UNIVERSIDADE CATÓLICA PORTUGUESA

The impact of education on happiness: Evidence from a natural experiment

Gabriel Ventura

Catolica Porto Business School

2021

UNIVERSIDADE CATÓLICA PORTUGUESA

The impact of education on happiness: Evidence from a natural experiment

Trabalho Final na modalidade de Dissertação
apresentado à Universidade Católica Portuguesa para
obtenção do grau de mestre em Finanças

por

Gabriel Ventura

sob orientação de

Prof. E. Gevrek

Catolica Porto Business School

2021

Acknowledgements

I would like to acknowledge and express my gratitude to everyone who supported me throughout this academic accomplishment of mine.

To my supervisor Eylem Gevrek for the guidance, patience, and continuous dedication to help me improve and make this Master Thesis possible.

To my mother Teresa Vieira, for her kindness in every circumstance, and for providing me with the right conditions at all times.

Last but not least, to my friends, who I will not name because they are so many, and who I'm extremely lucky to have.

Sumário Executivo

Esta dissertação tem como objetivo examinar o efeito causal da educação na felicidade e na satisfação com diversos domínios da vida pessoal usando dados obtidos do Turkish Life Satisfaction Survey. Para responder a um possível problema de endogeneidade da educação, implementamos o método das variáveis instrumentais (VI) e usamos a reforma educacional introduzida em 1997, que prolongou a escolaridade obrigatória de 5 para 8 anos na Turquia, como fonte de variação exógena na educação. As estimativas VI indicam que a educação não tem um efeito estatisticamente significativo sobre a felicidade para ambos os géneros. Os resultados demonstram também que o impacto da educação em vários domínios da satisfação com a vida difere entre homens e mulheres. Os resultados VI fornecem evidências de que, para as mulheres, ter pelo menos o ensino médio aumenta a probabilidade de estarem satisfeitas com o rendimento familiar, saúde e qualidade de habitação. Entre os homens, descobrimos que a educação tem um efeito negativo e estatisticamente significativo na satisfação com o emprego atual.

Palavras-chave: Educação, Felicidade, Bem-estar

Abstract

This dissertation aims to examine the causal effect of education on happiness and satisfaction with several life domains using data from the Turkish Life Satisfaction Survey. To tackle possible endogeneity of education, we implement the method of instrumental variables (IV) and make use of the 1997 education reform, which prolonged compulsory schooling from 5 to 8 years in Turkey, as a source of exogeneous variation in education. The IV estimates indicate that education has no statistically significant effect on happiness for both genders. Moreover, the impact of education on various life satisfaction domains differs between men and women. The IV results provide evidence that for females, having at least a middle school degree increases the likelihood of being satisfied with household income, health, and housing quality. Among males, we find that education has a negative and statistically significant effect on job satisfaction.

Keywords: Education, Happiness, Subjective well-being.

Index

Index of Figures

Index of Tables

1. Introduction

"Education is the most powerful weapon which you can use to change the world."

Nelson Mandela, President of the African National Congress, 1990

Happiness certainly is a main goal of human beings. It brings many rewards for the individual and results in better and stronger society. Given that governments aim to increase the well-being of their citizens which involves both pecuniary (such as improvement in per capita GDP) and non-pecuniary (such as improvement in life satisfaction) aspects of life, the determinants of subjective well-being (SWB) have recently been the subject of much research. Using data from the Turkish Life Satisfaction Survey, this study investigates the causal effect of education on various SWB measures. Schooling may affect an individual's SWB through two major channels. Most of the previous papers focus on the indirect effect of education on SWB through the income channel. More recently, researchers have started examining the effect of education on various non-materialistic outcomes such as health, marriage that are closely related to SWB. Oreopoulos and Salvanes (2011) provide evidence that non-pecuniary returns obtained from education are as important as the pecuniary ones.

While many studies have investigated the correlational relationship between education and SWB, there is a scant research on the causal effect of education on SWB. To the best of our knowledge there exist only two papers that examine the causal impact of education on SWB (Oreopoulos 2007; Dursun and Cesur 2016). The major problem to estimate this causal effect is endogeneity issu. For example, unobserved characteristics of individuals such as intelligence may jointly affect their education and SWB, which leads to biased estimates due to endogeneity. To

tackle the endogeneity issue, we use the 1997 Turkish education reform as a source of exogenous variation in education. In August 1997, the Turkish government lengthened compulsory schooling from 5 to 8 years. Students who finished the fourth grade or lower in Summer 1997 (i.e., at the end of the 1996-1997 academic year) were affected by the education reform and had to stay in school until the end of eight grade while those who finished the fifth grade in Summer 1997 were not obligated to stay in school. We employ the method of instrumental variables (IV) using exposure to the reform as an instrument for education. Since the dataset includes not only individuals' self-reported happiness but also satisfaction with earnings, household income, marriage, health, friends, job, neighbourhood, housing quality and relationship with family, we examine the causal effect of education on happiness as well as satisfaction with various life domains.

The estimation results can be summarized as follows. First, the Ordinary Least Squares (OLS) estimates indicate that for both males and females, education is positively correlated with happiness and satisfaction with earnings, household income, health, and housing quality however it is negatively associated with satisfaction with neighbourhood and family relationship. Second, the IV estimates show that being subject to the reform has a positive and statistically significant effect on the probability of having at least a middle school degree.

After accounting for endogeneity of education, we find that the impact of having at least a middle school degree on happiness is statistically insignificant for both genders. Moreover, the impact of education on various life satisfaction domains differs between men and women. Our IV results provide evidence that for females, having at least a middle school degree increases the likelihood of being satisfied with household income, health, and housing quality. Among males, we find that education has a negative and statistically significant effect on job satisfaction. Holding at least a middle school diploma decreases the probability of being satisfied with job by 19.3 percentage points. This finding,

which stands up to several robustness checks, might be explained by an imbalance between aspirations and attainments (Dursun and Cesur 2016). Torun (2018) documents that increased education because of the education reform does not have a statistically significant effect on males' wages. If an individual expects a higher wage as a reward from additional schooling but his expectation is not met, the resulting imbalance between aspirations and attainment may lead to a negative effect on job satisfaction.

The remainder of this study is organized as follows: Section 2 provides the literature on the link between education and SWB. Section 3 presents background information on the 1997 education law implemented in Turkey. Section 4 describes the dataset we use in the empirical analysis. Section 5 introduces the empirical methodology employed. Section 6 presents the estimation results as well as the robustness tests performed. Section 7 concludes.

2. Literature Review

Although there is a large literature on the link between education and subjective well-being (SWB), most of the articles provide correlational evidence on this relationship, only a few studies examine the causal effect of education on happiness.

Several studies document a positive correlation between education and happiness (e.g., Cunado and de Gracia 2012; Blanchflower and Oswald 2004; Hartog and Oosterbeek 1998). Previous literature, however, does not reach a consensus on the positive correlation between schooling and SWB measures. There are a few papers that find a negative or statistically insignificant association between education and happiness (for instance, Peiro 2007; Clark and Oswald 1996).

Estimating the causal impact of education on SWB measures is challenging because unobserved factors such as personality traits and family characteristics that affect both schooling and subjective well-being might result in an omitted variable bias, which is one of the sources of endogeneity problem. To the best of our knowledge, there are only two articles that explore the causal impact of education on happiness. Oreopoulos (2007) uses the change in the British compulsory schooling law to evaluate the causal effect of education on self-reported life satisfaction and happiness. In his study, the life satisfaction variable takes the value 1 if an individual reports being not at all satisfied with life, 2 if not satisfied, 3 if fairly satisfied, and 4 if very satisfied while the happiness variable takes the values that range from 1 to 3 (1 = not so happy, 2 = fairly happy, 3 = very happy). Oreopoulos (2007) uses data from Eurobarometer Surveys and finds that each additional year of education increases the probability of being very satisfied by 2.4 percentage points. Moreover, the results indicate that schooling has a positive effect on the probability of being very happy or fairly

happy[1]. To investigate the causal effect of education on happiness and life satisfaction, Dursun and Cesur (2016) use the 1997 education reform that prolonged compulsory schooling from 5 to 8 years in Turkey as a source of exogenous variation in education. Using data from the 2009-2014 waves of Turkish Statistical Institute's Life Satisfaction Survey, Dursun and Cesur (2016) implement the method of instrumental variables that mimics a fuzzy regression discontinuity design to estimate the causal effect of education on subjective well-being measures. They find that for females, education has a positive impact on the probability of being happy and likelihood of being satisfied with several life domains, but extended schooling decreases male subjective well-being. The authors conjecture that the negative causal relationship between education and male subjective well-being may result from an imbalance between aspirations and achievements.

There are several pecuniary and non-pecuniary channels through which education can influence individual's overall life satisfaction. Income is likely to serve as a mediator between education and subjective well-being. A number of studies find that education has a positive impact on earnings (for example, Oreopoulos and Salvanes 2011; Angrist and Krueger 1991). There is a growing literature on the non-pecuniary benefits of schooling. Several studies document that education has a statistically significant causal impact on health, fertility, marriage, and cognitive skills (See Oreopoulos and Salvanes 2011 for the review of the literature). In addition, Frey and Stutzer (2002) suggest that education might influence individual's adaptation and coping skills positively. Being hopeful about the future is also associated with happiness (Foster et al. 2012; Senik 2014). Education can play a key role in providing the necessary tools to promote hopefulness and therefore increase happiness. However, education might have a negative effect on happiness. Increased levels of stress and

[1] Oreopoulos and Salvanes (2011) conduct the same analysis using data from the U.S. General Social Surveys for individuals aged between 25 and 45 and find similar results.

decreased time for leisure activities might also be a consequence of additional education (Oreopoulos and Salvanes 2011). Although education can help achieve happiness as well as reduce stress, it can also have the opposite effect, and cause an imbalance between aspirations and attainments, and increased levels of stress, which, in turn, result in a decrease in happiness (Dursun and Cesur 2016).

According to the resource substitution theory, individuals with more alternative resources are less dependent on education to obtain their desired goals. The theory argues that schooling may play a vital role for those with fewer resources since they are less likely to have alternative strategies (Ross et al. 2012; Ross and Mirowsky 2006). There is also evidence that education may affect female and male SWB differently. Ross and Mirowsky (2006) indicate that the impact of education on SWB is far more crucial to women, associated to past difficulties experienced in society that education may diminish. Moreover, male and female SWB levels might vary throughout the life cycle in an opposite direction. Plagnol and Easterlin (2008) show that men are more likely to become happier at older ages, while women are typically happier at earlier ages.

3. The 1997 education reform in Turkey

In August 1997, the government prolonged compulsory schooling from 5 to 8 years in Turkey. The education law was enacted very quickly and unexpectedly because Turkey could not apply for European Union membership negotiations with an education system that has only 5 years of compulsory schooling (Dulger 2004). The Turkish government also sought to reduce the extent of religious education via this education reform.

Before the reform, the education system in Turkey was divided in three phases: a 5-year elementary school, a 3-year middle school and a 3-year high school. With the new education law, elementary and middle school were merged, forming an 8-year primary school, and consequently the fifth-grade completion diploma was terminated, and replaced by one single primary school diploma, earned only after completing the 8 obligatory years of schooling. According to the law, students who finished the fourth grade or lower in Summer 1997 (i.e., at the end of the 1996-1997 academic year) had to stay in school until the end of eight grade, while those who finished fifth grade in Summer 1997 were not obligated to do so (Kirdar et al. 2014).

The government made substantial efforts to expand primary school access. New schools were built, existing schools were rehabilitated, new educational materials and equipment was provided, and new teachers were recruited. From 1997 to 2003 nearly 104,000 new classrooms were built for children in primary school (Gevrek et al. 2019). This required a substantial amount of funding and government spending. The total annual costs of the reform were estimated to be above USD 3 billion annually between 1997 and 2004 (Dulger 2004). The government was likely to invest more in school infrastructure in regions where primary school enrolment rate was low before the reform. In addition, government provided poor students with free textbooks, free school meals and daily bus transportation.

Between 1997 and 2002 the primary school enrolment ratio increased from 85.63% to 96.30%, and the growth in rural areas was particularly remarkable. The primary school enrolment rate in the grades 6-8 was almost 100% by 2003, which are massive gains compared to the value of 65% pre-reform (Gevrek et al. 2019). It is important to note that the government did not implement any significant changes in terms of the quality of education. Since the education reform was put into effect very quickly, the curriculum stayed the same. There were no significant changes in the contents and composition of the courses induced by the reform (Dulger 2004).

The reform creates an ideal natural experiment and allows researchers to study the causal effect of education on several outcomes because it generated an exogenous increase in the educational attainment of children without any significant changes in curriculum. There are a number of studies that use this reform to assess the impact of education on different outcomes for example health, emigration intentions, wages, physical violence, and religiosity (Gevrek et. al 2019; Cesur and Mocan 2018; Erten and Keskin 2017; Dincer et al. 2014)

4. Data and Descriptive Statistics

The dataset used in this study is the Turkish Life Satisfaction Survey (TLSS), conducted by the Turkish Statistical Institute. The TLSS allows researchers to measure happiness and life satisfaction of individuals that are at least 18 years of age. The TLSS data we used in the empirical analysis belongs to the 2013-2017 period. In addition to the measures of SWB, this survey contains information on the socioeconomic and demographic profile of each respondent such as marital status, gender, and education.

Our sample covers the birth cohorts 1980 to 1992. Since the data comes from the 2013-2017 waves of the TLSS, individuals in our sample were between 21 and 37 years old at the time of the time survey. In our analysis, individuals born between 1980 and 1985 make up the control group and those born between 1987 and 1992 make up the treatment group.

The compulsory schooling law required students who did not complete the fifth grade in summer 1997 to continue their education until the completion of the 8^{th} grade. Because children normally start school when they are 6 years old in Turkey, individuals younger than 11 in 1997 (i.e., the treatment group: born between 1987 and 1992) were affected by the reform while those older than 11 in 1997 (i.e., the control group: born between 1980 and 1985) were not affected by the reform Following Gevrek et al. (2019) and Cesur and Mocan (2018), we do not include the birth cohort of 1986 in our main analysis.

According to the Turkish law, children who are 6 years old by the end of the calendar year start primary school in September. But Turkey's school-starting age cut-off rule has not been applied strictly (Torun 2018). Gevrek et al. (2019) state that parents may postpose their children's primary school enrolment for one year due to maturity reasons. Therefore, some individuals from the 1986 birth cohort may have started primary school in September 1993 instead of September 1992, even though they could be enrolled in primary school earlier, in September 1992.

They were affected by the reform because they finished the fourth grade in summer 1997, but some children who were born in 1986 were not affected by the reform because they started primary school in September 1992. Although we exclude those who were born in 1986 in our main analysis, we investigate whether the results are robust to the inclusion of the 1986 cohort or not.

Our key dependent variable is *Happy*, which we constructed by making use of the following question in the TLSS: "When you consider your entire life, how happy are you?". The possible answers to the question are: 5 (very happy), 4 (happy), 3 (neither happy, nor unhappy), 2 (unhappy), 1 (very unhappy). The outcome variable, *Happy*, is a dummy variable that takes the value of 1 if the individual reported his/her happiness level as "very happy" or "happy", and zero otherwise.

Survey participants in the TLSS were also asked several life satisfaction questions about various life domains such as financial well-being, marriage, neighbourhood, and health. The alternative answers to each life satisfaction question are "very satisfied" (5), "satisfied" (4), "neither satisfied, nor unsatisfied" (3), "unsatisfied" (2) and "very unsatisfied" (1). Using the answers to the life satisfaction questions, we created a series of dummy variables that indicate whether respondents are satisfied with earnings, household income, marriage, health, relationship with friends, job, neighbourhood, housing quality and relationship with family. Each life satisfaction dummy variable takes the value of 1 if the respondent's answer to the associated life domain satisfaction question is "very satisfied" and "satisfied", and 0 otherwise.

The TLSS includes information the highest education level attained by the respondent. The possible answers to the education level question are "no education"; "less than elementary school degree (less than 5 years of formal schooling)"; "elementary school degree (5 years of education)"; "middle school degree (8 years of education)"; "high school degree"; and "college or higher levels of education". Because the education reform made middle school

completion obligatory, our main variable of interest, *educ*, is an indicator variable that takes the value 1 if the respondent has at least a middle school diploma (i.e., having at least 8 years of schooling), and 0 otherwise.

Table 1 Descriptive statistics

	Female All	Female Control	Female Treatment	Male All	Male Control	Male Treatment
Happy	0.66	0.65	0.68	0.58	0.57	0.60
	(0.47)	(0.48)	(0.47)	(0.49)	(0.49)	(0.49)
Middle School	0.69	0.55	0.87	0.83	0.73	0.94
	(0.46)	(0.50)	(0.34)	(0.38)	(0.44)	(0.23)
Satisfied with earnings	0.48	0.47	0.50	0.49	0.47	0.52
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)
Satisfied with household income	0.46	0.43	0.49	0.48	0.45	0.52
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)
Satisfied with marriage	0.94	0.94	0.94	0.98	0.98	0.97
	(0.24)	(0.24)	(0.23)	(0.15)	(0.15)	(0.17)
Satisfied with health	0.81	0.78	0.85	0.87	0.86	0.89
	(0.39)	(0.41)	(0.36)	(0.33)	(0.35)	(0.31)
Satisfied with friends	0.90	0.91	0.90	0.90	0.89	0.91
	(0.29)	(0.29)	(0.30)	(0.30)	(0.31)	(0.28)
Satisfied with job	0.79	0.80	0.78	0.80	0.81	0.80
	(0.41)	(0.40)	(0.41)	(0.40)	(0.40)	(0.40)
Satisfied with neighborhood	0.78	0.79	0.78	0.79	0.79	0.78
	(0.41)	(0.41)	(0.42)	(0.41)	(0.41)	(0.41)
Satisfied with housing	0.76	0.75	0.77	0.80	0.80	0.81
	(0.43)	(0.43)	(0.42)	(0.40)	(0.40)	(0.39)
Satisfied with family relations	0.84	0.84	0.83	0.80	0.80	0.79
	(0.37)	(0.37)	(0.37)	(0.40)	(0.40)	(0.40)
Hopeful	0.22	0.23	0.20	0.24	0.26	0.21
	(0.41)	(0.42)	(0.40)	(0.42)	(0.44)	(0.41)
Expects to be better off next year	0.46	0.42	0.50	0.45	0.42	0.50
	(0.50)	(0.49)	(0.50)	(0.50)	(0.49)	(0.50)
Labor force participation	0.33	0.34	0.31	0.84	0.92	0.72
	(0.47)	(0.47)	(0.46)	(0.37)	(0.27)	(0.45)
Married	0.75	0.86	0.60	0.56	0.77	0.29
	(0.43)	(0.35)	(0.49)	(0.50)	(0.42)	(0.45)
Age	28.40	31.43	24.56	28.43	31.48	24.59
	(3.89)	(2.19)	(2.13)	(3.92)	(2.21)	(2.16)
Observations	15,635	8,132	6,272	12,455	6,481	5,008

Individuals born between 1987 and 1992 make up the treatment group while those who were born between 1980 and 1985 make up the control group. Values in parenthesis represent the standard deviations. The number of observations for "satisfied with earnings" variable in the female (male) sample is 5142 (10410). The number of observations for "satisfied with marriage" variable in the female (male) sample is 11751 (6996). The number of observations for "satisfied with job" variable in the female (male) sample is 5142 (10410).

Table 1 presents descriptive statistics by gender and treatment status. Table 1 shows that 87% of the females in the treatment group hold at least a middle school diploma, while this rate in the control group is only 55%. Among males, in the treatment group 94% have at least 8 years of education whereas only 73% have at least 8 years of education in the control group. The proportion of females who described themselves as happy in the control and treatment groups is 65% and 68%, respectively. The corresponding rates for males are 57% in the control group and 60% in the treatment group.

Table 1 indicates that health satisfaction is on average higher in the treatment group for both females (85% vs. 78% in the control group) and males (89% vs. 86% in the control group). Satisfaction with household income and earnings exhibit a similar pattern. The proportion of females (males) who are satisfied with their household income is 49% (52%) in the treatment group while 43% (45%) of females (males) reported to be satisfied with their household income in the control group. Table 1 reveals that for females (males) in the treatment group, 50% (52%) are satisfied with their earnings (vs. 47% in the control group for both genders). The difference is the average life satisfaction with respect to the remaining life domains between the control and treatment groups are small for both genders, ranging between 1 and 2 percentage points.

In Table 1, we also display mean values for the following variables: *labor force participation, hopeful, married and expects to be better off next year* [2]. These variables can mediate the relationship between education and subjective well-being. We use these mediators to explore potential mechanisms through which

[2] We use the binary indicators *married* and *labor force participation*, to examine the roles of marital and labor force status as mediators between education and happiness. We also use two other binary variables to measure short-term and long-term expected well-being, which are *expects to be better off next year* and *hopeful*, respectively. *Expects to be better off next year* takes the value of 1 if the individual expects an improvement in material well-being next year, and 0 otherwise, and *hopeful* is based on the question "How hopeful are you about your future?" with the 4 alternative options: from 4 "very hopeful" to 1 "not hopeful at all" and will take the value of 1 for those who report being very hopeful or hopeful, and 0 otherwise.

education can affect subjective well-being. 86% of females in the control group are married, while in the treatment group only 60% are married. For males, the corresponding rates are 77% and 29% respectively. The proportion of individuals who are hopeful about their future in the control group is higher than that in the treatment group for both genders. However, Table 1 shows that 50% of both males and females expect to be better off next year in the treatment group, while the corresponding rate for the control group is only 42% for both genders. There is a large gender gap in labor force participation behaviour in Turkey (Atasoy, 2017). The descriptive statistics indicate that 33% of females participated in the labor force while those in the labor force constitute 84% of the male sample.

5. Empirical Analysis

This study aims to investigate the relationship between education and subjective well-being (SWB). To this end, we use the following econometric specification to estimate the effect of education on the probability of being happy and on the probability of being satisfied with several life domains (i.e., earnings, household income, marriage, health, relationship with friends, job, neighbourhood, housing, and relationships with family members and relatives).

$$SWB_i = \beta_0 + \beta_1 \text{Educ}_i + X_i\gamma + \varepsilon_i \qquad (1)$$

where SWB_i is an indicator variable that represents a particular SWB measure for the individual *i*. For example, whether the individual *i* described himself as happy or whether the individual *i* described himself as satisfied with his household income. $Educ_i$ is an indicator variable that takes the value of one if the individual *i* has at least a middle school diploma (i.e., completed at least 8 years of schooling) and zero otherwise. The vector X_i contains survey year dummies, age, and age squared. ε_i is the error term.

Estimating equation (1) by ordinary least squares (OLS) may lead to biased estimates because the error term (ε_i), might be correlated with education. For example, the error term contains income that is one of the determinants of SWB, and there is a positive correlation between labor market earnings and education (Card 1999). Therefore, unobserved factors affecting both education and SWB causes an omitted variable bias, which is one of the sources of endogeneity problem.

To address the potential endogeneity of education to subjective well-being, we employ the method of instrumental variables (IV) and use exposure to the reform as an instrument for education.

The first-stage regression is specified by equation (2):

$$\text{Educ}_i = \alpha_0 + \alpha_1 \text{Reform}_i + X_i\delta + \mu_i \qquad (2)$$

where Reform_i is a binary variable that indicates whether the individual i was subject to the reform. It takes the value of 1 if the individual i was born after 1986, and zero if the individual i was born before 1986. Since it is not certain which members of the 1986 birth cohort were affected by the reform, the baseline specification does not include the 1986 birth cohort. As a robustness check, we include the 1986 cohort and estimate the model by assigning the *Reform* binary variable for the 1986 cohort the value of either 0.3 or 0.5[3]. Standard errors are clustered at the age level.

[3] The main results are robust to the inclusion of the 1986 cohort.

6. Results

6.1. Ordinary least squares (OLS) estimates

Table 2 presents the OLS estimates of the association between education and subjective well-being measures. The OLS results indicate that education is positively correlated with happiness. Column (1) of Table 2 shows that for females (males), having at least a middle school diploma is associated with a 4.3 (6.8) percentage point increase in the probability of being happy. Columns (2) and (3) of Table 2 reveal that there is a positive correlation between education and the probability of being satisfied with earnings and household income for both females and males.

The results presented in column (4) show that male schooling is not related to the probability of being satisfied with marriage, whereas females who hold at least a middle school diploma are 2 percentage points more likely to be satisfied with their marriage. Column (5) demonstrates that education is positively correlated with the probability of being satisfied with health for females and males. Using data from the Turkish Statistical Institute's Health Survey, Dursun et al. (2018) also find that holding at least a middle school degree is positively correlated with good health for both genders. In columns (6) and (7), we find that the associations between having at least a middle school diploma and the probability of being satisfied with job and relationship with friends are not statistically significant.

Columns (8) and (10) of Table 2 suggest that holding at least a middle school degree is negatively correlated with satisfaction with neighbourhood and family relationship for both genders. Column (9) reveals that women (men) who have at least a middle school diploma are 3.1 (1.6) percentage points more likely to be satisfied with housing. In sum, the OLS estimates in Table 2 provide evidence

that having at least a middle school diploma is correlated with increased subjective well-being (i.e., happiness and life satisfaction) for both genders.

Table 2 The effect of holding at least a middle school degree on happiness and life satisfaction: OLS estimation

	(1) Happy	(2) Satisfied with earnings	(3) Satisfied with HH income	(4) Satisfied with marriage	(5) Satisfied with health	(6) Satisfied with friends	(7) Satisfied with job	(8) Satisfied with neighborhood	(9) Satisfied with housing	(10) Satisfied with family relationship
Panel A: Females										
Middle school	0.043***	0.038*	0.114***	0.020***	0.050***	−0.001	0.012	−0.043***	0.031***	−0.024***
	(0.008)	(0.022)	(0.009)	(0.005)	(0.007)	(0.006)	(0.012)	(0.007)	(0.009)	(0.005)
Observations	14,404	4,731	14,404	10,782	14,404	14,404	4,731	14,404	14,404	14,404
Panel B: Males										
Middle school	0.068***	0.051***	0.121***	0.009	0.019**	0.0002	−0.005	−0.026**	0.016*	−0.028***
	(0.010)	(0.014)	(0.014)	(0.006)	(0.008)	(0.007)	(0.011)	(0.010)	(0.008)	(0.010)
Observations	11,489	9,577	11,489	6,466	11,489	11,489	9,577	11,489	11,489	11,489

Robust standard errors, corrected for clustering at the age level, are in the parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The “Middle school” indicator variable takes the value of one if the individual has at least a middle school diploma (i.e., completed at least 8 years of schooling) and zero otherwise. All regressions control for survey year dummies, age, and age squared.

6.2. Instrumental variables (IV) estimates

If unobserved determinants of subjective well-being are correlated with education, the estimation results presented in Table 2 are biased and do not show the causal impact of education. To estimate the causal impact of education on SWB, we implement the method of instrumental variables, using exposure to the education reform as an instrument for education.

Figures 1 and 2 show the proportion of males and females that hold at least a middle school diploma (i.e., at least 8 years of schooling) by birth cohort. The individuals who were born between 1980 and 1985 form the control group and those who were born between 1987 and 1992 were exposed to the reform, thus they form the treatment group. Since individuals born in 1986 may not be affected by the reform, we exclude the 1986 cohort from the empirical analyses. In Figures 1 and 2, we separate the control and treatment groups with a vertical line placed in the 1986 birth cohort.

Figures 1 and 2 demonstrate that for both genders, middle school completion rates increased substantially for birth cohorts affected by the education reform. Fig. 1 displays that for males born between 1980 and 1985, the proportion of those having at least a middle school diploma ranges between 70% and 75%. This rate jumps to 91.4% for those who were born in 1987, and climbs to 96.6% for the 1992 birth cohort. Fig. 2 displays a similar pattern for females, but in larger scale. The proportion of females holding a at least middle school degree is less than 50% for the 1980 birth cohort and increases to 59.3% for those born in 1985. In the treatment group, middle school completion rate jumps to 80.5% for those born in 1987 and continued to increase, reaching 90.6% for the 1992 birth cohort. Figs. 1 and 2 also suggest that the education reform narrowed the gender gap in the middle school completion.

Next, we estimate equation (2) to examine the impact of the education reform on the probability of holding at least a middle school diploma. The first-stage results of IV estimation are presented in Table 3. It should be noted that in our main analysis, we use individuals who were born between 1980 and 1992. Narrowing the window of birth cohorts, we re-estimated equation (2) using: (i) individuals who were born between 1981 and 1991 (treatment and control groups consists of 5 birth cohorts), (ii) individuals who were born between 1982 and 1990 (treatment and control groups consist of 4 birth cohorts). The estimation results for these two specifications are shown in columns (2) and (3) of Table 3, respectively.

The estimation results presented in Table 3 indicate that being subject to the education reform has a significant positive effect on the probability of having at least a middle school diploma for both females and males in all the three specifications. Panel A of Table 3 shows that among females, exposure to the reform rises the probability of having at least a middle school degree by between 19.5 and 20.9 percentage points. Panel B demonstrates that for males, exposure to the reform leads to an increase in the likelihood of holding at least a middle school degree that ranges between 14.6 and 16.1 percentage points.

Table 3 The effect of the education reform on holding at least a middle school degree

	(1) 1980-1992	(2) 1981-1991	(3) 1982-1990
Panel A: females			
Reform	0.195***	0.209***	0.196***
	(0.016)	(0.018)	(0.022)
Observations	14,404	12,054	9,606
First-stage *F* test	140.42	128.37	82.45
Panel B: males			
Reform	0.161***	0.158***	0.146***
	(0.016)	(0.017)	(0.020)
Observations	11,489	9,575	7,611
First-stage *F* test	105.47	82.26	51.55

The dependent variable is a binary variable that takes value 1 if the individual has at least 8 years of schooling and 0 otherwise. Robust standard errors, corrected for clustering at the age level, are in the parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All regressions control for survey year dummies, age, and age squared.

Table 4 The effect of holding at least a middle school degree on happiness: IV estimation

	(1) 1980-1992	(2) 1981-1991	(3) 1982-1990
Panel A: females			
Middle school	0.072	0.018	0.107
	(0.114)	(0.114)	(0.108)
Observations	14,404	12,054	9,606
Panel B: males			
Middle school	−0.212	−0.235	−0.162
	(0.128)	(0.153)	(0.134)
Observations	11,489	9,575	7,611

The dependent variable takes the value 1 if the individual reported his/her happiness level as "very happy" or "happy", and 0 otherwise. The "Middle school" indicator variable takes the value of one if the individual has at least a middle school diploma and zero otherwise. All regressions control for survey year dummies, age, and age squared. Robust standard errors, corrected for clustering at the age level, are in the parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

The first-stage F-statistics range from 140.42 (105.47) to 82.45 (51.55) for females (males), depending on the specification. Since the F-statistics are greater than 10, we can rule out the problem of weak instruments (Staiger and Stock 1997). It is important to note that the estimates presented in Table 3 are consistent with previous research that investigates the effect of the 1997 education reform on educational outcomes using different data sets (for instance, Gevrek et al. 2019; Dursun et al. 2018).

Figure 1: Proportion of males with at least a middle school diploma

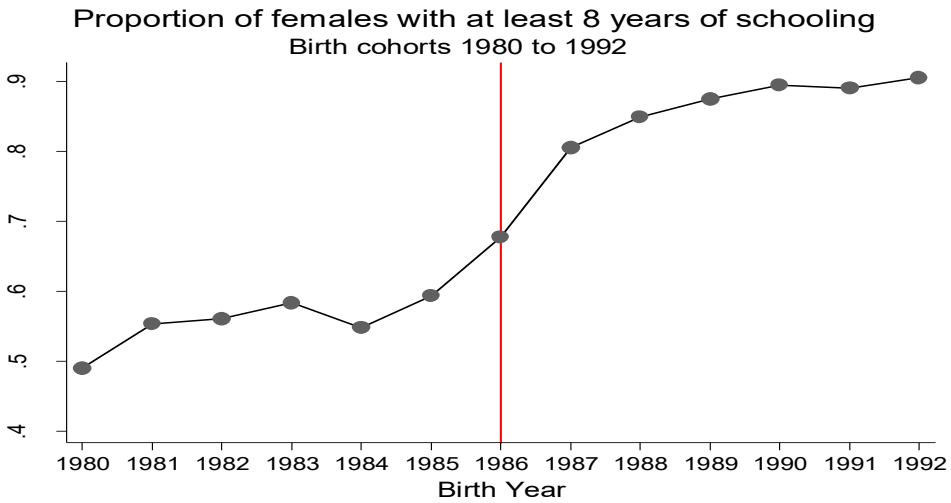


Figure 2: Proportion of females with at least a middle school diploma

Figures 3 and 4 show the proportion of women and men that have reported to be happy, by birth cohort. Fig. 3 indicates that there are no significant jumps in the proportion of women who are happy between the treatment and control groups. The treatment group shows a small increase in this proportion. We observe a similar pattern for the male sample. Fig. 4 indicates that there is no strong link between the reform and the propensity to be happy among males.

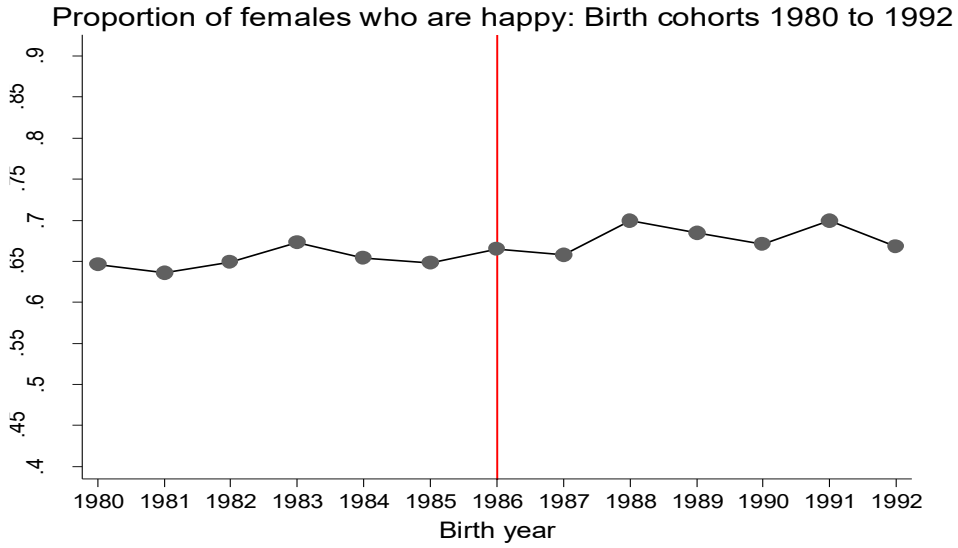


Figure 3: Proportion of females who are happy

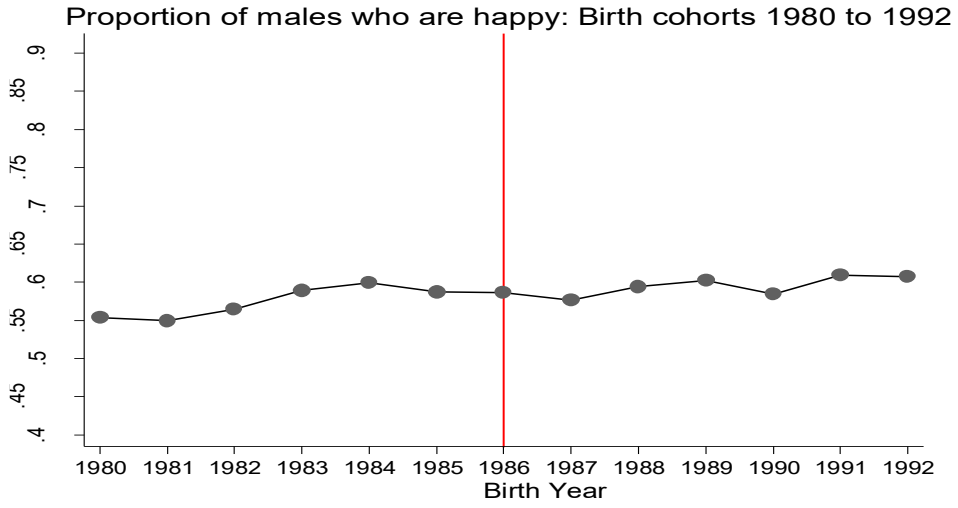


Figure 4: Proportion of males who are happy

Table 4 shows the instrumental variables estimation results for happiness. The estimates presented in Table 4 indicate that education does not have a statistically significant impact on the probability of being happy for both genders. It is important to note that since the 1997 education reform prolonged the compulsory years of schooling from five to eight years, our empirical framework allows us to identify the effect of these additional three years of schooling because of the reform. Therefore, the statistically insignificant relationship between education and the probability of being happy may result from the education margin we analyse in this study. These results might not be valid if we examined, for example, the causal impact of having a high school diploma in comparison to earning a middle school degree on the probability of being happy by using a different education reform (Gevrek et al. 2019).

The comparison of Table 2 with Table 4 reveals that after controlling for the endogeneity problem, the estimated coefficient of education in the happiness equation turns out to be statistically insignificant. (Gevrek et al. 2019) state that "The IV estimator identifies the average effect of education for the subpopulation of individuals who have a low probability of continuing their education behind the compulsory schooling". This subpopulation consists of individuals who would not have obtained these additional three years of education if there was no reform. The IV estimates suggest that the effect of middle school completion on the probability of being happy is not statistically significant in this subpopulation.

Table 5 shows IV estimates of the impact of having at least a middle school degree on life satisfaction for females and males[4].

[4] Figure 5 in the Appendix visually presents the impact of the education reform in Turkey on life satisfaction.

Table 5 The effect of holding at least a middle school degree on life satisfaction: IV estimation

	(1) Satisfied with earnings	(2) Satisfied with HH income	(3) Satisfied with marriage	(4) Satisfied with health	(5) Satisfied with friends	(6) Satisfied with job	(7) Satisfied with neighborhood	(8) Satisfied with housing	(9) Satisfied with family relationship
Panel A: females									
Middle school	0.001	0.122*	−0.046	0.082*	−0.070	−0.040	0.040	0.105*	0.059
	(0.274)	(0.069)	(0.044)	(0.041)	(0.064)	(0.148)	(0.058)	(0.059)	(0.087)
Observations	4,731	14,404	10,782	14,404	14,404	4,731	14,404	14,404	14,404
First-stage *F* test	16.56	140.42	110.67	140.42	140.42	16.56	140.42	140.42	140.42
Panel B: males									
Middle school	−0.068	−0.024	−0.028	−0.070	0.003	−0.193**	0.066	−0.044	−0.040
	(0.148)	(0.130)	(0.036)	(0.063)	(0.057)	(0.083)	(0.078)	(0.073)	(0.049)
Observations	9,577	11,489	6,466	11,489	11,489	9,577	11,489	11,489	11,489
First-stage *F* test	78.68	105.47	62.73	105.47	105.47	78.68	105.47	105.47	105.47

The dependent variable takes the value of one if the individual reported his/her satisfaction level as “very satisfied” or “satisfied”, and zero otherwise. All regressions control for survey year dummies, age, and age squared. Robust standard errors, corrected for clustering at the age level, are in the parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A of Table 5 indicates that education has a positive and statistically significant impact (at the 10% level) on the likelihood of being satisfied with household income (column 2), health (column 4), and housing (column 8) for females. Having at least a middle school degree increases the probability of being satisfied with health by 8.2 percentage points. Having at least a middle school degree also leads to a 12.2 (10.5) percentage point increase in the probability of being satisfied with household income (housing)[5].

To explore possible channels through which education affects these three life satisfaction domains, we estimate the effect of education on the potential determinants of life satisfaction that are available in the dataset (i.e., marital status, labour force participation and expectations about the future for females). The IV estimates shown in panel A of Table 6 demonstrate that the impact of education on the probability of being in the labor force is statistically significant at the 5 % level. Having at least a middle school diploma causes 16.8 percentage points increase in the likelihood of labor force participation. Therefore, we conjecture that increased income due to a change in female labor force participation behaviour might be an explanation for the positive relationship between education and satisfaction with health, housing, and household income among women.

The estimation results presented in Table 5 indicate that increased education because of the reform has differential effects for males and females. Panel B of Table 5 shows that holding at least a middle school diploma does not have a positive impact on male subjective well-being. For males, the effect of education on job satisfaction is negative and statistically significant at the 5 % level. Holding

[5] These causal relationships are in line with the findings of Dursun and Cesur (2016). In addition, Dursun et al. (2018) also investigate the causal effect of education on various health outcomes in Turkey. They document that the effect of education on men's self-reported health status is not statistically significant however education causes an increase in the likelihood of reporting excellent health for women.

at least a middle school diploma decreases the likelihood of being satisfied with job by 19.3 percentage points.

Table 6 The effect of holding at least a middle school degree on potential mediators: IV estimation

	(1) Married	(2) Expects to be better off next year	(3) Labor force participation	(4) Hopeful
Panel A: females				
Middle school	0.164	−0.104	0.168**	0.093
	(0.120)	(0.102)	(0.089)	(0.081)
Observations	14,404	14,404	14,404	14,404
First-stage *F* test	140.42	140.42	140.42	140.42
Panel B: males				
Middle school	−0.473***	−0.188**	0.383***	0.071
	(0.153)	(0.078)	(0.131)	(0.084)
Observations	11,489	11,489	11,489	11,489
First-stage F test	105.47	105.47	105.47	105.47

Robust standard errors, corrected for clustering at the age level, are in the parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The "Middle school" indicator variable takes the value of one if the individual has at least a middle school diploma (i.e., completed at least 8 years of schooling) and zero otherwise. All regressions control for survey year dummies, age, and age squared.

Table 7 The effect of holding at least a middle school degree on happiness while controlling for potential mediators: IV estimates

	(1)	(2)	(3)	(4)	(5)
Panel A: females					
	Estimates of happy	Controlling for potential mediators			
	Baseline estimate				
Middle school	0.072	0.038	0.084	0.080	0.105
	(0.114)	(0.115)	(0.109)	(0.119)	(0.111)
First-stage *F* test	140.34	150.82	144.07	138.15	140.71
Observations	[14,404]	[14,404]	[14,404]	[14,404]	[14,404]
Controls for					
Married		Yes	No	No	No
Expects to be better off next year		No	Yes	No	No
Labor force participation		No	No	Yes	No
Hopeful		No	No	No	Yes

Table 7 (continued)

	(1)	(2)	(3)	(4)	(5)
Panel B: males					
	Happy	Controlling for potential mediators			
	Baseline model				
Middle school	−0.212	−0.151	−0.181	−0.265**	−0.188
	(0.128)	(0.133)	(0.124)	(0.127)	(0.118)
First-stage *F* test	113.06	104.80	115.13	112.28	113.59
Observations	[11,489]	[11,489]	[11,489]	[11,489]	[11,489]
Controls for					
Married		Yes	No	No	No
Expects to be better off next year		No	Yes	No	No
Labor force participation		No	No	Yes	No
Hopeful		No	No	No	Yes

Robust standard errors, corrected for clustering at the age level, are in the parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The "Middle school" indicator variable takes the value of one if the individual has at least a middle school diploma (i.e., completed at least 8 years of schooling) and zero otherwise. All regressions control for survey year dummies, age, and age squared.

The IV estimates shown in Panel B of Table 6 provides an explanation for the negative effect of education on the probability of being satisfied with job among men. Panel B of Table 6 documents that holding at least a middle school diploma decreases the probability of expecting to be better off next year and the likelihood of being married among men. Completing middle school education may negatively affect male subjective well-being through its impact on the probability of being married and expectations for future[6]. Moreover, Torun (2018) finds that the 1997 education reform does not have a statistically significant impact on wages among males. As argued by Dursun et al. (2016), if the increased education leads to higher expectations about subjective well-being without increasing labor market earnings, the resulting imbalance between aspirations and attainments may explain why the extended education has a negative effect on the male subjective well-being.

[6] Eren and Asici (2017) find that married people have higher life satisfaction. Higher expectations for future, which can be used as a proxy for psychological well-being, are also found to affect the subjective well-being positively.

6.3. Robustness tests

In the baseline specification, we exclude the 1986 cohort because it is not clear which members of this cohort were affected by the reform. To examine the robustness of the impact of having at least a middle school degree on subjective well-being, we include the 1986 birth cohort and assign the Reform dummy for the 1986 cohort (i) the value of 0.3 and (ii) the value of 0.5, respectively. Panels A and B of Table 8 present the estimation results under the assumption that one third of the individuals born in 1986 were treated by the reform (i.e., Reform dummy for the 1986 cohort takes the value of 0.3) while Panels C and D of Table 8 present the estimation results under the assumption that half of the individuals born in 1986 were treated by the reform (i.e., Reform dummy for the 1986 cohort takes the value of 0.5).

The estimation results presented in Panels A and C of Table 8 show that for females, the positive impact of education on the probability of being satisfied with household income and housing is robust to including the 1986 cohort. However, including the 1986 cohort and setting the Reform dummy for the 1986 cohort equal to the value of 0.3 (Panel A, column 5) or equal to the value of 0.5 (Panel C, column 5) changes the estimated impact of education on the likelihood of being satisfied with health among females. The estimated coefficient of education turns out to be statistically insignificant. Moreover, we find that the effect of education on the probability of being satisfied with marriage is negative and statistically significant at the 5% level when we assume that one third of the females born in 1986 were treated by the reform, but this effect turns out to be statistically insignificant under the assumption that half of the females born in 1986 were treated by the reform. Column 7 of Table 8 indicates that among males, the negative effect of education on the likelihood of being satisfied with job is robust to the inclusion of the 1986 cohort. Moreover, column 1 of Table 8 reveals

that the effect of education on happiness remains insignificant for both genders in these two alternative specifications.

We also examine whether the estimation results displayed in Table 5 are robust to narrowing the window of birth cohorts. We re-estimate the regression model by using (i) individuals who were born between 1981 and 1991 (treatment and control groups have 5 birth cohorts), (ii) individuals who were born between 1982 and 1990 (treatment and control groups have 4 birth cohorts). The estimation results for these two specifications are show in Panels A and B of Table 9 and Panels C and D of Table 9, respectively. It is important to note that this exercise leads to a reduction in the number of observations.

A comparison of the results presented in Table 9 with those in Table 5 reveals that when we narrow the window of birth cohorts, for males, the negative impact of education on the likelihood of being satisfied with job does not change much but for females, the effect of education on the likelihood of being satisfied with household income, health and housing becomes statistically insignificant.

Table 5 shows that among females, having at least a middle school degree increases the probability of being satisfied with household income, health, and housing while for males, having at least a middle school degree has a negative impact on the likelihood of being satisfied with job. We descriptively examine how potential mediators influence the impact of education on the likelihood of being satisfied with these four life domains. (i.e., satisfaction with household income, health and housing quality for females, and satisfaction with job for males).

The estimation results presented in Table 10 indicate that when we control for potential mediators, the effect of education on the four life satisfaction domains remains statistically significant. For females, the largest change in the point estimate of education across specifications ranges between 13% (satisfaction with housing) and 20% (household income). For males, controlling for marital status, expectations about the future, labor force participation and hopefulness causes a

decrease in the estimated coefficient of education by 4%, 15%, 21% and 11%, respectively.

7. Conclusion

This dissertation investigates the causal effect of education on happiness and satisfaction with various life domains using the 2013-2017 waves of the Turkish Statistical Institute's Life Satisfaction Survey. To tackle the potential endogeneity of education, we implement the method of instrumental variables and make use of the 1997 education reform, which prolonged compulsory schooling in Turkey from 5 to 8 years, as a source of exogenous variation in education.

The IV estimates indicate that education does not have a statistically significant impact on happiness. It is important to note that the education margin we analyse in this study might be responsible for the statistically insignificant effect because we are able to identify the impact of the extended primary education on happiness. The causal impact of higher educational attainment at different levels of schooling, for example having university degree, remains subject for future research. We also find that the effect of education on several life satisfaction domains differs between men and women. Having at least a middle school degree increases the probability of being satisfied with household income, health, and housing quality among females while it decreases the probability of being satisfied with job among males.

The dataset used in the empirical analysis does not contain information on the respondents' place of residence and ethnicity. Due to the data limitations, we cannot investigate whether the causal effect of education on happiness and life satisfaction changes between rural and urban areas and across regions of Turkey, and ethnicities. To check the robustness of our empirical results, future research should explore whether the causal effect varies among different subpopulations (i.e., ethnic groups and regions). Our final sample contains individuals aged between 21 and 37 years old. Therefore, it also would be informative to explore whether the causal relationship between education and subjective well-being (i.e., happiness and life satisfaction) changes at older ages.

Table 8 The effect of holding at least a middle school degree on life satisfaction, while including 1986 cohort: IV estimation

	(1) Happy	(2) Satisfied with earnings	(3) Satisfied with HH income	(4) Satisfied with marriage	(5) Satisfied with health	(6) Satisfied with friends	(7) Satisfied with job	(8) Satisfied with neighborhood	(9) Satisfied with housing	(10) Satisfied with family relationship
Treatment = 0.3										
Panel A: females										
Middle school	0.061	0.342	0.210***	−0.078**	−0.010	−0.062	0.257	0.077	0.129**	0.056
	(0.120)	(0.260)	(0.053)	(0.039)	(0.120)	(0.058)	(0.184)	(0.069)	(0.060)	(0.084)
Observations	15,635	5,142	15,635	11,751	15,635	15,635	5,142	15,635	15,635	15,635
First-stage *F* test	130.55	15.65	130.55	119.21	130.55	130.55	15.65	130.55	130.55	130.55
Panel B: males										
Middle school	−0.271	−0.230	−0.057	−0.046	−0.047	−0.049	−0.316***	−0.021	−0.110	0.007
	(0.180)	(0.156)	(0.115)	(0.037)	(0.081)	(0.086)	(0.106)	(0.118)	(0.124)	(0.065)
Observations	12,455	10,410	12,455	6,996	12,455	12,455	10,410	12,455	12,455	12,455
First-stage *F* test	67.43	51.39	67.43	47.64	67.43	67.43	51.39	67.43	67.43	67.43

Table 8 (continued)

	(1) Happy	(2) Satisfied with earnings	(3) Satisfied with HH income	(4) Satisfied with marriage	(5) Satisfied with health	(6) Satisfied with friends	(7) Satisfied with job	(8) Satisfied with neighborhood	(9) Satisfied with housing	(10) Satisfied with family relationship
Treatment = 0.5										
Panel C: females										
Middle school	0.067	0.128	0.158***	−0.059	0.045	−0.067	0.071	0.054	0.114*	0.058
	(0.115)	(0.276)	(0.060)	(0.039)	(0.069)	(0.060)	(0.155)	(0.059)	(0.059)	(0.084)
Observations	15,635	5,142	15,635	11,751	15,635	15,635	5,142	15,635	15,635	15,635
First-stage *F* test	148.57	18.91	148.57	127.73	148.57	148.57	18.91	148.57	148.57	148.57
Panel D: males										
Middle school	−0.232*	−0.120	−0.035	−0.034	−0.062	−0.015	−0.231***	0.036	−0.066	−0.024
	(0.140)	(0.147)	(0.122)	(0.035)	(0.067)	(0.063)	(0.089)	(0.078)	(0.084)	(0.054)
Observations	12,455	10,410	12,455	6,996	12,455	12,455	10,410	12,455	12,455	12,455
First-stage *F* test	100.85	79.01	100.85	69.63	100.85	100.85	79.01	100.85	100.85	100.85

Robust standard errors, corrected for clustering at the age level, are in the parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The “Middle school” indicator variable takes the value of one if the individual has at least a middle school diploma (i.e., completed at least 8 years of schooling) and zero otherwise. All regressions control for survey year dummies, age, and age squared.

Bibliography

Angrist JD, Krueger AB (1991) Does compulsory school attendance affect schooling and earnings? Q J Econ 106:979-1014

Blanchflower DG, Oswald AJ (2004) Well-being over time in Britain and the USA. J Public Econ 88:1359-1386

Atasoy, B.S. (2017) Female Labour Force Participation in Turkey: The Role of Traditionalism. Eur J Dev Res 29, 675–706

Card, D. (1999) The Causal Effect of Education on Earnings, Editor(s): Orley C. Ashenfelter, David Card, Handbook of Labor Economics, Elsevier, Volume 3, Part A, Chapter 30, 1801-1863.

Cesur R, Mocan HN (2013) Does secular education impact religiosity, electoral participation and the propensity to vote for Islamic parties? Evidence from an education reform in a Muslim Country. NBER Working Paper 19769

Cesur R, Mocan HN (2018) Education, religion, and voter preference in a Muslim country. Journal of Population Economics, 31(1), 1-44

Clark AE, Oswald AJ (1996) Satisfaction and comparison income. J Public Econ 61:359-381

Cunado, J., de Gracia, F.P. (2012) Does Education Affect Happiness? Evidence for Spain. Soc Indic Res 108, 185–196.

Dinçer MA, Kaushal N, Grossman M (2014) Women's education: harbinger of another spring? Evidence from a natural experiment in Turkey. World Dev 64:243-258

Dulger I (2004) Turkey: rapid coverage for compulsory education: case study of the 1997 basic education program. World Bank, Washington DC

Dursun B, Cesur R (2016) Transforming lives: the impact of compulsory schooling on hope and happiness. J Popul Econ 29(3):911-956

Dursun B, Cesur R, Mocan HN (2018) The impact of education on health outcomes and behaviours in a middle-income, low-education country. Economics and Human Biology, 31, 94-114

Eren KA, Asici AA (2017) The Determinants of Happiness in Turkey: Evidence from City-Level Data. Journal of Happiness Studies, 18(3), 647-669, June

Erten B, Pinar Keskin (2017) For better or for worse? Education and the prevalence of domestic violence in Turkey. American Economic Journal: Applied Economics. https://www.aeaweb.org/articles?id=10.1257/app.20160278

Foster G, Frijters P, Johnston DW (2012) The triumph of hope over disappointment: a note on the utility value of good health expectations. J Econ Psychol 33:206-214

Frey BS, Stutzer A (2002b) Happiness and economics: how the economy and institutions affect human well-being. Princeton University Press, NJ

Gevrek Z, Kunt P, Ursprung HW (2019) Education, political discontent, and emigration intentions: evidence from a natural experiment in Turkey. Public Choice, 186(3), 563-585

Hartog J, Oosterbeek H (1998) Health, wealth and happiness: why pursue a higher education? Econ Educ Rev 17:245-256

Kirdar MG, Meltem D-T, Koc S (2014) Does longer compulsory education equalize schooling by gender, and rural/urban residence? IZA Working Paper No: 7939

Oreopoulos P (2007) Do dropouts drop out too soon? Wealth, health and happiness from compulsory schooling. J Public Econ 91:2213-2229

Oreopoulos P, Salvanes KG (2011) Priceless: the nonpecuniary benefits of schooling. J Econ Perspect 25:159-184

Peiro, A (2007) Happiness, Satisfaction and Socioeconomic Conditions: Some International Evidence. Handbook on the Economics of Happiness, chapter 20, Edward Elgar Publishing, Editors Luigino Bruni & Pier Luigi Porta.

Plagnol AC, Easterlin RA (2008) Aspirations, attainments, and satisfaction: life cycle differences between American women and men. J Happiness Stud 9:601-619.

Ross CE, Mirowsky J (2006) Sex differences in the effect of education on depression: resource multiplication or resource substitution? Soc Sci Med 63:1400-1413

Ross CE, Masters RK, Hummer RA (2012) Education and the gender gaps in health and mortality. Demography 49:1157-1183

Senik C (2014) The French unhappiness puzzle: the cultural dimension of happiness. J Econ Behav Organ 106:379-401

Staiger, D., & Stock, J. H. (1997) Instrumental variables regression with weak instruments. Econometrica, 65, 557-586

Torun H (2018) Compulsory Schooling and Early Labor Market Outcomes in a Middle-Income Country. Journal of Labor Research, 39, 277-305

Appendix

Table 9 Robustness Checks: Narrowing the window of birth cohorts

	(1) Satisfied with earnings	(2) Satisfied with HH income	(3) Stafisfied with marriage	(4) Satisfied with health	(5) Satisfied with friends	(6) Satisfied with job	(7) Satisfied with neighborhood	(8) Satisfied with housing	(9) Satisfied with family relationship
1981-1991									
Panel A: females									
Middle school	−0.134	0.071	−0.055	0.077	−0.055	0.052	0.068	0.065	0.046
	(0.311)	(0.059)	(0.038)	(0.047)	(0.067)	(0.184)	(0.061)	(0.061)	(0.088)
Observations	4,001	12,054	9,126	12,054	12,054	4,001	12,054	12,054	12,054
Panel B: males									
Middle school	0.001	−0.076	−0.031	−0.089	0.008	−0.195*	0.008	−0.083	−0.043
	(0.174)	(0.139)	(0.043)	(0.071)	(0.079)	(0.100)	(0.095)	(0.096)	(0.072)
Observations	8,066	9,575	5,37	9,575	9,575	8,066	9,575	9,575	9,575
1982-1990									
Panel C: females									
Middle school	−0.364	0.053	−0.020	0.074	−0.066	0.143	−0.001	0.046	0.115
	(0.334)	(0.069)	(0.068)	(0.074)	(0.073)	(0.267)	(0.073)	(0.070)	(0.120)
Observations	3,215	9,606	7,364	9,606	9,606	3,215	9,606	9,606	9,606
Panel D: males									
Middle school	0.098	0.020	−0.008	0.009	−0.058	−0.178*	−0.097	−0.089	0.044
	(0.191)	(0.147)	(0.039)	(0.065)	(0.065)	(0.092)	(0.109)	(0.105)	(0.103)
Observations	6,483	7,611	4,278	7,611	7,611	6,483	7,611	7,611	7,611

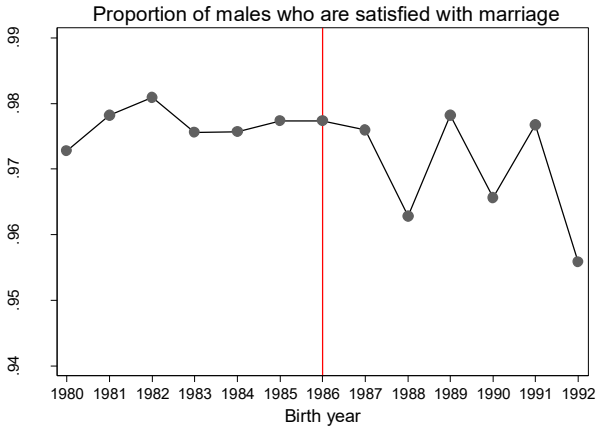
Standard errors, corrected for clustering at the age level, are in the parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The “Middle school” indicator variable takes the value of one if the individual has at least a middle school diploma (i.e., completed at least 8 years of schooling) and zero otherwise. All regressions control for survey year dummies, age, and age squared.

Table 10 The effect of holding at least a middle school degree on life satisfaction, while controlling for potential mediators: IV estimation

	Females															Males				
	Satisfied with HH income					Satisfied with health					Satisfied with housing					Satisfied with job				
	Baseline	Controlling for potential mediators				Baseline	Controlling for potential mediators				Baseline	Controlling for potential mediators				Baseline	Controlling for potential mediators			
Middle school	0.122*	0.119*	0.139**	0.112*	0.146**	0.082*	0.077*	0.086**	0.082*	0.096**	0.105*	0.105*	0.108*	0.107*	0.119**	−0.193**	−0.185**	−0.165**	−0.153**	−0.171**
	(0.069)	(0.067)	(0.068)	(0.068)	(0.073)	(0.041)	(0.040)	(0.042)	(0.043)	(0.042)	(0.059)	(0.058)	(0.056)	(0.061)	(0.054)	(0.083)	(0.089)	(0.081)	(0.071)	0.084
First-stage *F* test	140.42	150.82	144.07	138.15	140.71	140.42	150.82	144.07	138.15	140.71	140.42	150.82	144.07	138.15	140.71	78.68	84.61	91.20	112.28	89.75
Observations	14,404	14,404	14,404	14,404	14,404	14,404	14,404	14,404	14,404	14,404	14,404	14,404	14,404	14,404	14,404	9,577	9,577	9,577	11,489	9,577
Controls for																				
Married		Yes	No	No	No		Yes	No	No	No		Yes	No	No	No		Yes	No	No	No
Expects to be better off		No	Yes	No	No		No	Yes	No	No		No	Yes	No	No		No	Yes	No	No
Labor force		No	No	Yes	No		No	No	Yes	No		No	No	Yes	No		No	No	Yes	No
Hopeful		No	No	No	Yes		No	No	No	Yes		No	No	No	Yes		No	No	No	Yes

Robust standard errors, corrected for clustering at the age level, are in the parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The “Middle school” indicator variable takes the value of one if the individual has at least a middle school diploma (i.e., completed at least 8 years of schooling) and zero otherwise. All regressions control for survey year dummies, age, and age squared.

Figure 5: The impact of the 1997 education reform in Turkey on life satisfaction



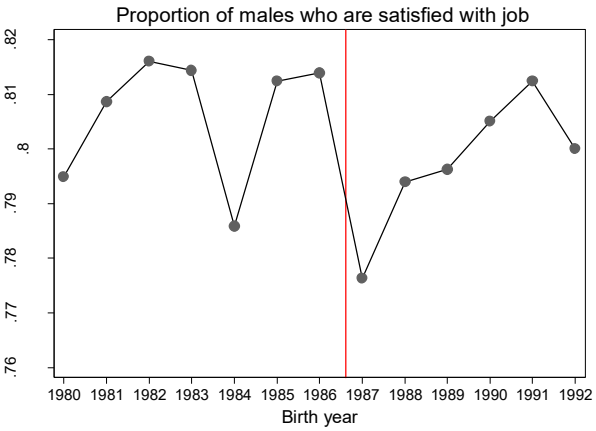

Proportion of females who are satisfied with health
.73
.76
.79
.82
.85
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992
Birth year


Proportion of males who are satisfied with health
.81
.83
.85
.87
.89
.91
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992
Birth year

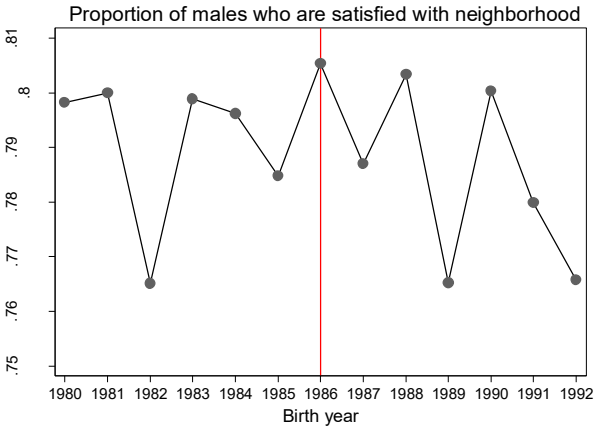

Proportion of females who are satisfied with relationshiops with friends
.87
.88
.89
.9
.91
.92
.93
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992
Birth year


Proportion of males who are satisfied with relationships with friends
.87
.88
.89
.9
.91
.92
.93
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992
Birth year

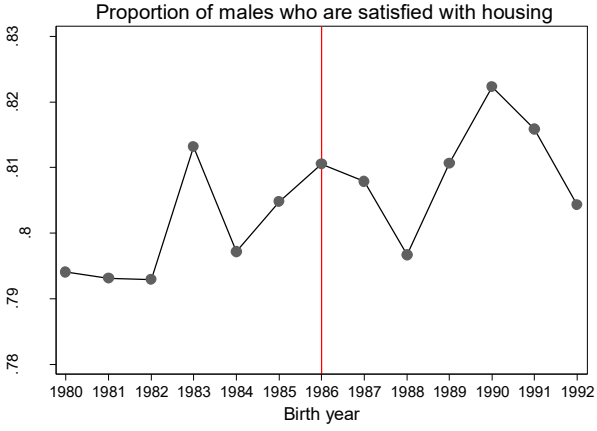

Proportion of females who are satisfied with job
.74
.75
.76
.77
.78
.79
.8
.81
.82
.83
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992
Birth year


Proportion of males who are satisfied with job
.76
.77
.78
.79
.8
.81
.82
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992
Birth year


Proportion of females who are satisfied with neighborhood
.75 .76 .77 .78 .79 .8 .81
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992
Birth year


Proportion of males who are satisfied with neighborhood
.75 .76 .77 .78 .79 .8 .81
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992
Birth year


Proportion of females who are satisfied with housing
.72 .73 .74 .75 .76 .77 .78 .79
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992
Birth year


Proportion of males who are satisfied with housing
.78 .79 .8 .81 .82 .83
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992
Birth year


Proportion of females who are satisfied with family relationships
.8 .81 .82 .83 .84 .85 .86 .87
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992
Birth year


Proportion of males who are satisfied with family relationships
.77 .78 .79 .8 .81 .82
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992
Birth year