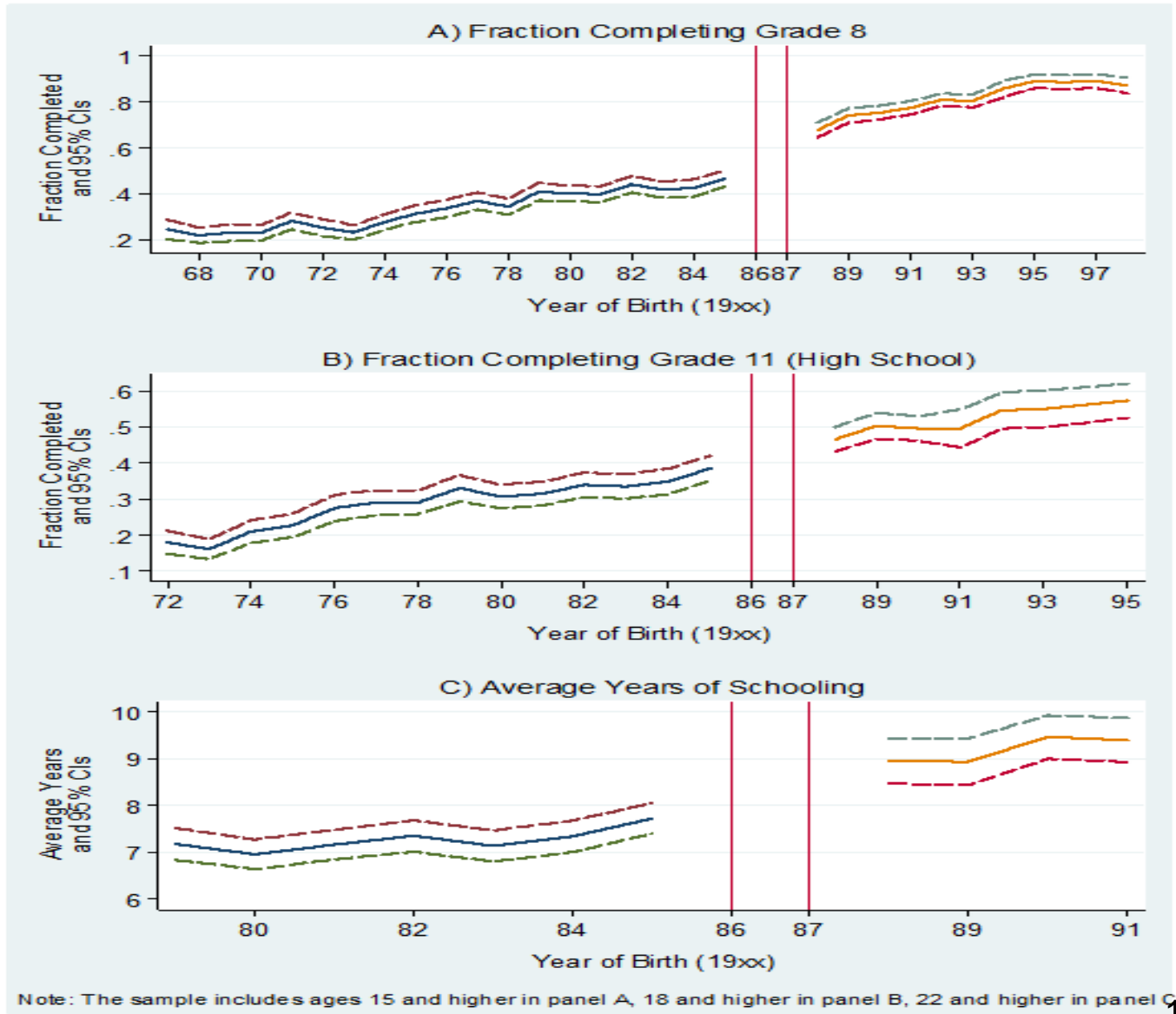Geographical controls at time of birth: rural/urban, NUTS1 level region.

Falsification Test:
- Slide the timing of the policy over time

RESULTS

Fractions completing various grade levels

A) Fraction Completing Grade 8

B) Fraction Completing Grade 11 (High School)

C) Average Years of Schooling

Note: The sample includes ages 15 and higher in panel A, 18 and higher in panel B, 22 and higher in panel C

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Policy Effect on Schooling Outcomes

	Single Time Trend				Split Time Trends		Obs.
	Linear	Quadratic	Cubic	Quartic	Linear	Quadratic	
	(1)	(2)	(3)	(4)	(5)	(6)	

A) Policy Effect on the Odds of Completing Grade 8 and Grade 11 - Logistic Regression Results

	Linear (1)	Quadratic (2)	Cubic (3)	Quartic (4)	Linear (5)	Quadratic (6)	Obs.
A1) 8th grade completion	2.806***	1.906***	1.909***	2.120***	2.033***	1.683***	21,845
	[0.269]	[0.203]	[0.189]	[0.272]	[0.140]	[0.196]	
A2) 11th grade completion	1.257***	1.131	1.167***	1.296***	1.274***	1.180**	19,321
	[0.062]	[0.085]	[0.066]	[0.110]	[0.056]	[0.085]	

B) Policy Effect on Years of Schooling - OLS Regression Results

	Linear (1)	Quadratic (2)	Cubic (3)	Quartic (4)	Linear (5)	Quadratic (6)	Obs.
Years of Schooling	1.039***	0.708***	1.240***	1.030***	0.858***	0.915	16,448
	[0.135]	[0.248]	[0.350]	[0.264]	[0.195]	[0.560]	

Notes: The sample includes observations from both 2008 and 2013 DHS. The sample is restricted to ages 15 and above in panel (A1), to ages 18 and above in panel (A2), and to ages 22 and above in panel (B). In addition, 1986 and 1987 birth cohorts are excluded. The policy dummy is one when year of birth is greater than 1987. Each cell comes from a separate regression of the specified schooling outcome on the policy variable as well as the specified time trends. In panel (A), odds ratios and their standard errors from logistic regressions are given; in panel (B), OLS estimates are given. In the first 4 columns, single time trends up to quartic polynomials are fitted, whereas separate polynomials are fitted on either side of the discontinuity in columns (5) and (6). The standard errors are clustered at the year-of-birth level. Statistical significance is *** at 1 percent level, ** at 5 percent level, * at 10 percent level.

Fractions of
Women Ever
Married
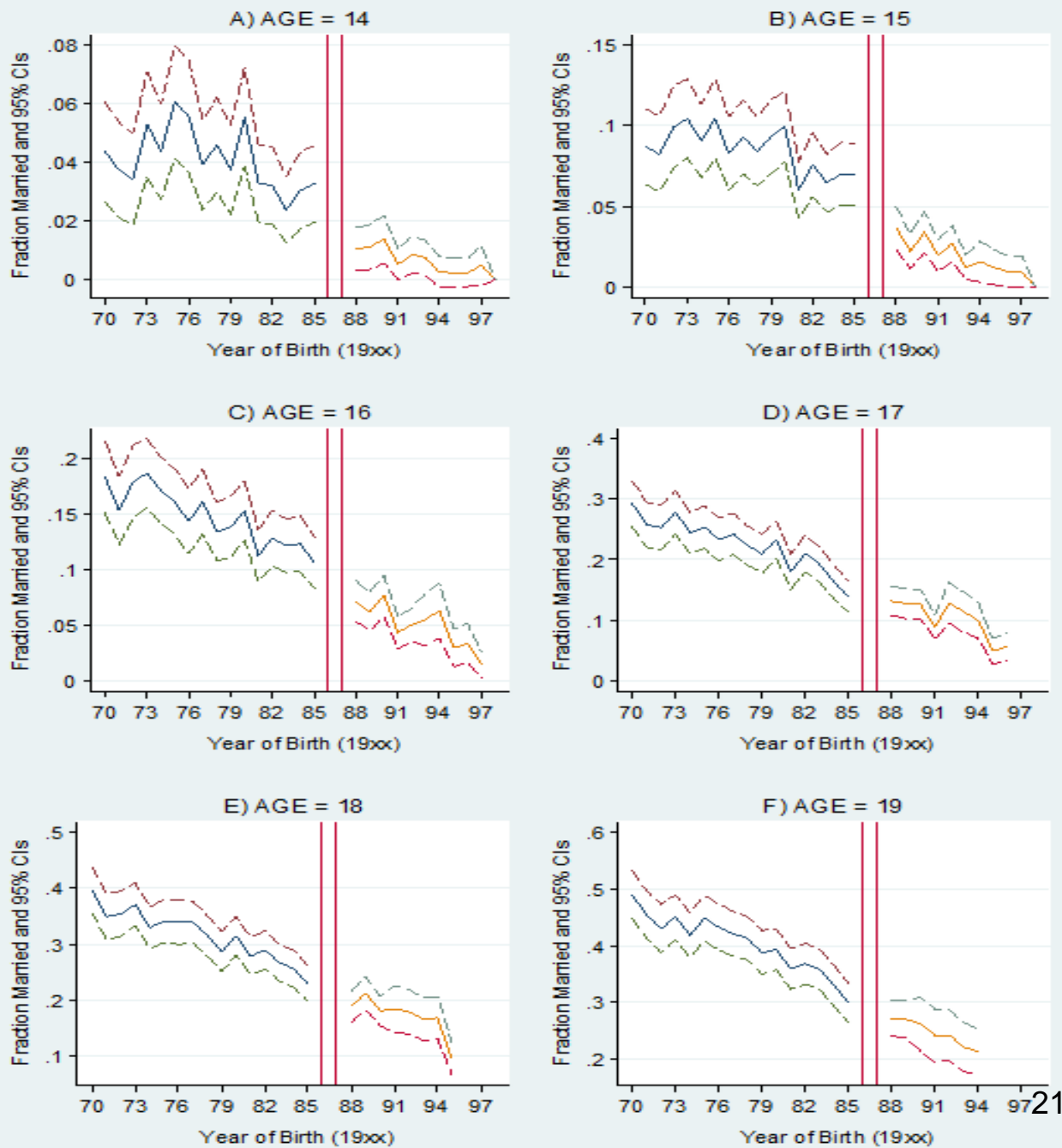
Fractions of
Women Ever
Given Birth

Time to First Birth After Marriage

Year of Birth (19xx)

23
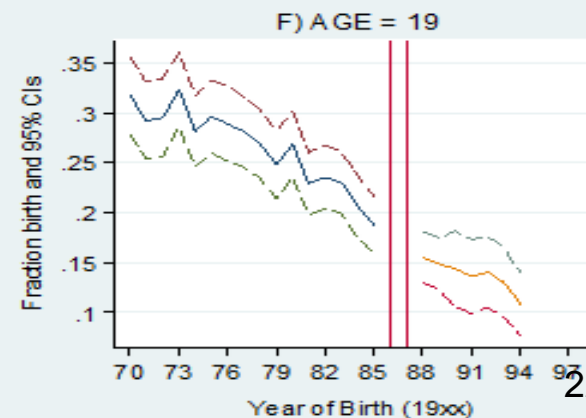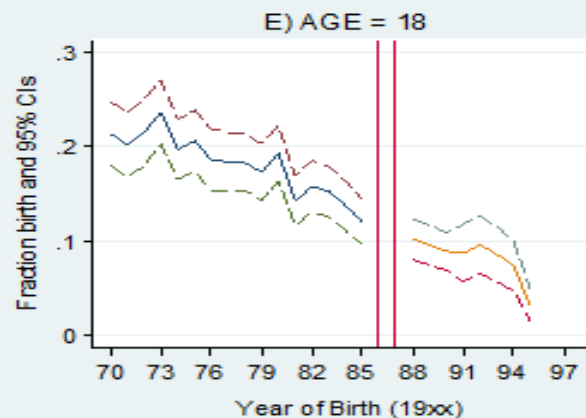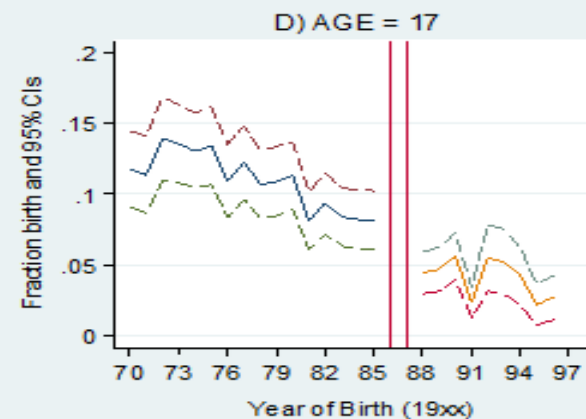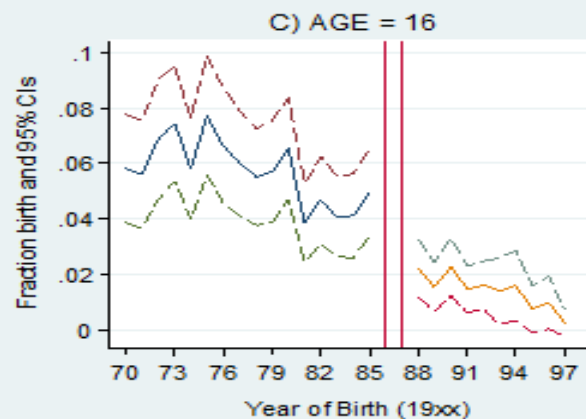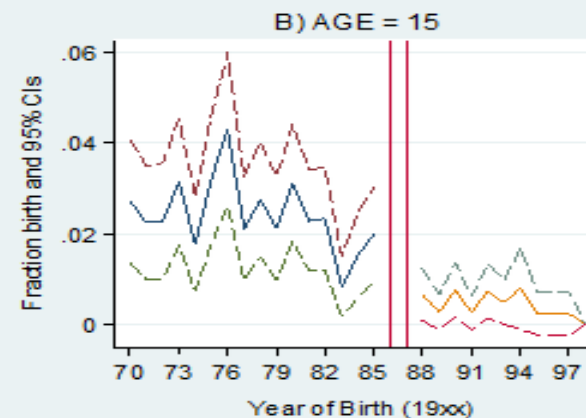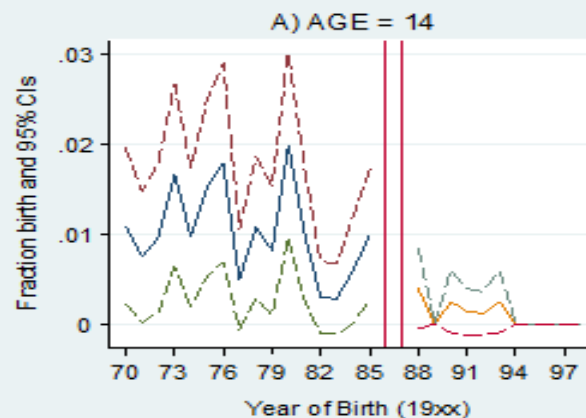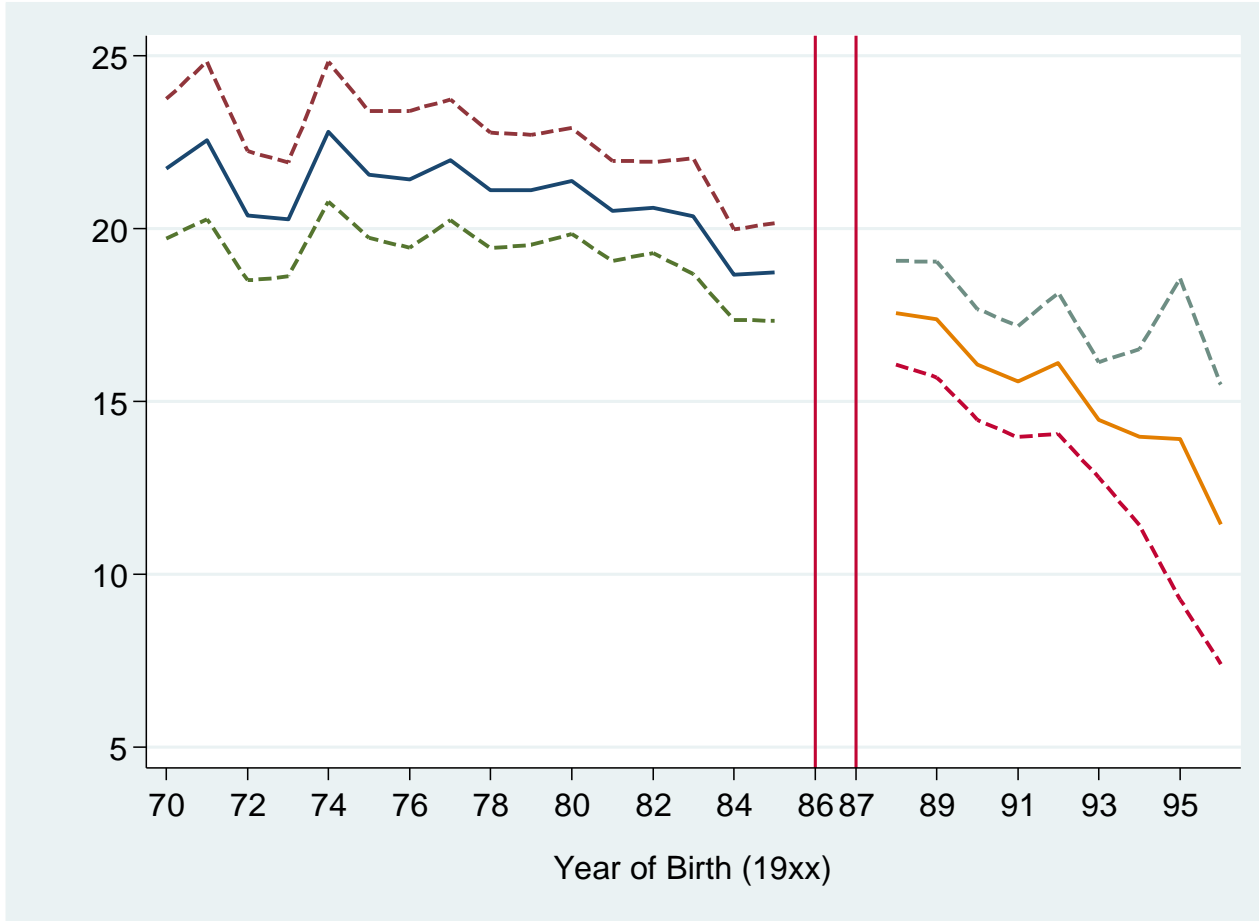
Policy Effect on the Odds of Ever Being Married by Age

	Dependent Variable: Ever Married						
	Single Time Trend				Split Time Trends		
	Linear (1)	Quadratic (2)	Cubic (3)	Quartic (4)	Linear (5)	Quadratic (6)	Obs.
Age=12	0.249*** [0.118]	0.597 [0.366]	0.488 [0.309]	0.415 [0.288]	0.333* [0.199]	0.690 [0.492]	20,552
Age=13	0.329*** [0.083]	0.590 [0.247]	0.604 [0.241]	0.487* [0.213]	0.572* [0.183]	0.791 [0.356]	20,552
Age=14	0.305*** [0.056]	0.438*** [0.108]	0.601** [0.137]	0.546** [0.130]	0.572** [0.129]	0.387*** [0.108]	20,552
Age=15	0.389*** [0.061]	0.528*** [0.120]	0.701** [0.123]	0.611*** [0.098]	0.729* [0.120]	0.494** [0.148]	20,552
Age=16	0.556*** [0.056]	0.744** [0.098]	0.828 [0.102]	0.777** [0.086]	0.785* [0.098]	0.610*** [0.105]	19,732
Age=17	0.711*** [0.072]	0.979 [0.115]	1.073 [0.124]	1.127 [0.148]	0.932 [0.094]	0.775 [0.150]	18,879
Age=18	0.749*** [0.050]	0.922 [0.087]	0.985 [0.128]	1.027 [0.120]	0.874 [0.109]	0.655*** [0.072]	18,043
Age=19	0.800*** [0.040]	0.929 [0.069]	0.976 [0.077]	1.042 [0.067]	0.859*** [0.039]	0.871** [0.056]	17,174

Policy Effect on the Odds of Ever Given Birth by Age

	Dependent Variable: Ever Given Birth						
	Single Time Trend				Split Time Trends		
	Linear (1)	Quadratic (2)	Cubic (3)	Quartic (4)	Linear (5)	Quadratic (6)	Obs.
Age=12	0.163* [0.179]	0.923 [1.539]	3.986 [7.639]	22.405 [52.871]	-- --	-- --	20,552
Age=13	0.282** [0.158]	0.885 [0.736]	1.385 [1.129]	1.520 [1.196]	1.217 [0.598]	0.137 [0.229]	20,552
Age=14	0.255*** [0.105]	0.417 [0.267]	0.702 [0.455]	0.669 [0.428]	0.652 [0.338]	0.335 [0.374]	20,552
Age=15	0.353*** [0.077]	0.446** [0.153]	0.486** [0.160]	0.411** [0.153]	0.444*** [0.130]	0.209** [0.128]	20,552
Age=16	0.425*** [0.054]	0.587*** [0.118]	0.678** [0.129]	0.610*** [0.114]	0.639*** [0.104]	0.454*** [0.121]	19,732
Age=17	0.567*** [0.067]	0.651*** [0.091]	0.710** [0.107]	0.773* [0.112]	0.638*** [0.093]	0.500** [0.142]	18,873
Age=18	0.677*** [0.056]	0.873 [0.085]	1.003 [0.127]	1.047 [0.117]	0.850 [0.100]	0.600** [0.127]	18,033
Age=19	0.697*** [0.039]	0.829** [0.065]	0.904 [0.078]	0.968 [0.057]	0.757*** [0.038]	0.746*** [0.062]	17,159

Policy Effect on Predicted Fractions of Ever Being Married and Ever Giving Birth

Age	A) Ever Married				B) Ever Given Birth			
	Baseline	Policy	Diff.	% Fall	Baseline	Policy	Diff.	% Fall
12	0.004	0.002	0.002	50.0	0.000	0.004	-0.004	--
13	0.011	0.005	0.006	54.5	0.001	0.002	-0.001	--
14	0.027	0.015	0.012 **	44.4	0.005	0.004	0.001	20.0
15	0.062	0.039	0.023 ***	37.1	0.017	0.007	0.010 **	58.8
16	0.103	0.082	0.021 **	20.4	0.040	0.025	0.015 ***	37.5
17	0.144	0.159	-0.015	-10.4	0.072	0.057	0.015 *	20.8
18	0.225	0.230	-0.005	-2.2	0.117	0.122	-0.005	-4.3
19	0.293	0.302	-0.009	-3.1	0.180	0.175	0.005	2.8

Policy Effect on the Time to First Birth after Marriage

	Dependent Variable: Time to First Birth after Marriage						
	Single Time Trend				Split Time Trends		
Linear	Quadratic	Cubic	Quartic		Linear	Quadratic	Obs.
(1)	(2)	(3)	(4)		(5)	(6)	
A) With age at marriage controls							
-3.558***	-1.061	0.040	-0.036		-1.108**	-0.168	12,644
[0.656]	[0.772]	[0.560]	[0.661]		[0.432]	[0.639]	
B) Without age at marriage controls							
-3.043***	-0.893	-0.286	-0.336		-1.447***	-0.304	12,644
[0.559]	[0.735]	[0.606]	[0.713]		[0.411]	[0.687]	

Policy Effect on Marriage Hazard by Age

	Single Time Trend				Split Time Trends	
Dependent Variable: Marriage status conditional on not being married until that age						
	Linear (1)	Quadratic (2)	Cubic (3)	Quartic (4)	Linear (5)	Quadratic (6)
Age=12	0.226** [0.138]	0.533 [0.436]	0.234 [0.267]	0.172 [0.195]	0.164 [0.195]	0.763 [1.234]
Age=13	0.381*** [0.143]	0.583 [0.360]	0.662 [0.382]	0.517 [0.330]	0.742 [0.280]	0.805 [0.520]
Age=14	0.289*** [0.065]	0.357*** [0.109]	0.613 [0.183]	0.597 [0.188]	0.573* [0.175]	0.215*** [0.069]
Age=15	0.459*** [0.089]	0.599* [0.184]	0.780 [0.184]	0.660* [0.155]	0.866 [0.190]	0.576 [0.264]
Age=16	0.739** [0.091]	1.096 [0.193]	1.124 [0.215]	1.097 [0.218]	0.964 [0.170]	0.759 [0.223]
Age=17	0.901 [0.155]	1.512* [0.356]	1.675** [0.371]	1.993** [0.566]	1.292 [0.204]	1.119 [0.334]
Age=18	0.722*** [0.088]	0.825 [0.160]	0.861 [0.198]	0.864 [0.188]	0.825 [0.184]	0.644 [0.189]
Age=19	0.788* [0.106]	1.029 [0.194]	1.273 [0.240]	1.284 [0.231]	1.109 [0.193]	1.006 [0.341]

Policy Effect on Birth Hazard by Age

Dependent Variable: Birth status conditional on not giving birth until that age

	Single Time Trend				Split Time Trends	
	Linear (1)	Quadratic (2)	Cubic (3)	Quartic (4)	Linear (5)	Quadratic (6)
Age=12	0.134* [0.153]	0.900 [1.601]	4.937 [9.618]	20.947 [47.847]	- -	- -
Age=13	0.372 [0.280]	0.980 [1.063]	1.057 [1.191]	0.842 [0.942]	0.782 [0.791]	- -
Age=14	0.243*** [0.118]	0.301* [0.212]	0.524 [0.356]	0.515 [0.364]	0.495 [0.293]	0.241 [0.363]
Age=15	0.417*** [0.110]	0.454** [0.181]	0.443** [0.163]	0.339** [0.149]	0.404*** [0.132]	0.137*** [0.068]
Age=16	0.455*** [0.071]	0.721 [0.172]	0.876 [0.186]	0.799 [0.170]	0.818 [0.141]	0.598** [0.153]
Age=17	0.689** [0.110]	0.734 [0.156]	0.808 [0.189]	1.044 [0.237]	0.716 [0.155]	0.512 [0.220]
Age=18	0.763* [0.116]	1.198 [0.237]	1.442** [0.264]	1.444* [0.287]	1.169 [0.170]	1.044 [0.342]
Age=19	0.659*** [0.048]	0.800** [0.074]	0.902 [0.063]	0.957 [0.066]	0.767*** [0.048]	0.817 [0.103]

Falsification Test – Sliding the Timing of Policy Over Time

A) Dependent Variable: Ever Married

| | | Year of Discontinuity | | | | | | | |
		1983 (1)	1984 (2)	1985 (3)	1986 (4)	Actual (5)	1988 (6)	1989 (7)	1990 (8)
Age=14		0.932 [0.283]	0.986 [0.309]	0.998 [0.386]	0.624* [0.151]	0.546** [0.130]	0.553** [0.138]	0.750 [0.274]	0.853 [0.447]
	No obs.	20,588	20,616	20,625	20,527	20,552	20,542	20,502	20,470
Age=15		1.023 [0.257]	0.886 [0.221]	0.751 [0.133]	0.649*** [0.094]	0.611*** [0.098]	0.656* [0.152]	0.945 [0.203]	0.975 [0.285]
	No obs.	20,588	20,616	20,625	20,527	20,552	20,542	20,502	20,470
Age=16		1.094 [0.165]	0.957 [0.124]	0.888 [0.100]	0.838 [0.111]	0.777** [0.086]	0.868 [0.137]	0.933 [0.169]	0.891 [0.199]
	No obs.	19,768	19,796	19,805	19,707	19,732	19,722	19,682	19,650

B) Dependent Variable: Ever Given Birth

| | | Year of Discontinuity | | | | | | | |
		1983 (1)	1984 (2)	1985 (3)	1986 (4)	Actual (5)	1988 (6)	1989 (7)	1990 (8)
Age=15		0.771 [0.254]	0.764 [0.297]	0.923 [0.559]	0.526 [0.225]	0.411** [0.153]	0.350*** [0.139]	0.624 [0.244]	0.879 [0.516]
	No obs.	20,588	20,616	20,625	20,527	20,552	20,542	20,502	20,470
Age=16		1.153 [0.294]	1.185 [0.297]	1.004 [0.267]	0.731** [0.107]	0.610*** [0.114]	0.568*** [0.117]	0.822 [0.185]	0.929 [0.265]
	No obs.	19,768	19,796	19,805	19,707	19,732	19,722	19,682	19,650
Age=17		1.067 [0.181]	1.018 [0.162]	0.934 [0.119]	0.875 [0.116]	0.773* [0.112]	0.893 [0.163]	0.969 [0.270]	0.915 [0.431]
	No obs.	18,909	18,937	18,946	18,848	18,873	18,863	18,823	18,791

Policy Effect on the Odds of Being Married by Age
Analysis by Month and Year of Birth

	Dependent Variable: Ever Married									
	Single Time Trend						Split Time Trends			
	One (1)	Two (2)	Three (3)	Four (4)	Five (5)	Six (6)	One (7)	Two (8)	Three (9)	Obs.
Age=12	0.634 [0.583]	0.768 [0.699]	0.487 [0.495]	0.587 [0.539]	2.823 [4.078]	0.773 [1.462]	0.701 [0.644]	0.190 [0.330]	0.321 [1.536]	6,653
Age=13	1.168 [0.725]	1.315 [0.804]	0.600 [0.455]	0.762 [0.555]	1.529 [1.572]	0.848 [0.947]	1.311 [0.776]	0.355 [0.360]	0.395 [0.789]	6,653
Age=14	0.588 [0.257]	0.779 [0.350]	0.488 [0.264]	0.353* [0.217]	0.495 [0.366]	0.261 [0.225]	0.743 [0.318]	0.178** [0.145]	0.110* [0.144]	6,653
Age=15	0.485*** [0.124]	0.656 [0.182]	0.464** [0.150]	0.308*** [0.124]	0.392** [0.173]	0.312** [0.156]	0.614* [0.168]	0.203*** [0.102]	0.229* [0.174]	6,653
Age=16	0.717* [0.123]	0.858 [0.161]	0.630** [0.139]	0.409*** [0.111]	0.514** [0.154]	0.538* [0.184]	0.813 [0.149]	0.351*** [0.115]	0.682 [0.341]	6,363
Age=17	1.134 [0.159]	1.295* [0.189]	1.156 [0.226]	0.793 [0.175]	1.017 [0.268]	1.046 [0.315]	1.220 [0.173]	0.751 [0.198]	1.261 [0.545]	6,031
Age=18	1.112 [0.140]	1.221 [0.173]	1.127 [0.204]	0.721 [0.150]	0.821 [0.191]	1.101 [0.320]	1.164 [0.158]	0.708 [0.168]	0.922 [0.365]	5,715
Age=19	1.078 [0.131]	1.111 [0.158]	1.080 [0.186]	0.873 [0.195]	0.899 [0.208]	1.189 [0.361]	1.091 [0.146]	0.876 [0.220]	1.107 [0.469]	5,412

Policy Effect on the Odds of Ever Giving Birth by Age
Analysis by Month and Year of Birth

	Dependent Variable: Ever Given Birth									
	Single Time Trend						Split Time Trends			
	One	Two	Three	Four	Five	Six	One	Two	Three	Obs.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
Age=13	0.539	1.523	2.945	0.176	0.002	0.844	--	--	--	6,653
	[0.994]	[1.305]	[3.538]	[0.385]	[0.013]	[1.134]	--	--	--	
Age=14	1.076	2.672	2.099	2.470	3.284	2.640	2.040	1.186	--	6,653
	[1.006]	[2.530]	[2.381]	[3.843]	[8.161]	[8.114]	[1.759]	[2.416]	--	
Age=15	0.647	0.715	0.539	0.215*	0.401	0.263	0.642	0.109*	0.408	6,653
	[0.291]	[0.320]	[0.314]	[0.171]	[0.404]	[0.321]	[0.295]	[0.139]	[0.753]	
Age=16	0.577*	0.646	0.511*	0.239***	0.336**	0.209**	0.591	0.133***	0.141*	6,363
	[0.171]	[0.218]	[0.192]	[0.118]	[0.182]	[0.137]	[0.200]	[0.091]	[0.160]	
Age=17	0.745	0.680	0.526**	0.238***	0.295***	0.231***	0.650*	0.143***	0.107**	6,031
	[0.153]	[0.177]	[0.147]	[0.094]	[0.115]	[0.113]	[0.170]	[0.073]	[0.094]	
Age=18	1.054	1.189	1.077	0.630*	0.798	1.147	1.110	0.565*	1.195	5,715
	[0.172]	[0.214]	[0.237]	[0.168]	[0.230]	[0.406]	[0.195]	[0.172]	[0.579]	
Age=19	1.100	1.159	1.297	0.965	0.979	1.313	1.100	1.024	0.940	5,412
	[0.142]	[0.181]	[0.236]	[0.236]	[0.244]	[0.440]	[0.162]	[0.273]	[0.438]	

Policy Effect on the Marriage Hazard Rate by Age
Analysis by Month and Year of Birth

Degree of Polynomial	Single Time Trend						Split Time Trends		
	One (1)	Two (2)	Three (3)	Four (4)	Five (5)	Six (6)	One (7)	Two (8)	Three (9)
A) Dependent Variable: Ever Married									
Age=12	0.332	0.438	0.302	0.562	3.811	2.832	0.441	0.400	4.578
	(0.479)	(0.612)	(0.496)	(0.734)	(7.521)	(5.821)	(0.604)	(0.694)	(18.044)
Age=13	1.685	1.851	0.709	0.888	1.090	0.866	1.926	0.474	0.314
	(1.325)	(1.474)	(0.670)	(0.840)	(1.300)	(1.103)	(1.441)	(0.561)	(0.663)
Age=14	0.365*	0.553	0.424	0.150*	0.175	0.109	0.502	0.089*	0.092
	(0.219)	(0.332)	(0.320)	(0.152)	(0.203)	(0.156)	(0.286)	(0.118)	(0.171)
Age=15	0.415***	0.584	0.471*	0.290**	0.326*	0.342	0.540*	0.225**	0.336
	(0.140)	(0.201)	(0.197)	(0.158)	(0.200)	(0.234)	(0.186)	(0.155)	(0.357)
Age=16	1.036	1.194	0.804	0.512*	0.693	1.058	1.136	0.501	1.569
	(0.242)	(0.266)	(0.245)	(0.185)	(0.319)	(0.481)	(0.248)	(0.221)	(0.959)
Age=17	2.225***	2.520***	2.418***	1.694	2.607**	2.658**	2.343***	1.789	3.573*
	(0.496)	(0.538)	(0.750)	(0.570)	(1.170)	(1.293)	(0.496)	(0.761)	(2.760)
Age=18	1.109	1.224	1.026	0.687	0.621	0.840	1.187	0.672	0.417
	(0.216)	(0.264)	(0.266)	(0.217)	(0.203)	(0.349)	(0.247)	(0.239)	(0.241)
Age=19	1.093	1.407	1.024	0.811	0.885	2.097	1.367	0.801	5.325***
	(0.241)	(0.347)	(0.282)	(0.311)	(0.347)	(1.093)	(0.310)	(0.358)	(3.291)

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Policy Effect on the Birth Hazard by Age
Analysis by Month and Year of Birth

	Dependent Variable: Ever Given Birth								
	Single Time Trend						Split Time Trends		
	One (1)	Two (2)	Three (3)	Four (4)	Five (5)	Six (6)	One (7)	Two (8)	Three (9)
Age=12	0.539	1.523	2.945	0.176	0.002	0.000	0.844	--	--
	(0.994)	(1.305)	(3.538)	(0.385)	(0.013)	(0.000)	(1.134)	--	--
Age=13	0.539	1.523	2.945	0.176	0.002	0.000	0.844	--	--
	(0.994)	(1.305)	(3.538)	(0.385)	(0.013)	(0.000)	(1.134)	--	--
Age=14	1.200	3.100	2.259	4.116	6.541	3.012	2.706	2.536	145.838
	(1.312)	(3.860)	(3.175)	(7.931)	(17.056)	(8.802)	(2.944)	(4.974)	(452.762)
Age=15	0.488	0.495	0.321*	0.064***	0.083**	0.066**	0.436	0.014**	0.007**
	(0.266)	(0.257)	(0.218)	(0.064)	(0.099)	(0.083)	(0.236)	(0.023)	(0.016)
Age=16	0.541	0.668	0.496	0.242**	0.298*	0.199**	0.614	0.135**	0.083
	(0.213)	(0.302)	(0.238)	(0.154)	(0.194)	(0.156)	(0.276)	(0.116)	(0.125)
Age=17	0.919	0.841	0.536*	0.228***	0.270**	0.331*	0.820	0.142***	0.132**
	(0.263)	(0.272)	(0.203)	(0.114)	(0.143)	(0.196)	(0.263)	(0.089)	(0.128)
Age=18	1.615*	2.266***	2.184**	1.628	2.112*	3.484**	1.982***	1.731	4.629**
	(0.397)	(0.510)	(0.696)	(0.584)	(0.917)	(1.765)	(0.433)	(0.736)	(3.159)
Age=19	1.230	1.544**	1.750**	1.324	1.194	1.418	1.426*	1.668	0.868
	(0.261)	(0.341)	(0.496)	(0.483)	(0.441)	(0.674)	(0.300)	(0.649)	(0.555)

Conclusions:

- The increased compulsory schooling years reduce the probability of teenage marriage by age 16 and the probability of births by age 17.

- The probability of marriage by age 14 falls by 44 percent and the probability of marriage by age 16 falls by 20 percent. However, the policy effect on marriage disappears after age 16.

- In a parallel fashion, the probability of giving birth by age 15 falls by 59 percent and the probability of marriage by age 17 falls by 21 percent. However, the policy effect on marriage disappears after age 17.

- We find no policy effect on the time to birth after marriage.

- Marriage and fertility hazard rates rebound shortly after women are out of school.

- Marriage hazard rate at age 17 and the fertility hazard rate at age 18 are higher with the policy than they would be in the absence of it.

- The policy effects on marriage, and thus on fertility, is very strong during the compulsory schooling years; however, these effects do not persist much beyond the new compulsory schooling years. (It persists only for a couple more years.)

- In other words, we find very strong incarceration effects of the new policy, but relatively small human capital effects. In addition, we do not find any human capital effect on the time to first birth after marriage.