

**Education and Views on Gender Roles:
Evidence from a Natural Experiment in Turkey**

Asena Caner¹

Cagla Okten²

September 29, 2015

Abstract:

.....

....

Keywords: compulsory schooling, traditional gender roles, returns to education, Turkey
JEL codes:

¹ TOBB University of Economics and Technology, Department of Economics, Ankara, Turkey (acaner@etu.edu.tr).

² Bilkent University, Department of Economics, Ankara, Turkey (cokten@bilkent.edu.tr)

1. Introduction

The literature on the returns to education has been mostly interested in pecuniary returns. Recently, interest on nonpecuniary returns to education has been on the rise (Oreopoulos and Salvanes, 2011). One major problem in measuring the returns to education is the possible endogeneity of education with the outcome variable of interest. To identify the causal effect of education on an outcome of interest, we need to use an estimation strategy based on exploiting plausibly exogenous variations in schooling. One main variable that generates an exogenous variation in schooling is the change in compulsory schooling laws. Compulsory schooling laws have been used in many studies as they are ideal instruments that allow researchers to measure the exogenous effect of more schooling on specific outcomes. The outcomes that have been studied are earnings (Angrist & Krueger, 1991; Harmon & Walker, 1995; Acemoglu & Angrist, 2001; Oreopoulos, 2006), schooling rate of future generations (Oreopoulos, Page, & Stevens, 2006), health of future generations (Chou, Liu, Grossman, & Joyce, 2010), lifetime wealth (Oreopoulos, 2007), intergenerational inequality (Eckstein & Zilcha, 2002), crime (Lochner & Moretti, 2004; Machin, Marie, & Vujic, 2011), teenage pregnancy (Black, Devereux, & Salvanes, 2008), adult health (Lleras-Muney, 2005; Clark & Royer, 2010), and old age cognitive abilities (Banks & Mazzonna, 2012).

In this study, we examine the causal effects of education on the attitudes of Turkish women towards gender roles, by using nationally representative data. Turkey is a developing country with a population of about 75 million people. ... We study the causal effects of education by using a major policy change in Turkey, implemented in 1997, as a source of exogenous variation in schooling.

...

Differences in gender roles have been offered as an explanation for observed gender differences in educational and labor market outcomes (Bertrand, 2010). A study of 25 OECD countries finds that evaluation of women's sense of self, as measured by agreement with the statements "when jobs are scarce, men should have more right to a job than women" or "being a housewife is just as fulfilling as working for pay", is closely associated with women's labor market outcomes (Fortin, 2005). Many believe that views on gender roles are largely determined early in childhood. In some countries, children grow up in an environment in which son preference is strong (see, for example, Zhang et al. (2007) for China and Stash and Hannum (2001) for Nepal). Even in countries that are not typically considered to have patrilineal family systems, female labor market outcomes may depend on parental views on gender roles. In Australia, females' attitudes towards working women are developed in their youth by their religious affiliation and their parents' education and labor market behavior (Vella, 1994). In the U.S., mothers with less traditional gender values are more likely to have working daughters and daughters-in-law (Farre & Vella, 2012).

In socially conservative parts of Turkey, a traditional view on gender roles prevails. Indeed, several studies that have conducted face-to-face interviews with parents, teachers and local officials in Turkey, report conservative views against girls' education as a major impediment. In four cities of the Black Sea region with low enrollment rates for girls, a concern for girls' chastity, need for girls' labor at home, preference for religious education and early marriages were presented as the main reasons for not educating girls (Alat & Alat, 2011). In a traditional and low-income city (Van), parents stated that low income and social pressure

against sending girls to mixed sex schools as the most important reasons for keeping girls out of school. Interestingly, all families in the sample who do not educate their daughters educate their sons (İlhan Tunç, 2009). Conservative views on gender roles also are also reflected in popular discourse. Recently, the Turkish Minister of Health has been quoted to say “Mothers should not place another career other than motherhood at the center of their lives” (Hurriyet Daily News, January 05, 2015).

...

The findings of the paper indicate, first, that the education reform substantially raised educational attainment in Turkey among women. Secondly,

The rest of the paper is organized as follows. Section 2 introduces to the reader the relevant literature and the institutional setting. Section 3 describes the dataset. Section 4 discusses the empirical strategy and identification issues. Section 5 explains the findings of the paper. Section 6 discusses the results and concludes.

2. Background

2.1 Education and attitudes towards gender roles

One key purpose of schooling is to develop skills. For example, learning a second language will significantly improve the employability of an individual in many countries. Critical thinking and social skills, while less tangible are also important. Critical thinking helps individuals “select pertinent information for the solution of a problem and formulate relevant and promising hypotheses.” In other words, it helps individuals process new situations or problems and make better decisions. Social skills facilitate interaction and communication with others. Hence, schooling provides an environment where children are exposed to ideas and value systems possibly different than the ones within their families.

Apple (1982, 1995, 2012) articulated his theory on educational institutions and the reproduction of and resistance to unequal power relations, and provided a thorough examination of the ways in which race-gender-class dynamics are embedded in, and reflected through, curricular issues in an influential book first published in 1982.

There is a large body of research on documenting gender inequality embedded in curricula (Acker, 1987; Esen, 1998; Esen and Bağlı, 2002; Gümüšoğlu, 2013; Helvacıoğlu, 1996; Kılıç and Eyüp, 2011; Sayılan and Özkazanç, 2009; Sayılan, 2012; Tan, 2005; Tietz, 2007; Weiler, 1988). The literature contains studies determining the perceptions of secondary education and university students toward gender roles (Keith and Jacqueline, 2002; Kimberly & Mahaffy, 2002; Koca, 2006; Rosenkrantz et al., 1986; Trommsdorff and Iwawaki, 1989). For example, Kalayci and Hayirsever (2014) document that majority of elementary students surveyed state that childcare is mostly mothers’ duty. They also find that the textbook taught in Citizenship and Democracy Education did not advocate views promoting more gender equality.

However, it is an open question how views on gender roles embedded in school curricula compare to those values taught at home. Alesina et. al. (1999) articulate a model where

individuals have different preferences over the type of public good provided. In this model, individuals first vote on the amount of public good and on the type of public good provided. By backward induction, individuals when voting on the amount of public good to be implemented will keep in mind that the public good will be the one most preferred by the median voter. The conclusion of this paper is that in a society with diverse preferences over the type of public good provided, the amount of public good chosen will be low.

2.2 The compulsory schooling law changes in Turkey

This paper uses the exposure to a nationwide reform of the compulsory education system in Turkey as an instrument for educational attainment. The reform, implemented in 1997, provides us with an ideal natural experiment, since it varied the number of years of schooling, without significant curriculum changes. It changed the duration of compulsory schooling suddenly and unexpectedly, thereby creating an external shock on educational attainment of children.

In Turkey, school enrolment rates have increased quite slowly over time. Dulger (2004) reports the enrollment rate in five-year primary schools in 1972-1973 as 89.6 percent, and that of three-year middle schools as only 34.3 percent. By 1996, school enrolment rates had risen to almost 97 percent at five-year primary education and to almost 65 percent at lower-secondary education. The 1997 Eight-Year Compulsory Education Enforcement Law (Law: 4306) was introduced against this background with the main objective of providing all children with 8 years of continuous education and to provide assistance to ensure that all children can comply. In order to provide a strong incentive for students to complete at least the 8th grade, the “Primary School Diploma” for 5th grade completers was abolished and a “Basic Education Completers Diploma” was offered to 8th grade completers.³

The law change in 1997 imposed 8 years of compulsory education by merging five years of primary education with three years of junior high school. The law did not specify the ages or birth-cohorts of children it targets. Instead, it required that, as of the beginning of the 1997-1998 school year, all children enrolled in grades 1 through 5, and all children who started school in the future would remain in school through completion of the eighth grade (Dulger, 2004). In Turkey, children typically start school at age 6, so we can infer that cohorts born in or after 1987 were subject to the education reform. Some children start school at age 7; therefore the 1986 birth cohort may also have been subject to the reform.

As an important provision, the law established a temporary set of earmarked taxes targeted to finance the expansion of schooling. These new taxes raised US\$2 billion in new revenues to support the cost of buildings, teachers and educational materials. To meet the expected increase in enrollment, the Ministry of National Education (MONE) constructed 103,983 new basic education classrooms during 1997-2001, raising the total stock to 264,776 (Dulger, 2004). During 1996-2003, 103,000 additional primary school teachers were hired, creating a 36% increase (Dinçer, Kaushal, & Grossman, 2013). In order to accommodate the

³ The law and its implementation have been discussed in several papers (Dulger, 2004; Kirdar, Dayioglu, & Koc, 2013; Gulesci & Meyersson, 2013; Kirdar, Dayioglu, & Koc, 2012; Güneş, 2013a); therefore we explain only the main points of the reform here.

children living in rural areas far away from existing schools, transportation was arranged. The reform led to a substantial increase in the number of students in primary school between the 1996/97 and the 2000/01 school years, by around 21% from 8.65 million to 10.48 million (educational statistics are available at <http://sgb.meb.gov.tr>).

Although the need for an education reform was long felt, the law change in 1997 was made rather abruptly, before much discussion in advance, and was immediately put into effect. Some analysts write that at the time the political climate was ripe for a change, therefore the politicians did not want to miss the opportunity (Dulger, 2004). For this study, it is in fact fortunate that the change was sudden and the households did not have the time to make plans against the change, since it makes it easier to defend using the reform as an instrument for educational attainment of the children.

A small number of studies have used the 1997 reform as an instrument for educational attainment, with the ultimate aim of measuring the causal effects of education on various outcomes such as religiosity (Gulesci & Meyersson, 2013), teenage marriage and birth (Kirdar, Dayioglu, & Koc, 2012), fertility (Güneş, 2013a), child health (Güneş, 2013b), schooling by gender and rural-urban residence (Kirdar, Dayioglu, & Koc, 2013), and measures of empowerment (Dinçer, Kaushal, & Grossman, 2013). These studies have reached different result on the effect of the 1997 reform on educational attainment. For instance, Kirdar, Dayioglu, and Koc (2013) report a noticeable positive effect on both boys and girls in Turkey, but they note that the reform did not narrow the gender gap. Gulesci and Meyersson (2013) find that the reform resulted in a one-year increase in years of schooling among women on average, but it did not increase schooling among men. Güneş (2013b) considers only females and finds that mothers who were exposed to the reform are about 32 percentage points more likely to have completed 8 years of schooling. Güneş (2013a) finds that for females in different birth cohorts the reform raised years of education by 0.44-2.69 years. All of these studies use data from the Turkish Demographic and Health Survey.

The 1997 Education reform essentially had two effects on students finishing elementary school: 1) It made it compulsory to stay in school for three more years. 2) It ensured that these three more years are spent at a school giving secular education. In other words, both a student who was planning to drop out after 5 years of elementary school and another one who was planning to continue her education at a vocational religious studies school (Imam-Hatip) were by law decreed to attend school three more years in a secular school and only start going to an Imam Hatip at high school level.

Imam-Hatip Schools have been opened as vocational schools to educate future imams the equivalent of ministers in Islam. These schools are viewed as reinforcing traditional views on gender roles by some parts of the society. Those who advocate this view argue that girls who graduate from these schools cannot become Imams. Hence, some argue that a girl who is attending this vocational school is expected to get married and stay out of the labor force.

Therefore, we would expect that girls who continued their education in a secular junior high school instead of an Imam Hatip were subject to a three more years of secular education instead of religious education.

As we have seen in our literature review section, many studies find that even a secular education may reinforce the traditional views on gender. Wrigley (1992) states that there is no

simple relationship between education and gender equality. Schools may both reinforce traditional views on gender and help girls use their brains and develop new skills. It enables them to learn about their abilities which may go unnoticed at home.

Here we consider the model presented in Alesina et. al. (1999) and assume the type of public good provided in Turkey reflects median voter’s preferences in terms of views on gender roles. In other words, the gender views reflected in the school curriculum will reflect the preferences of the median voter. If the median voter also means median student then half of students would receive an education with more traditional views than their own and the other half would get an education with less traditional views than their own. However, we observe in our data that adults with more traditional views have also more children. Hence this suggests that, more than half of the students would receive an education that is less traditional than views within their families.

This theoretical framework and the two elements of the reform suggest that the reform may moderate traditional views on gender roles. However, the effect of education on views on gender roles remains ultimately an empirical question.

3. Data and Summary Statistics

3.1 Data

Data on views on gender roles come from the Turkish Demographic and Health Surveys (hereafter TDHS) which were conducted by Hacettepe University of Turkey. TDHS are representative not only at the national level but also at five major regions of the country (the West, South, Central, North, and East). The TDHS have a cross-sectional nature with independent samples collected in different waves. The ever-married women module of TDHS provides data for a wide range of monitoring and impact evaluation indicators related to population, health, nutrition, women’s beliefs and attitudes, and children’s educational attainment, for the sample of women between ages 15 and 49.

For our analyses we make use of the 2008 round of TDHS. In 2008, the 1986 birth cohort (the first cohort that was exposed to the new reform) was 22 years old. Therefore, the 2008 survey can be used to study the effects of the reform on young female adults in Turkey.

Our measures of view on gender role focuses on nine questions asked in the survey. The questions ask whether the participant agrees or disagrees with the statements listed in Table 1. Responses to these questions are recoded as 0-1 variables where 0 represents a traditional (more conservative) view on gender roles and 1 represents a modern view.

Table 1: Questions related to attitude towards gender roles (TDHS 2008)

Statement	Modern view (coded as 1)	Traditional view (coded as 0)
“Important family decisions should be made only by men.”	Disagree	Agree

“Women should not argue with husband even if she disagrees.”	Disagree	Agree
“It is better to educate a son rather than a daughter.”	Disagree	Agree
“Men are wiser.”	Disagree	Agree
“Women should be virgin when they get married.”	Disagree	Agree
“Men should also do housework.”	Agree	Disagree
“Married women should work outside if she wants to.”	Agree	Disagree
“Women may go anywhere without husband’s permission.”	Agree	Disagree
“Women should be more involved in politics.”	Agree	Disagree

An advantage of TDHS is that it provides information on the highest grade completed. We rely on this information to define a “junior high school completion” dummy variable that takes the value of 1 if the woman completed at least 8 years of schooling and 0 otherwise. Figure 1 shows the average junior high school completion rates by birth cohorts. The jump at the time of the reform is clearly visible in the figure.

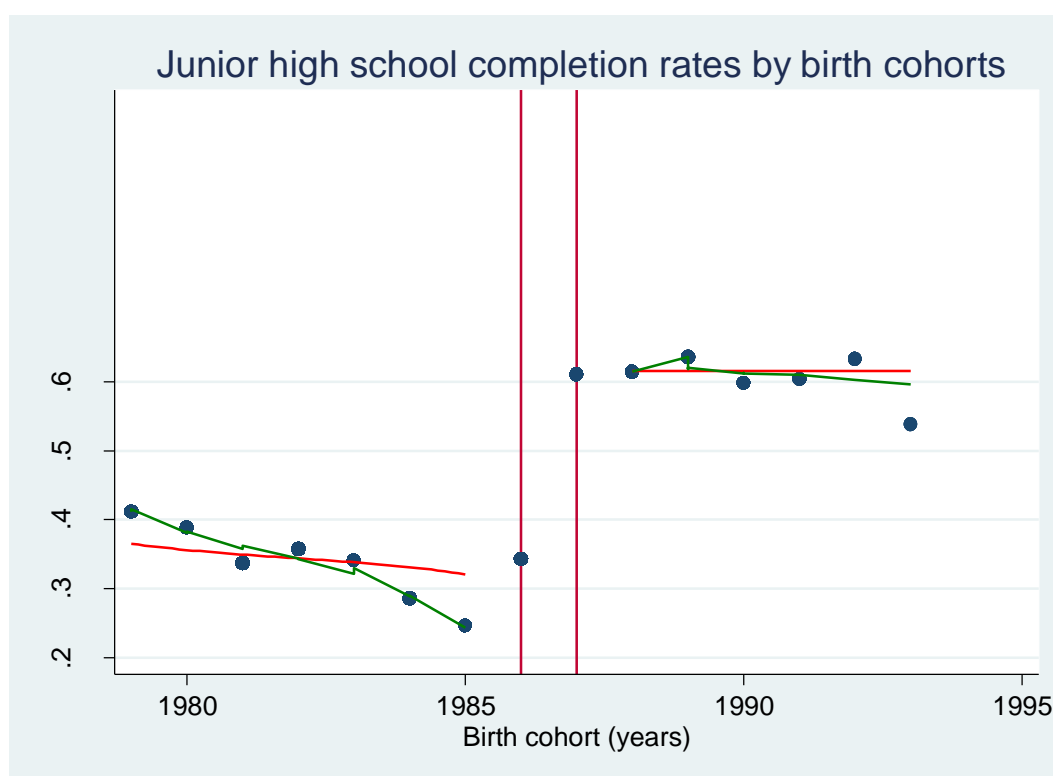


Figure 1: Junior high school completion rates by birth cohort

3.2 Summary Statistics

Table 1 presents the averages of educational attainment and the variables related to gender roles in the treatment (“After”) and control (“Before”) groups. Clearly, in both treatment groups, the educational indicators (years of education and completion rates of elementary and junior high school) are better on average compared to the relevant control group. The null hypotheses of equality of means (for two samples with unequal variances) in the two periods are rejected for all three indicators of educational achievement.

Four different indicators are used to represent the views on gender roles. The last variable in the table (Women should not argue with men) takes a higher value in the “After” sample with a p-value of less than 5%. This means that the views of women in the treatment group are less traditional and more modern. The average values of the other three indicators do not differ much across treatment and control groups. The p-values of the t-tests of equality of averages are higher than 20%. In general, we cannot say that post-reform cohorts have more modern views on societal gender roles.

Table 2: A comparison of educational attainment and the variables related to gender roles in the pre-reform and post-reform birth cohorts (averages are reported) (1998 TDHS data)

	Before	After	p-value
Completion of junior high school (8 years)			
Statement 1: “Important family decisions should be made only by men.”			
Statement 2: “Women should not argue with husband even if she disagrees.”			
Statement 3: “It is better to educate a son rather than a daughter.”			
Statement 4: “Men are wiser.”			
Statement 5: “Women should be virgin when they get married.”			
Statement 6: “Men should also do housework.”			
Statement 7: “Married women should work outside if she wants to.”			
Statement 8: “Women may go anywhere without husband’s permission.”			
Statement 9: “Women should be more involved in politics.”			
<i>Number of observations</i>			

Notes: The sample includes birth cohorts 1979-1985 (pre-reform) and 1987-1994 (post-reform). The transitional cohorts (1986 and 1987) are excluded. The p-values are derived from t-tests on the equality of means of two samples with unequal variances. They belong to hypothesis tests where the null hypotheses state that the averages in the pre- and post-reform periods are equal and the alternative hypotheses state that they are different.

4. Empirical Strategy and Identification

In this paper, we perform a two-stage least squares estimation⁴ in which the first-stage equation is specified as follows:

$$E(S_{i0}|y_i) = \alpha_0 + \alpha_{01} ydev_i + \alpha_{02} ydev_i^2 + X'_{it}\delta. \quad (1)$$

$$E(S_{i1}|y_i) = \alpha_0 + \alpha_1 + \alpha_{11} ydev_i + \alpha_{12} ydev_i^2 + X'_{it}\delta. \quad (2)$$

$$ydev_i = y_i - y_R. \quad (3)$$

$$S_i = \alpha_0 + \alpha_{01}ydev_i + \alpha_{02} ydev_i^2 + \alpha_1 R_i + \alpha_{21} R_i ydev_i + \alpha_{22} R_i ydev_i^2 + X'_{it}\delta + \epsilon_{it}. \quad (4)$$

$$\alpha_{21} = \alpha_{11} - \alpha_{01}. \quad (5)$$

$$\alpha_{22} = \alpha_{12} - \alpha_{02}. \quad (6)$$

In the above, S_{it} shows the indicator of junior high school completion by individual i observed in survey year t . The reform dummy (R_{it}) is a binary indicator that takes the value of one for post-reform cohorts (the treatment group) and zero for pre-reform cohorts (the control group). The main coefficient of interest is α_1 , which shows the effect of the reform. The challenge in estimating the effect of the reform is to separate out the possible time trend in educational attainment from the reform effect. To control for the possible time trend, linear and quadratic trend terms are added to the regressions. The variable $ydev_i$ is defined as the deviation of the individual's birth cohort from the first cohort that is affected by the reform (the 1987 birth cohort). The variable $ydev_i^2$ (the square of $ydev_i$) is added to capture possible non-linearities in the trend across birth cohorts. The reform dummy is interacted with $ydev_i$ and $ydev_i^2$ to allow the trend to be different before and after the reform. Equation (4) shows the full specification of the first-stage regression. The estimate of α_1 may be affected by the way trend is controlled for. To determine the sensitivity of α_1 to the specification of the equation, several alternatives are used, as listed below:

Specification 1: $S_i = \alpha_0 + \alpha_{01}ydev_i + \alpha_1 R_i + \alpha_{21} R_i ydev_i + X'_{it}\delta + \epsilon_{it}.$

Specification 2: $S_i = \alpha_0 + \alpha_{01}ydev_i + \alpha_1 R_i + X'_{it}\delta + \epsilon_{it}.$

Specification 3:

$$S_i = \alpha_0 + \alpha_{01}ydev_i + \alpha_{02} ydev_i^2 + \alpha_1 R_i + \alpha_{21} R_i ydev_i + \alpha_{22} R_i ydev_i^2 + X'_{it}\delta + \epsilon_{it}.$$

Specification 4: $S_i = \alpha_0 + \alpha_{01}ydev_i + \alpha_{02} ydev_i^2 + \alpha_1 R_i + X'_{it}\delta + \epsilon_{it}.$

Specification 1 controls for a linear trend, allowing it to be different before and after the reform. Specification 2 controls for a linear trend, but requires it to be the same before and after the reform. Specification 3 is the full specification that controls for linear and quadratic trend

⁴ Angrist (2001) discusses that conventional two-stage least squares (2SLS) models are appropriate when both the outcome and endogenous variable are discrete once valid instruments are found.

terms that may vary before and after the reform. Specification 4 controls for linear and quadratic trend that remains the same across birth cohorts.

The data used in the estimations includes all individuals who are 15 or older in the survey year. The matrix X_{it} includes age of each woman to control for the age difference between the treatment and control groups. The matrix X_{it} also includes the region dummy variables that controls for residence in the five major regions of the country (the West, South, Central, North, and East).

Identification of the causal effect of the education reform relies on the comparison of individuals in the treatment group to those in the control group, for a given age. The identification strategy used here is similar to that in Oreopoulos (2006) and Kirdar et al. (2015). Unlike Oreopoulos (2006), time trends are allowed to be different before and after the policy in Kirdar et al. (2015). In this paper, instead of using a single specification, four different specifications are used with the purpose of studying whether the estimate of the reform effect is robust to the way the time trend is defined.

The effect of the reform, α_1 , would not be identified if unobserved cohort-specific factors that affected the outcome variables were to change at the same time of the education reform. Macroeconomic changes that took place around the time of the reform should not matter for the analysis, since they must have affected both treatment and control groups. In 2002, a change in the Turkish Civil Code raised the minimum marriage age of women from 15 to 17. The change is relevant to the cohorts that are targeted by the 1997 education reform and it might have a confounding effect in this study. When identification is based on a comparison of pre-reform to post-reform cohorts, it is not possible to separate out the effects of the civil code change from the effects of the education reform.

The first-stage equation is estimated by ordinary least squares (OLS) for the four specifications described above. In the above, ϵ_{it} is the random error term. Heteroskedasticity robust standard errors are estimated using Huber-White correction methods.⁵

The full specification of the second-stage regression is similar to that in the first stage:

$$G_{it} = \beta_0 + \beta_{01} ydev_i + \beta_{02} ydev_i^2 + \beta_1 \widehat{S}_{it} + \beta_{21} R_i ydev_i + \beta_{22} R_i ydev_i^2 + X'_{it}\theta + \epsilon_{it}. \quad (7)$$

In equation (7), G_{it} is the attitude of individual i in year t towards gender roles. \widehat{S}_{it} is the predicted value of educational attainment in the first-stage regression. The second stage regression has all the other controls of the first stage and thus the identification of the coefficient for predicted schooling (\widehat{S}_{it}) depends entirely on the exclusion of the reform dummy from the second-stage regression. As long as the reform has no direct effect on attitudes towards gender roles, except through changing educational attainment, the instrumental variables (IV) estimation of the two-stage system summarized in equations (1)-(7) will yield the causal effect of schooling on attitudes towards gender roles (β_1). In addition to the IV estimates, we generate

⁵ Since we have only 16 birth cohorts, we do not compute clustered standard errors that allow for correlation within clusters of birth-cohorts. Instead, we compute standard errors that are robust to arbitrary forms of heteroskedasticity. It is reported in the literature that standard errors tend to be understated if the number of clusters on which they are based is small. Bertrand, Duflo, and Mullainathan (2004) and Angrist & Pischke (2009) argue that between 42 and 50 clusters are required to obtain consistent estimates of standard errors that account for clustering.

the OLS estimates of β_1 by regressing the attitude variables directly on the indicator of junior high school completion. To confirm that the reform has an effect on the outcomes of interest, we obtain reduced form estimates by regressing the outcome variables on the post-reform dummy variable.

The aim of the study is to capture the change at the time of the reform. The optimal number of cohorts to be used in the analyses depends on the balance between costs and benefits of increasing the number of cohorts. More data enables us to better handle possible time trends but comes with the cost of being far from the date of reform and being subject to other influences besides the reform. In this study, all estimates are repeated for four different sets of birth cohorts (Sample A, B, C, and D). In all samples, the 1986 and 1987 birth cohorts are excluded because of the fuzziness in the adoption of the reform. The largest number of post-reform cohorts that can possibly be included in the analysis is 6 (excluding the 1987 birth cohort) since the youngest individuals in the data are 15 years old. Sample A includes 7 pre- and 6 post-reform cohorts, which means that it includes individuals in birth cohorts 1979-1993. Sample B includes 6 pre- and 6 post-reform cohorts (birth cohorts 1980-1993). Sample C is used to test the sensitivity of the estimates to the extension of older cohorts. It includes 10 pre- and 6 post-reform cohorts (birth cohorts 1976-1993). Sample D is the smallest sample; it includes 5 pre- and 5 post-reform cohorts (birth cohorts 1981-1992).

Compulsory schooling laws affect the students who want to leave school as soon as possible. For that reason, those who would continue their education anyway are not affected by such laws. The new compulsory schooling law did not change the rules on high school education; therefore, it should not be expected to have an effect on educational attainment beyond high school. In particular, those who would have pursued college education anyway should not have changed their behavior in response to the reform. Those are the individuals who would have continued their education regardless of the reform. We estimate the equations both for the entire samples (Samples A, B, C, and D) and for the sub-samples that include those who have at most high school education (Samples A1, B1, C1, and D1). Samples A1-D1 defined in this manner should have the highest concentration of individuals who have been affected by the reform. The sub-samples of those who have some college education or more are called Samples A2, B2, C2, and D2.

5. Estimation Results

5.1 First-stage results

The first stage results, presented in Table 3, show that the 1997 education reform has had a strong effect on the completion rate of 8 years of education. In all four samples and in all specifications, the reform dummy is positive and statistically highly significant. The estimates tell us that the reform is associated with more than 40% increase in junior high school completion. The table also reports F-statistics that can be used to test the strength of the instrument. Except for specification 3, the F-statistics are all high and well above the recommended threshold.

Table 3: First-stage regressions: Dependent variable: Junior high school completion

Samples:		Sample A Cohorts: 1979-1993 (7 pre- and 6 post-reform cohorts)		Sample B Cohorts: 1980-93 (6 pre- and 6 post-reform cohorts)		Sample C Cohorts: 1976-93 (10 pre-, 6 post-reform cohorts)		Sample D Cohorts: 1981-1992 (5 pre- and 5 post-reform cohorts)	
		Full sample	Sample 1	Full sample	Sample 1	Full sample	Sample 1	Full sample	Sample 1
Specification 1	Post reform dummy	0.440*** (0.094)	0.474*** (0.092)	0.464*** (0.097)	0.495*** (0.095)	0.455*** (0.085)	0.507*** (0.084)	0.476*** (0.105)	0.491*** (0.103)
	Adjusted R-squared	0.062	0.091	0.069	0.104	0.053	0.076	0.077	0.120
	F-statistic	21.94	26.39	22.87	27.13	28.61	36.20	20.38	22.82
Specification 2	Post reform dummy	0.410*** (0.090)	0.459*** (0.091)	0.413*** (0.091)	0.463*** (0.091)	0.457*** (0.085)	0.505*** (0.085)	0.411*** (0.096)	0.451*** (0.096)
	Adjusted R-squared	0.062	0.091	0.068	0.104	0.051	0.074	0.077	0.120
	F-statistic	20.70	25.59	20.83	25.77	28.83	35.70	18.32	22.16
Specification 3	Post reform dummy	0.452*** (0.153)	0.454*** (0.153)	0.487*** (0.166)	0.467*** (0.163)	0.500*** (0.136)	0.532*** (0.138)	0.581*** (0.202)	0.534*** (0.194)
	Adjusted R-squared	0.061	0.090	0.068	0.103	0.053	0.075	0.077	0.119
	F-statistic	8.67	8.83	8.59	8.21	13.45	14.79	8.29	7.56
Specification 4	Post reform dummy	0.407*** (0.091)	0.455*** (0.092)	0.407*** (0.092)	0.456*** (0.092)	0.470*** (0.086)	0.512*** (0.086)	0.407*** (0.097)	0.447*** (0.097)
	Adjusted R-squared	0.061	0.091	0.068	0.104	0.051	0.074	0.076	0.119
	F-statistic	19.81	24.50	19.78	24.48	29.58	35.72	17.64	21.39
	Observations	2125	1926	1862	1692	2934	2657	1544	1414

Notes: Each column shows estimates from four different regressions. 1986 and 1987 birth cohorts are excluded from all samples. All regressions include year fixed effects and a rural-urban dummy. Individual weights are used in all regressions. Robust standard errors, reported in parentheses, are estimated using Huber-White standard errors. Significance levels: + p<0.15, * p<0.10, ** p<0.05, *** p<0.01.

5.2 Second-stage results

Tables 4-12 show the second-stage results separately for each of the nine outcome variables. In the OLS regressions, the outcome variable of interest is regressed on junior high school completion dummy and other variables as described in the empirical strategy section. In the IV regressions, the outcome variable of interest is regressed on junior high school completion dummy (instrumented by the post-reform dummy) and other variables. In the reduced form regressions, the outcome variable of interest is regressed on the post-reform dummy to check whether the instrument does indeed affect the outcome variable in Samples A1-D1 but not in Samples A2-D2.

The tables, first, show that OLS estimates of junior high school completion dummy are usually positive and statistically significant, indicating a strong positive correlation between education and modern attitudes towards gender roles. The exceptions in the OLS regressions are the outcome variables “Women may go anywhere without husband’s permission” and “Women should be more involved in politics” (Tables 11 and 12).

In tables 4, 5, 6, and 8, despite the positive correlation indicated by the OLS regressions, the IV estimates show no causal effect of education. This finding is supported by the reduced form regressions which show us no effect of the reform on the three outcome variables (“Important family decisions should be made only by men”, “Women should not argue with husband even if she disagrees”, “It is better to educate a son rather than a daughter”, “Women should be virgin when they get married.”).

In table 7 (“Men are wiser.”), we observe that the OLS, reduced form, and IV estimates agree, but the result is restricted only to specification 3. In table 9 (“Men should also do housework.”), we observe that the OLS, reduced form, and IV estimates agree, but the result is restricted only to sample C1 and specifications 3 and 4. Therefore, the results on these two outcome variables are weak.

In table 10 (“Married women should work outside if she wants to.”), we observe that the OLS, reduced form, and IV estimates agree, with the exception of specification 3. When statistically significant reduced form effects are detected, they are detected only in Samples A1-D1 and not in Samples A2-D2, which reassures us that the effect of the reform is acting through education and not through some other factors.

Table 11 (“Women may go anywhere without husband’s permission.”) and Table 12 (“Women should be more involved in politics.”) show that the OLS, reduced form, and IV estimates sometimes agree.

To sum up, we detect some evidence for a positive causal effect of education on attitudes towards gender roles. The strongest results are found when attitudes are measured by Statement 7 (“Married women should work outside if she wants to.”). Weaker results are found when attitudes are measured by Statement 8 (“Women may go anywhere without husband’s permission.”) and by Statement 9 (“Women should be more involved in politics.”).

Table 4: Second-stage regressions: Dependent variable: “Important family decisions should be made only by men.”

			A1	B1	C1	D1	A2	B2	C2	D2
Spec. 1	OLS	Junior high	0.156*** (0.017)	0.164*** (0.019)	0.161*** (0.014)	0.177*** (0.021)				
	Reduced Form	Post reform	0.020 (0.072)	0.008 (0.075)	0.049 (0.064)	-0.040 (0.078)	0.212+ (0.145)	0.209 (0.160)	0.160 (0.115)	0.409* (0.221)
	IV	Junior high	0.042 (0.152)	0.016 (0.152)	0.098 (0.125)	-0.083 (0.165)				
		Weak instrument Endogeneity								
Spec. 2	OLS	Junior high	0.155*** (0.017)	0.164*** (0.019)	0.162*** (0.014)	0.178*** (0.021)				
	Reduced Form	Post reform	0.014 (0.065)	0.010 (0.065)	0.049 (0.063)	0.004 (0.067)	0.209 (0.151)	0.191 (0.156)	0.155 (0.108)	0.374* (0.201)
	IV	Junior high	0.031 (0.142)	0.022 (0.141)	0.097 (0.125)	0.009 (0.149)				
		Weak instrument Endogeneity								
Spec. 3	OLS	Junior high	0.157*** (0.017)	0.167*** (0.019)	0.163*** (0.014)	0.181*** (0.021)				
	Reduced Form	Post reform	0.039 (0.119)	0.029 (0.132)	0.072 (0.104)	-0.046 (0.155)	0.336* (0.184)	0.339* (0.190)	0.250+ (0.169)	-0.435+ (0.270)
	IV	Junior high	0.086 (0.260)	0.061 (0.279)	0.134 (0.192)	-0.086 (0.293)				
		Weak instrument Endogeneity								
Spec. 4	OLS	Junior high	0.155*** (0.017)	0.164*** (0.019)	0.162*** (0.014)	0.179*** (0.021)				
	Reduced Form	Post reform	0.009 (0.066)	0.009 (0.066)	0.034 (0.064)	0.006 (0.067)	0.169 (0.131)	0.149 (0.137)	0.122 (0.087)	0.317* (0.189)
	IV	Junior high	0.021 (0.146)	0.019 (0.146)	0.067 (0.125)	0.013 (0.151)				
		Weak instrument Endogeneity								
Observations			1913	1681	2641	1405	199	170	277	130

Notes: 1986 and 1987 birth cohorts are excluded from all samples. All regressions include year fixed effects in addition to a rural-urban dummy. Individual weights are used in all regressions. Robust standard errors, reported in parentheses, are estimated using Huber-White standard errors. Significance levels: + p<0.15, * p<0.10, ** p<0.05, *** p<0.01. The critical values for the Cragg-Donald Wald F statistic (maximal IV size) are 10%: 16.38, 15%: 8.96, 20%: 6.66, 25%: 5.53 (Stock & Yogo, 2005). Kleibergen-Paap rK LM statistic. “Post reform” is the post reform dummy variable. “Junior high” is junior high school completion dummy. p-values of Wooldridge’s (1995) robust score test are reported.

Table 5: Second-stage regressions: Dependent variable: “Women should not argue with husband even if she disagrees.”

			A1	B1	C1	D1	A2	B2	C2	D2
Spec. 1	OLS	Junior high	0.099*** (0.030)	0.091*** (0.033)	0.121*** (0.026)	0.105*** (0.036)				
	Reduced Form	Post reform	0.074 (0.103)	0.058 (0.107)	0.036 (0.091)	-0.000 (0.116)	-0.272 (0.307)	-0.251 (0.309)	-0.148 (0.315)	-0.492 (0.395)
	IV	Junior high	0.153 (0.214)	0.113 (0.211)	0.069 (0.177)	-0.000 (0.225)				
		Weak instrument Endogeneity								
Spec. 2	OLS	Junior high	0.096*** (0.031)	0.089*** (0.033)	0.123*** (0.026)	0.104*** (0.036)				
	Reduced Form	Post reform	-0.008 (0.096)	-0.013 (0.096)	0.033 (0.093)	-0.020 (0.101)	-0.276 (0.302)	-0.280 (0.310)	0.016 (0.281)	-0.403 (0.419)
	IV	Junior high	-0.016 (0.204)	-0.026 (0.202)	0.065 (0.180)	-0.043 (0.216)				
		Weak instrument Endogeneity								
Spec. 3	OLS	Junior high	0.098*** (0.030)	0.090*** (0.033)	0.122*** (0.026)	0.106*** (0.036)				
	Reduced Form	Post reform	0.087 (0.167)	0.032 (0.184)	0.072 (0.146)	-0.048 (0.223)	-0.237 (0.535)	-0.215 (0.560)	-0.129 (0.523)	-0.509 (0.758)
	IV	Junior high	0.189 (0.366)	0.067 (0.380)	0.133 (0.272)	-0.084 (0.396)				
		Weak instrument Endogeneity								
Spec. 4	OLS	Junior high	0.095*** (0.030)	0.087*** (0.033)	0.124*** (0.026)	0.103*** (0.036)				
	Reduced Form	Post reform	-0.023 (0.097)	-0.026 (0.097)	0.039 (0.094)	-0.025 (0.101)	-0.258 (0.316)	-0.287 (0.322)	-0.006 (0.295)	-0.359 (0.436)
	IV	Junior high	-0.049 (0.207)	-0.056 (0.205)	0.074 (0.180)	-0.054 (0.219)				
		Weak instrument Endogeneity								
		Observations	1901	1669	2621	1395	199	170	276	130

Notes:

Table 6: Second-stage regressions: Dependent variable: “It is better to educate a son rather than a daughter.”

			A1	B1	C1	D1	A2	B2	C2	D2
Spec. 1	OLS	Junior high	0.123*** (0.017)	0.118*** (0.019)	0.110*** (0.014)	0.123*** (0.022)				
	Reduced Form	Post reform	-0.011 (0.079)	-0.021 (0.082)	-0.048 (0.070)	-0.073 (0.090)	-0.005 (0.056)	-0.038 (0.057)	-0.020 (0.035)	-0.057 (0.071)
	IV	Junior high	-0.024 (0.168)	-0.042 (0.169)	-0.095 (0.145)	-0.149 (0.196)				
		Weak instrument Endogeneity								
Spec. 2	OLS	Junior high	0.121*** (0.017)	0.117*** (0.019)	0.110*** (0.014)	0.122*** (0.022)				
	Reduced Form	Post reform	-0.040 (0.077)	-0.039 (0.078)	-0.048 (0.070)	-0.054 (0.081)	-0.005 (0.053)	-0.025 (0.039)	-0.039 (0.052)	-0.025 (0.045)
	IV	Junior high	-0.087 (0.177)	-0.084 (0.176)	-0.096 (0.145)	-0.121 (0.192)				
		Weak instrument Endogeneity								
Spec. 3	OLS	Junior high	0.125*** (0.017)	0.121*** (0.019)	0.112*** (0.014)	0.128*** (0.021)				
	Reduced Form	Post reform	0.010 (0.122)	-0.014 (0.130)	-0.076 (0.110)	-0.023 (0.161)	0.035 (0.099)	-0.042 (0.100)	-0.001 (0.047)	-0.096 (0.123)
	IV	Junior high	0.023 (0.268)	-0.030 (0.282)	-0.144 (0.221)	-0.043 (0.305)				
		Weak instrument Endogeneity								
Spec. 4	OLS	Junior high	0.122*** (0.017)	0.118*** (0.019)	0.110*** (0.014)	0.123*** (0.022)				
	Reduced Form	Post reform	-0.033 (0.078)	-0.035 (0.078)	-0.043 (0.071)	-0.050 (0.081)	-0.003 (0.050)	-0.022 (0.040)	-0.032 (0.056)	-0.024 (0.050)
	IV	Junior high	-0.074 (0.178)	-0.078 (0.180)	-0.085 (0.145)	-0.113 (0.194)				
		Weak instrument Endogeneity								
Observations			1918	1684	2646	1407	199	170	277	130

Notes:

Table 7: Second-stage regressions: Dependent variable: “Men are wiser.”

			A1	B1	C1	D1	A2	B2	C2	D2
Spec. 1	OLS	Junior high	0.143*** (0.018)	0.144*** (0.020)	0.137*** (0.015)	0.148*** (0.023)				
	Reduced Form	Post reform	0.040 (0.079)	0.068 (0.081)	0.045 (0.070)	0.108 (0.087)	0.179 (0.139)	0.090 (0.150)	0.120 (0.105)	-0.044 (0.223)
	IV	Junior high	0.090 (0.170)	0.141 (0.165)	0.090 (0.138)	0.227 (0.178)				
		Weak instrument Endogeneity								
Spec. 2	OLS	Junior high	0.142*** (0.018)	0.142*** (0.020)	0.137*** (0.015)	0.147*** (0.023)				
	Reduced Form	Post reform	0.024 (0.074)	0.030 (0.074)	0.042 (0.070)	0.057 (0.078)	0.174 (0.139)	0.092 (0.121)	0.144 (0.141)	0.016 (0.145)
	IV	Junior high	0.054 (0.164)	0.067 (0.162)	0.086 (0.140)	0.132 (0.177)				
		Weak instrument Endogeneity								
Spec. 3	OLS	Junior high	0.146*** (0.018)	0.148*** (0.020)	0.139*** (0.015)	0.151*** (0.023)				
	Reduced Form	Post reform	0.238* (0.129)	0.320** (0.141)	0.188* (0.113)	0.419** (0.167)	0.112 (0.149)	0.016 (0.154)	0.045 (0.113)	-0.029 (0.193)
	IV	Junior high	0.575* (0.331)	0.753* (0.385)	0.368* (0.217)	0.859** (0.430)				
		Weak instrument Endogeneity								
Spec. 4	OLS	Junior high	0.143*** (0.018)	0.143*** (0.020)	0.138*** (0.015)	0.147*** (0.023)				
	Reduced Form	Post reform	0.034 (0.075)	0.035 (0.075)	0.049 (0.072)	0.058 (0.079)	0.088 (0.118)	0.050 (0.103)	0.035 (0.136)	0.061 (0.091)
	IV	Junior high	0.078 (0.168)	0.080 (0.167)	0.099 (0.141)	0.135 (0.180)				
		Weak instrument Endogeneity								
		Observations	1863	1639	2573	1374	199	170	277	130

Notes:

Table 8: Second-stage regressions: Dependent variable: “Women should be virgin when they get married.”

			A1	B1	C1	D1	A2	B2	C2	D2
Spec. 1	OLS	Junior high	0.065** (0.026)	0.047* (0.028)	0.058** (0.023)	0.036 (0.029)				
	Reduced Form	Post reform	0.007 (0.080)	0.009 (0.084)	0.014 (0.071)	0.011 (0.089)	0.217 (0.388)	0.033 (0.415)	0.417 (0.348)	-0.188 (0.530)
	IV	Junior high	0.014 (0.164)	0.018 (0.166)	0.027 (0.136)	0.022 (0.177)				
		Weak instrument Endogeneity								
Spec. 2	OLS	Junior high	0.064** (0.027)	0.046* (0.028)	0.059*** (0.023)	0.035 (0.029)				
	Reduced Form	Post reform	-0.012 (0.075)	-0.007 (0.075)	0.013 (0.071)	0.006 (0.079)	0.158 (0.432)	0.060 (0.447)	0.415 (0.395)	-0.100 (0.534)
	IV	Junior high	-0.026 (0.160)	-0.015 (0.159)	0.025 (0.138)	0.012 (0.171)				
		Weak instrument Endogeneity								
Spec. 3	OLS	Junior high	0.067*** (0.026)	0.049* (0.027)	0.060*** (0.022)	0.037 (0.028)				
	Reduced Form	Post reform	0.099 (0.126)	0.085 (0.138)	0.072 (0.110)	0.080 (0.171)	-0.507 (0.696)	-0.839 (0.754)	0.043 (0.621)	-1.158 (1.019)
	IV	Junior high	0.216 (0.281)	0.185 (0.306)	0.134 (0.206)	0.150 (0.327)				
		Weak instrument Endogeneity								
Spec. 4	OLS	Junior high	0.064** (0.026)	0.047* (0.028)	0.059*** (0.023)	0.036 (0.029)				
	Reduced Form	Post reform	-0.006 (0.076)	-0.007 (0.076)	0.015 (0.072)	0.008 (0.080)	-0.018 (0.479)	-0.004 (0.486)	0.313 (0.425)	-0.242 (0.596)
	IV	Junior high	-0.013 (0.164)	-0.014 (0.163)	0.028 (0.138)	0.018 (0.175)				
		Weak instrument Endogeneity								
		Observations	1878	1649	2586	1377	186	157	259	121

Notes:

Table 9: Second-stage regressions: Dependent variable: “Men should also do housework.”

			A1	B1	C1	D1	A2	B2	C2	D2
Spec. 1	OLS	Junior high	0.106*** (0.029)	0.092*** (0.031)	0.121*** (0.024)	0.116*** (0.034)				
	Reduced Form	Post reform	0.008 (0.098)	-0.029 (0.103)	0.124 (0.087)	-0.014 (0.110)	-0.113 (0.125)	-0.144 (0.147)	0.041 (0.108)	-0.152 (0.238)
	IV	Junior high	0.017 (0.206)	-0.059 (0.207)	0.243 (0.173)	-0.028 (0.221)				
		Weak instrument Endogeneity								
Spec. 2	OLS	Junior high	0.109*** (0.029)	0.096*** (0.031)	0.120*** (0.024)	0.121*** (0.034)				
	Reduced Form	Post reform	0.085 (0.092)	0.087 (0.092)	0.124 (0.088)	0.106 (0.096)	-0.104 (0.142)	-0.091 (0.138)	0.009 (0.126)	-0.039 (0.196)
	IV	Junior high	0.184 (0.200)	0.185 (0.199)	0.244 (0.174)	0.232 (0.212)				
		Weak instrument Endogeneity								
Spec. 3	OLS	Junior high	0.110*** (0.029)	0.096*** (0.031)	0.121*** (0.024)	0.118*** (0.034)				
	Reduced Form	Post reform	0.143 (0.160)	0.085 (0.177)	0.282** (0.140)	-0.009 (0.215)	-0.028 (0.264)	0.032 (0.294)	0.146 (0.239)	0.164 (0.458)
	IV	Junior high	0.315 (0.362)	0.182 (0.380)	0.535* (0.297)	-0.018 (0.405)				
		Weak instrument Endogeneity								
Spec. 4	OLS	Junior high	0.110*** (0.029)	0.098*** (0.031)	0.120*** (0.024)	0.122*** (0.034)				
	Reduced Form	Post reform	0.103 (0.092)	0.103 (0.092)	0.142+ (0.088)	0.115 (0.096)	-0.112 (0.149)	-0.048 (0.134)	-0.054 (0.138)	0.075 (0.181)
	IV	Junior high	0.223 (0.204)	0.223 (0.203)	0.277+ (0.175)	0.253 (0.214)				
		Weak instrument Endogeneity								
		Observations	1917	1683	2645	1405	198	169	276	129

Notes:

Table 10: Second-stage regressions: Dependent variable: “Married women should work outside if she wants to.”

			A1	B1	C1	D1	A2	B2	C2	D2
Spec. 1	OLS	Junior high	0.087*** (0.017)	0.086*** (0.019)	0.076*** (0.013)	0.093*** (0.023)				
	Reduced Form	Post reform	0.119+ (0.075)	0.109 (0.079)	0.108* (0.064)	0.129+ (0.088)	0.025 (0.060)	-0.008 (0.048)	-0.030 (0.049)	0.011 (0.052)
	IV	Junior high	0.247+ (0.155)	0.214 (0.156)	0.210* (0.126)	0.261+ (0.174)				
			Weak instrument Endogeneity							
Spec. 2	OLS	Junior high	0.088*** (0.017)	0.087*** (0.020)	0.075*** (0.013)	0.094*** (0.023)				
	Reduced Form	Post reform	0.123* (0.072)	0.123* (0.073)	0.108* (0.065)	0.136* (0.076)	0.022 (0.060)	-0.009 (0.045)	-0.035 (0.060)	0.010 (0.045)
	IV	Junior high	0.265* (0.157)	0.263* (0.158)	0.210* (0.127)	0.306* (0.170)				
			Weak instrument Endogeneity							
Spec. 3	OLS	Junior high	0.085*** (0.017)	0.084*** (0.019)	0.073*** (0.013)	0.089*** (0.023)				
	Reduced Form	Post reform	0.119 (0.116)	0.100 (0.128)	0.092 (0.102)	0.046 (0.158)	0.144+ (0.091)	0.080 (0.061)	0.031 (0.054)	0.222 (0.166)
	IV	Junior high	0.277 (0.281)	0.223 (0.289)	0.184 (0.205)	0.085 (0.285)				
			Weak instrument Endogeneity							
Spec. 4	OLS	Junior high	0.088*** (0.017)	0.088*** (0.020)	0.075*** (0.013)	0.094*** (0.023)				
	Reduced Form	Post reform	0.128* (0.074)	0.127* (0.075)	0.112* (0.067)	0.137* (0.077)	0.028 (0.062)	-0.001 (0.048)	-0.026 (0.065)	0.021 (0.048)
	IV	Junior high	0.278* (0.163)	0.276* (0.163)	0.216* (0.129)	0.309* (0.173)				
			Weak instrument Endogeneity							
Observations			1902	1669	2628	1395	199	170	277	130

Notes:

Table 11: Second-stage regressions: Dependent variable: “Women may go anywhere without husband’s permission.”

			A1	B1	C1	D1	A2	B2	C2	D2
Spec. 1	OLS	Junior high	0.050*	0.033	0.065***	0.036				
			(0.028)	(0.030)	(0.025)	(0.032)				
	Reduced Form	Post reform	0.102	0.085	0.128*	0.075	-0.672**	-0.689**	-0.596***	-1.028***
			(0.082)	(0.085)	(0.075)	(0.091)	(0.263)	(0.285)	(0.202)	(0.383)
IV		Junior high	0.218	0.173	0.252+	0.154				
			(0.181)	(0.176)	(0.154)	(0.189)				
		Weak instrument								
		Endogeneity								
Spec. 2	OLS	Junior high	0.051*	0.036	0.064**	0.040				
			(0.028)	(0.030)	(0.025)	(0.032)				
	Reduced Form	Post reform	0.126*	0.128*	0.128*	0.133*	-0.663**	-0.640***	-0.664**	-0.777***
			(0.075)	(0.075)	(0.075)	(0.079)	(0.270)	(0.240)	(0.286)	(0.293)
IV		Junior high	0.276+	0.277+	0.253+	0.294+				
			(0.175)	(0.174)	(0.155)	(0.188)				
		Weak instrument								
		Endogeneity								
Spec. 3	OLS	Junior high	0.047*	0.031	0.062**	0.032				
			(0.028)	(0.030)	(0.025)	(0.033)				
	Reduced Form	Post reform	0.072	0.034	0.069	-0.089	-0.889**	-0.857*	-0.665***	-1.574***
			(0.138)	(0.151)	(0.120)	(0.181)	(0.358)	(0.443)	(0.246)	(0.514)
IV		Junior high	0.158	0.071	0.128	-0.167				
			(0.309)	(0.319)	(0.228)	(0.342)				
		Weak instrument								
		Endogeneity								
Spec. 4	OLS	Junior high	0.052*	0.037	0.064**	0.040				
			(0.028)	(0.030)	(0.025)	(0.032)				
	Reduced Form	Post reform	0.138*	0.138*	0.125*	0.138*	-0.755***	-0.665***	-0.753**	-0.860***
			(0.074)	(0.074)	(0.075)	(0.079)	(0.282)	(0.251)	(0.299)	(0.308)
IV		Junior high	0.303*	0.301*	0.243+	0.305+				
			(0.178)	(0.177)	(0.152)	(0.190)				
		Weak instrument								
		Endogeneity								
Observations			1902	1670	2625	1394	198	169	275	130

Notes:

Table 12: Second-stage regressions: Dependent variable: “Women should be more involved in politics.”

			A1	B1	C1	D1	A2	B2	C2	D2
Spec. 1	OLS	Junior high	0.001 (0.032)	0.001 (0.035)	0.023 (0.026)	0.002 (0.038)				
	Reduced Form	Post reform	0.177+ (0.108)	0.204* (0.113)	0.146+ (0.097)	0.203* (0.123)	-0.295 (0.257)	-0.328 (0.265)	-0.180 (0.246)	-0.367 (0.358)
	IV	Junior high	0.335+ (0.212)	0.376* (0.216)	0.266+ (0.180)	0.378+ (0.235)				
		Weak instrument Endogeneity								
Spec. 2	OLS	Junior high	0.001 (0.032)	0.001 (0.035)	0.023 (0.026)	0.002 (0.038)				
	Reduced Form	Post reform	0.151+ (0.103)	0.153+ (0.103)	0.146+ (0.097)	0.154 (0.109)	-0.289 (0.262)	-0.301 (0.268)	-0.164 (0.221)	-0.378 (0.340)
	IV	Junior high	0.299 (0.209)	0.303+ (0.210)	0.266+ (0.180)	0.315 (0.227)				
		Weak instrument Endogeneity								
Spec. 3	OLS	Junior high	-0.007 (0.032)	-0.008 (0.035)	0.017 (0.026)	-0.007 (0.038)				
	Reduced Form	Post reform	0.065 (0.177)	0.097 (0.195)	0.048 (0.156)	0.130 (0.232)	-0.595 (0.430)	-0.606 (0.457)	-0.383 (0.395)	-0.373 (0.580)
	IV	Junior high	0.140 (0.388)	0.207 (0.423)	0.088 (0.288)	0.239 (0.429)				
		Weak instrument Endogeneity								
Spec. 4	OLS	Junior high	0.000 (0.032)	0.000 (0.035)	0.023 (0.026)	0.003 (0.038)				
	Reduced Form	Post reform	0.145 (0.104)	0.146 (0.105)	0.145+ (0.098)	0.156 (0.109)	-0.355 (0.281)	-0.328 (0.279)	-0.247 (0.240)	-0.300 (0.347)
	IV	Junior high	0.292 (0.214)	0.294 (0.214)	0.260+ (0.178)	0.325 (0.230)				
		Weak instrument Endogeneity								
Observations			1698	1490	2354	1240	189	160	262	121

Notes:

....

6. Discussion and Conclusion

This paper uses the education reform in 1997 as a source of exogenous change in educational attainment to measure the causal effect of education on views about gender roles in Turkey. The reforms extend the duration of compulsory schooling from 5 to 8 years.

The empirical identification of the effect of education relies on the comparison of the individuals in the treatment group (post-reform cohorts) to those in the control group (pre-reform cohorts). We perform two-stage least squares estimation using education reform as an instrument for educational attainment in the first-stage regressions. We find that the education reforms substantially raised educational attainment in Turkey.

Some positive causal effect of education has been found on attitudes towards gender roles. Possible reasons behind this finding are discussed.....

The findings of the paper will be wrong if some changes, other than the education reforms, affected the views of the pre-reform and post-reform groups differently.

...

- Acemoglu, D., & Angrist, J. (2001). How Large are Human-Capital Externalities? Evidence from Compulsory Schooling Laws. In B. S. Bernanke, & K. Rogoff (Eds.), *NBER Macroeconomics Annual* (Vol. 15, pp. 9-74). Cambridge: MIT Press.
- Alat, Z., & Alat, K. (2011). A Qualitative Study of Parental Resistance to Girls' Schooling. *Educational Sciences: Theory & Practice*, 11(3), 1369-1373.
- Angrist, J. (2001). Estimation of limited dependent variable models with dummy endogenous regressors. *Journal of Business and Economic Statistics*, 19(1), 2–16.
- Angrist, J. D., & Krueger, A. (1991). Does Compulsory School Attendance Affect Schooling and Earnings? *Quarterly Journal of Economics*, 106(4), 979-1014.
- Banks, J., & Mazzonna, F. (2012). The effect of education on old age cognitive abilities: evidence from a regression discontinuity design. *The Economic Journal*, 122(560), 418-448.
- Baum, C. F., Schaffer, M. E., & Stillman, S. (2010). *ivreg2: Stata module for extended instrumental variables/2SLS, GMM and AC/HAC, LIML and k-class regression*. Retrieved from

<http://ideas.repec.org/c/boc/bocode/s425401.html>

- Bertrand, M. (2010). New Perspectives on Gender. In O. Ashenfelter, & D. Card (Eds.), *Handbook of Labor Economics* (Vol. 4B, pp. 1545-1592).
- Black, S., Devereux, P., & Salvanes, K. (2008). Staying in the Classroom and Out of the Maternity Ward? The Effect of Compulsory Schooling Laws on Teenage Births. *Economic Journal*, 118, 1025-1054.
- Cameron, A. C., & Trivedi, P. K. (2005). *Microeconometrics: Methods and Applications*. New York: Cambridge University Press.
- Chevalier, A., & Feinstein, L. (2006). Sheepskin or Prozac: the causal effect of education on mental health. IZA Discussion Paper No. 2231.
- Chou, S., Liu, J., Grossman, M., & Joyce, T. (2010). Parental Education and Child Health: Evidence from a Natural Experiment in Taiwan. *American Economic Journal: Applied Economics*, 2(1), 33-61.
- Clark, D., & Royer, H. (2010). The Effect of Education on Adult Health and Mortality: Evidence from Britain. NBER Working Paper No. 16013.
- Dinçer, M. A., Kaushal, N., & Grossman, M. (2013). Women's Education: Harbinger of Another Spring? Evidence from a Natural Experiment in Turkey. NBER Working Paper No. 19597.
- Dulger, İ. (2004). Turkey: Rapid Coverage for Compulsory Education— the 1997 Basic Education Program. Scaling up Poverty Reduction: A Global Learning Process and Conference. Shanghai, China.
- Eckstein, Z., & Zilcha, I. (2002). The Effects of Compulsory Schooling on Growth, Income Distribution and Welfare. *Journal of Public Economics*, 54(3), 339-359.
- Farre, L., & Vella, F. (2012). The Intergenerational Transmission of Gender Role Attitudes and Its Implications for Female Labor Force Participation. *Economica*, 80, 1–29.
- Fortin, N. (2005). Gender Role Attitudes and Women's Labour Market Outcomes Across OECD Countries. *Oxford Review of Economic Policy*, 21, 416–438.
- Grossman, M. (2005). Education and Nonmarket Outcomes. NBER Working Paper No. 11582.
- Gulesci, S., & Meyersson, E. (2013). 'For the Love of the Republic' Education, Secularism, and Empowerment. Working paper.
- Gulesci, S., & Meyersson, E. (2013). 'For the Love of the Republic' Education, Secularism, and Empowerment. Working paper.
- Güneş, P. M. (2013a). The Impact of Female Education on Fertility: Evidence from Turkey. GCC Working Paper Series, GCC 13-01.
- Güneş, P. M. (2013b). The Role of Maternal Education in Child Health: Evidence from a Compulsory Schooling Law. Job market paper.
- Harmon, C., & Walker, I. (1995). Estimates of the Economic Return to Schooling for the United Kingdom. *The American Economic Review*, 85(5), 1278-1286.
- İlhan Tunç, A. (2009). Kız Çocuklarının Okula Gitmeme Nedenleri Van İli Örneği. *Yüzüncü Yıl Üniversitesi, Eğitim Fakültesi Dergisi*, 6(1), 237-269.
- Kirdar, M., Dayioglu, M., & Koc, I. (2012). The Effects of Compulsory Schooling Laws on Teenage Marriage and Births in Turkey. Working paper.
- Kirdar, M., Dayioglu, M., & Koc, I. (2013). Does Longer Compulsory Education Equalize Schooling by Gender and Rural/Urban Residence? Working paper.
- Lleras-Muney, A. (2005). The Relationship Between Education and Adult Mortality in the United States. *Review of Economic Studies*, 72, 189–221.
- Lochner, L., & Moretti, E. (2004). The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports. *American Economic Review*, 94(1), 155-189.
- Machin, S., Marie, O., & Vujic, S. (2011). The Crime Reducing Effect of Education. *The Economic Journal*, 121 (May), 463-484.
- Oreopoulos, P. (2006). Estimating Average and Local Treatment Effects of Education When Compulsory Schooling Laws Really Matter. *American Economic Review*, 96(1), 152-75.
- Oreopoulos, P. (2007). Do Dropouts Drop out too Soon? Wealth, Health and Happiness from

- Compulsory Schooling. *Journal of Public Economics*, 91, 2213-2229.
- Oreopoulos, P., & Salvanes, K. (2011). Priceless: the nonpecuniary benefits of schooling. *Journal of Economic Perspectives*, 25(1), 159-184.
- Oreopoulos, P., Page, M., & Stevens, A. (2006). The Intergenerational Effects of Compulsory Schooling. *Journal of Labor Economics*, 24(4), 729-760.
- Powdthavee, N., Lekfuangfu, W. N., & Wooden, M. (2013). The Marginal Income Effect of Education on Happiness: Estimating the Direct and Indirect Effects of Compulsory Schooling on Well-Being in Australia. Melbourne Institute Working Paper No. 16/13.
- Schultz, T. W. (1963). *The economic value of education*. New York: Columbia University Press.
- Staiger, D., & Stock, J. H. (1997). Instrumental variables regression with weak instruments. *Econometrica*, 65 (3), 557-586.
- Stock, J. H., & Yogo, M. (2005). Testing for Weak Instruments in Linear IV Regression. In D. W. Andrews, & J. H. Stock (Eds.), *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg* (pp. 80-108). Cambridge: Cambridge University Press.
- Vella, F. (1994). Gender Roles and Human Capital Investment: The Relationship between Traditional Attitudes and Female Labor Market Performance. *Economica*, 61, 191-211.
- Alesina, Baqir, Easterly (1999), "Public Goods and Ethnic Divisions", *Quarterly Journal of Economics*
- Apple, M.W. (1995). *Education and Power*. New York: Routledge.
- Esen, Y. (1998). Ders kitaplarında cinsiyetçilik: İlköğretim Türkçe kitapları üzerinde yapılmış bir içerik çözümlemesi (Yüksek lisans tezi, Ankara Üniversitesi, Sosyal Bilimler Enstitüsü. Ankara). <http://tez2.yok.gov.tr/> adresinden edinilmiştir.
- Esen, Y. ve Bağlı M.T. (2002). İlköğretim ders kitaplarındaki kadın ve erkek resimlerine ilişkin bir inceleme. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*, 35(1-2), 143-154.
- Gümüšoğlu, F. (2013). *Ders kitaplarında toplumsal cinsiyetçilik*. İstanbul: Kaynak Yayınları.
- Helvacıoğlu, F. (1996). *Ders kitaplarında cinsiyetçilik*. İstanbul: Kaynak Yayınları.
- Keith, B., & Jacqueline, S. (2002). Parent and adolescent gender role attitudes in 1990's Great Britain. *Sex Roles*, 46(7-8), 239-244.
- Kılıç, L. K. ve Eyüp, B. (2011). İlköğretim Türkçe ders kitaplarında ortaya çıkan toplumsal cinsiyet rolleri üzerine bir inceleme. *Ordu Üniversitesi, Sosyal Bilimler Enstitüsü Sosyal Bilimler Araştırmaları Dergisi*, 2(3), 129-148.
- Kimberly, A., & Mahaffy, K. (2002). The gendering of adolescents' child bearing and educational plans: Reciprocal effects and the influence of social context. *Sex Roles*, 46(11-12), 403-417.
- Koca, C. (2006). *Beden eğitimi ve spor alanında toplumsal cinsiyet ilişkileri*. Hacettepe Üniversitesi Spor Bilimleri Dergisi, 17(2), 81-99
- Kalayci N. and F. Hayirsever, "An Analysis of Citizenship and Democracy Education Textbook in the Context of Gender Equality and Determining Students Perceptions on Gender Equality" *Educational Sciences: Theory & Practice* • 14(3) • 1065-1072.
- Rosenkrantz, P., Vogel, S., Bee, H., Broverman, I., & Broverman, D. M. (1986). Sex roles stereotypes and selfconcepts in college students. *Journal of Consulting and Clinical Psychology*, 32(3), 287-295.
- Sayılan, F. (2012). *Toplumsal cinsiyet ve eğitim*. Ankara: Dipnot Yayınları.
- Sayılan, F. ve Özkazanç, A. (2009). İktidar ve direniş bağlamında toplumsal cinsiyet: Bir okul etnografisi. *Toplum ve Bilim*, 114, 51-73.
- Tan, M. (2005). Yeni (!) İlköğretim programları ve toplumsal cinsiyet. *Eğitim Bilim ve Toplum*, 3(11), 68-77.
- Tietz, W. M. (2007). Women and men in accounting textbooks: Exploring the hidden curriculum. *Issues in Accounting Education*, 22(3), 459-480.
- Trommsdorff, G., & Iwawaki, S. (1989). Student's perceptions of socialization and gender role in Japan and Germany. *International Journal of Behavioral Development*, 12(4), 485-493.
- Weiler, K. (1988). *Women teaching for change: Gender plus and power*. New York: Bergin and Garvey Publishers.

Wrigley, J. 1992 Education and Gender Equality, Falmer Press.