ESSAYS ON QUASI-EXPERIMENTAL STUDIES IN LABOR ECONOMICS

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I certify that this thesis satisfies all the requirements as a thesis for the degree of Doctor of Philosophy.

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This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Doctor of Philosophy.

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

ESSAYS ON QUASI-EXPERIMENTAL STUDIES IN LABOR ECONOMICS

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This dissertation consists of two empirical papers that explore the causal relationship between education and labor market outcomes in Turkey based on quasi-experimental methods. The instrumental variable strategy has the potential to accurately estimate the true rate of return to schooling, but good instruments are hard to find. In the first essay of the thesis, I develop a new instrument from an unexpected decline in graduates and new admissions in post-secondary education from the student protests in the late 1970s and the coup in 1980. Using the 2005 Turkish Household Labor Force Survey, my instrumental variables estimates suggest that the economic return to an additional year of schooling in Turkey ranges between 11.6-12.8 percent for men. Moreover, I find that the decline in educational attainment due to student protests shifted the affected population from high-income occupations toward low-income ones. In the second essay, I examine the spillover effect of a large-scale primary school construction program (as part of the 1997 compulsory schooling law) on high school attainment and labor force participation using the 2011 Population and Housing Census. I employ a difference-in-differences strategy exploiting provincial differences in the intensity of construction program and the variation in exposure across birth cohorts induced by the timing of the program. The estimates suggest that the construction program

increased the high school attainment rate by 2.1-2.4 percentage points for men and by 2.3-2.5 percentage points for women. While the program had no significant effects for the male labor force participation, it led to a 2.2-2.6 percentage point rise for the female labor force participation.

Keywords: Returns to Education, Wages, Student Movements, Treatment Effect Models, Education Policy.

ÖZ

ÇALIŞMA EKONOMİSİNDE YARI-DENEYSEL ÇALIŞMALAR ÜZERİNE MAKALELER

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Doktora, İktisat Bölümü
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Ortak Tez Yöneticisi: Doç. Dr. Semih Tümen

Eylül 2017, 144 sayfa

Bu tez, eğitim ve işgücü piyasası sonuçları arasındaki nedensellik ilişkisinin yarı deneysel metotlar ile araştırmasını esas alan iki uygulamalı çalışmadan oluşmaktadır. Araç değişken yöntemi, eğitimin getirisini doğru olarak tahmin etme potansiyeline sahiptir. Ancak, iyi araçlar bulmak oldukça zordur. Tezin ilk bölümünde, 1970'lerin sonlarında yaşanan yoğun öğrenci olayları ve sonrasında 1980 darbesinin yol açtığı yükseköğretimde beklenmeyen yeni kayıt ve mezun düşüşleri kullanılarak yeni bir araç geliştirilmiştir. 2005 yılı Türkiye Hanehalkı İşgücü Anketi kullanılarak araç değişken yöntemiyle yapılan çalışmada, Türkiye'de eğitimin getirisi erkekler için yüzde 11,6 ile yüzde 12,8 arasında tahmin edilmiştir. Ayrıca, öğrenci olayları nedeniyle yükseköğretim mezuniyetlerinde yaşanan azalma bu olaylardan etkilenen grubun yüksek ücretli mesleklerden düşük ücretli mesleklere itilmesine yol açtığı bulunmuştur. İkinci çalışmada, 1997 sekiz yıllık zorunlu eğitim yasası ile ilişkili büyük ölçekli eğitim yatırımlarının lise eğitim düzeyi ve işgücü üzerindeki taşma etkisi araştırılmıştır. Bu bölümün analizinde, iller arasındaki yatırım yoğunluk farkları ve programın zamanlamasından kaynaklı kuşaklar arasındaki yatırımlardan etkilenmedeki değişkenlik kullanılarak farkların farkı stratejisi uygulanmıştır. Çalışmada 2011 yılı Nüfus ve Konut Araştırması sayım verileri kullanılmıştır. Yapılan tahminlere göre eğitim yatırım programı, lise mezuniyet yüzde

oranlarını erkekler için 2,1-2,4 puan arasında kadınlar için ise 2,3-2,5 puan arasında artırmıştır. Ayrıca, bu program erkeklerin işgücüne katılımlarını etkilemezken kadınların işgücüne katılım yüzdesini 2,2-2,6 puan arasında yükseltmiştir.

Anahtar Kelimeler: Eğitimin Getirisi, Ücretler, Öğrenci Hareketleri, Etki Analizi Modelleri, Eğitim Politikası.

To My Parents

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I wish to express my deep gratitude to my dissertation advisors, Professor Hakan Ercan and Professor Semih Tümen, for their inexhaustible support and guidance. I am very thankful for their help, encouragement, and insight that enabled me to finally defend my dissertation.

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Finally, I am very thankful to my family for their continued support.

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CHAPTER 1

INTRODUCTION

The rate of return to schooling (the growth rate of earnings with respect to schooling) is perhaps the most frequently estimated parameter in empirical labor economics. The empirical studies on estimating the return to schooling are intended to provide economic information to policy makers in formulating education/human capital investment policies. The accumulating evidence on the economic benefits of schooling has increased the importance of human capital in politics by being a key pillar in stimulating productivity and growth (Becker, 1993).

Estimates of the return to schooling are mostly based on the standard Mincer (1974) wage equation. The Mincer model involves ordinary least square (OLS) regression of the natural logarithm of earnings (or wage) as the dependent variable on years of schooling and a quadratic function of potential years of experience in the labor market as the independent variables.

A large number of studies have demonstrated that on average, more-educated workers earn higher wages than their less-educated counterparts. Despite this overwhelming evidence, there is still considerable uncertainty about the causal link between education and earnings. Without experimental evidence it is hard to know whether more education cause higher earnings, or whether individuals with higher intellectual capacity or come from better-educated families, tend to receive more schooling and get higher wages as well.

The cross-sectional correlation between education and wage may not be consistently estimated using a standard ordinary least square regression because of omitted variables that are correlated with schooling such as ability, motivation and family background. Caner and Okten (2013) find that individuals coming from better-educated and higher income families are more likely to succeed in the highly competitive nationwide university entrance exam in Turkey. A possible solution to this causal inference problem is to use the method of instrumental variables (IV) that has been extensively employed in the literature. This methodology needs at least one observable covariate that affects earnings only through schooling decisions.

The relevant instrument can change depending on the context. Institutional features of schooling system have often been exploited in instrumental variable estimates of the return to education. Angrist and Krueger (1991) use quarter of birth as the instrumental variable. They show that the quarter of birth is related to educational attainment because of a combination of the school start age policy and compulsory school attendance laws in the Unites States (US). Their instrumental variables estimate of the return to schooling is close to the ordinary least squares estimate, which is about 7.5 percent for men.

Oreopoulos (2006) exploits institutional features of education system in the United Kingdom (UK). He uses an indicator about whether a cohort faced a school leaving age of 15 at age 14. Oreopoulos (2006) finds that IV estimates of the return to schooling for men range from 7-10 percent in the UK. In contrast, Devereux and Hart (2010) re-analyze the same dataset used and find smaller IV estimates of the return to schooling (of about 4–7 percent) for men in the same context.

Beside compulsory schooling laws, some other instruments chosen by researchers in estimating the return to schooling are: tuition at 2- and 4-year colleges; distance to nearest high school/college; and living in a university town (Card, 1999). The instruments based on the geographic location of individuals

of college or high school going age cannot be valid if the choice of going to school and the location decision are correlated (Heckman, Lochner, and Todd, 2006). Families may choose to locate in areas based on proximity to schools. Average tuition may also be invalid because Carneiro and Heckman (2002) show that the average college quality is correlated with the average tuition in the US.

In addition to features of the school system, family background such as parents' and twin's education are frequently used as instruments in studies of the returns to education. For these instruments, it is crucial to presume that potential wages in college and high school regions are independent of family characteristics, but many studies document that these are among the main determinants of ability (Heckman, Lochner, and Todd, 2006). Thus, these instruments are controversial unless the ability is somehow included in the regressions.

Even though a large body of literature investigates the endogeneity of education in the estimation of the returns to schooling in developed countries, few studies deal with this issue in developing countries. The seminal paper by Duflo (2001) is one. Duflo (2001) investigates a dramatic change in education policy that launched a major primary school construction program to target children who had not previously been enrolled in school in Indonesia. She finds moderate economic returns to education ranging from 6.8-10.6 percent for men. These estimates are close to most estimates found for developed countries.

Fang et al. (2012) is another study in this literature. They construct their instrument by exploiting the China Compulsory Education Law of 1986. Their IV estimates for the return to schooling for men are about 51 percent — or more than five times the corresponding OLS estimate (9 percent). This finding could be controversial due to the large difference between the IV and OLS estimates.

With a few exceptions, research on evaluating the impact of education on earnings using quasi-experimental designs remains limited in Turkey as well. Torun (2015) and Aydemir and Kirdar (2017) exploit Turkey's compulsory schooling law of 1997 in their studies. The law introduced a continuous uninterrupted eight-year education in the same school building. Both studies use an indicator of whether birth cohorts are affected by the policy as an instrument. Torun (2015) and Aydemir and Kirdar (2017) find low returns to schooling estimates about 2–3 percent for men mainly because the 1997 law changes schooling distribution at the elementary school level (grades 6 through 8). Returns to schooling can in fact be low at these grades. Beside these quasi-experimental studies, Tansel (1994) and Tansel and Daoud (2014) find high estimates of the return to schooling for Turkey by using OLS and Heckman's two-step estimation procedure, respectively.

The instrumental variables estimates of the return to schooling show great variation across studies even using the same data set in both developed and developing countries. The modern theory of instrumental variables explains this variation with the local average treatment effect (LATE) interpretation. In a heterogeneous-outcome framework, the instrumental variable method has the potential to estimate the average causal effects of schooling for the subgroup whose schooling attainment is changed by the instrument, and it is called LATE (Imbens and Angrist 1994; Angrist, Imbens, and Rubin 1996; Card 2001).

Even though the data available to studies have greatly improved, the quests for accurately estimating the rate of return to schooling continue to this day, especially in developing countries. Because most of conventional instruments are controversial, the major motivation of the first essay of this thesis is to develop a new instrument that helps to better understand the causal relationship between education and earnings in Turkey.

Turkey experienced violent student protests in the late 1970s and a coup in 1980, which significantly eroded post-secondary educational attainment. From

1978 to 1980, an average of 20 youths were killed each day on Turkey's streets and university campuses. After the coup, students were regularly snatched up in mass arrests. I exploit these dramatic events (often referred to as "the 1978-82 upheaval") to estimate the causal effect of education on earnings in the first part of thesis. As far as I know, this is the first study to construct an instrument from the global student protests in the 1960s and 1970s.

The upheaval of 1978-82 undermined post-secondary educational attainment in Turkey in several ways. To begin with, new enrollments fell in the 1978-79 school year, largely due to the closure of teacher-training institutes — which had been linked to student violence. Also, graduation rates declined because of mass student arrests and because many students dropped out due to security concerns.

Using the 2005 Turkish Household Labor Force Survey (HLFS), I find that the group most affected by this period (which I will often refer to as "1978-82") is male wage earners of age 40-45 in 2005. Because birth year is random and unrelated to ability, motivation, or family characteristics, I assert that the sole reason for wage decline in this group, after standardizing the experience across the labor market, is the decrease in post-secondary education. For this reason, I use birth year as an instrument in the wage equation.

I estimate that the turmoil of 1978-82 led to a 6.6-7 percentage point decline in the probability of completing post-secondary education, a 0.22-0.28 decline in mean years of schooling, and a 2.6-3.5 percent drop in wages for this 40-45 year-old male cohort. Furthermore, this educational decline led to a shift from high-income to lower-income jobs. Using this exogenous source of income variation, my instrumental variables estimates suggest that the economic returns to education in Turkey range from 11.6-12.8 percent for men.

These estimates may be a close approximation of the average causal effect of an additional year of schooling in post-secondary education for several reasons.

First, the instrument only affects post-secondary education. Second, those whose schooling attainment is changed by the instrument (the compliant subpopulation) are at least 31 percent of individuals having post-secondary education in the male sample of wage earners of age 40-45. Third, those individuals affected from the 1978-82 upheaval were the dropouts in post-secondary education or would have gone to universities if these events had never occurred. Thus, those individuals in my treatment group are not marginal individuals who are indifferent between going to university or not.

Besides developing a new instrument in the limited literature of the returns to education via quasi-experimental studies in Turkey, the first part of thesis makes two other important contributions. First, the IV estimates of the return to schooling in this thesis are close to most estimates found for developed countries, but rather smaller than estimates recorded in Behrman (1999) and Psacharopoulos and Patrinos (2004) for developing economies. Thus, I argue that developing countries may not be experiencing higher returns to education than the developed countries. The last contribution is to present the main impacts of the 1978-82 upheaval on schooling and the labor market for those affected. These findings clearly indicate that such political and social upheaval has long lasting effects on wage and occupational distributions in a society.

These days, the focus of educational research in developed countries tends to center on quality (Hanushek, 2002). Yet Turkey and many other developing countries still focus on enhancing educational attainment. In 2015, the share of 25-64 year-olds in Turkey with upper secondary education was 37 percent — compared to the OECD average of 78 percent. In the past 20 years, Turkey has invested heavily in its education sector for the purpose of boosting the average level of schooling. However, few studies have analyzed the causal impact of these large governmental programs.

The second essay of my thesis examines the spillover effect of Turkey's large-scale primary school construction program on high school attainment and labor

force participation. This study presents the first empirical analysis focusing on school construction programs in Turkey. It isolates the causal effect of the construction program by also accounting for other governmental programs in relation to the compulsory schooling law of 1997 — such as programs for boarding schools and school transportation.

The government launched this program in connection with the 1997 compulsory schooling law. Attended by high political expectations, the law passed quickly through parliament. Many believed that the main motivation for the law was to restrict religious education by closing three-year lower secondary Imam Hatip schools (Gunay, 2001; Pak, 2004). It was different from other traditional compulsory schooling laws because it neither increased the legal dropout age, 15, nor extended the duration of compulsory schooling. Rather, it introduced an uninterrupted eight-year education in a single school building.

The law's implementation necessitated a major expansion of school infrastructure. First, 1.5 million out-of-school lower-secondary-age children needed to be put in school (MONE, 1996), which spurred a government strategy focused on building new classrooms. With the help of private contributions, the government increased the number of classrooms by 67,014 from 1998 to 2002 — an approximately 31 percent increase in classrooms over this period (MONE, 1999, 2000, 2001, 2002, 2003,). Meanwhile, implementing the law created unutilized school facilities due to the closure of many five-year primary schools in rural regions and lower secondary schools within high schools.

Following Duflo (2001), I employ a difference-in-differences strategy that exploits the provincial differences in construction intensity and the variation in exposure across birth cohorts resulting from program timing. I use a unique dataset generated by combining the 2011 Population and Housing Census (PHC) and provincial educational data from National Education Statistics books published by the Ministry of National Education (MONE). After controlling for

birth province and cohort fixed effects, the coefficients of interactions between cohort dummies and the net increase in the number of classrooms in primary education are plausibly exogenous variables because the timing of the policy was driven by political choices.

The results indicate that primary school construction has significant spillover effects on high school attainment for men and women. The program increased high school attainment rates by 2.1-2.4 percentage points for men and by 2.3-2.5 percentage points for women. My findings also suggest that the construction program impacts only female labor force participation. The program's additional investments in educational infrastructure led to a 2.2-2.6 percentage point rise in female labor force participation.

The findings of the second part of the thesis have important implications for the literature on the impact of school construction on educational attainment in developing countries. Duflo (2001) and Li and Liu (2014) examine the impact of primary school construction programs in Indonesia and China, respectively. Both studies show that these programs have some spillover effects on lower secondary school attainment. The common point for all three studies (mine included) is that large school construction programs often affect not only the attainment rates of the targeted level of schooling but also that of the subsequent education level.

The second essay also adds to the literature examining the role of school construction in improving gender equality in the labor market for developing countries. As the level of educational attainment rises, female labor force participation increases in Turkey, as in most developing countries. This study indicates that Turkey's school construction program boosts labor force participation only for women, not men.

CHAPTER 2

RETURNS TO EDUCATION IN TURKEY: EVIDENCE FROM THE STUDENT PROTESTS IN THE LATE 1970S AND THE SUBSEQUENT COUP IN 1980

2.1. Institutional Setting

Turkey experienced violent student protests in the late 1970s and a coup in 1980, which significantly eroded post-secondary educational attainment. From 1978 to 1980, an average of 20 youths were killed each day on Turkey's streets and university campuses. After the coup, students were regularly snatched up in mass arrests. In this chapter, I exploit these dramatic events (often referred to as "the 1978-82 upheaval") to estimate the causal effect of education on earnings.

In the 1960s and early 1970s, student movements grew in much of the world, including Turkey. In Europe and the US, these movements had declined significantly by the mid-1970s (Barker, 2012), which is when they started to escalate in Turkey (Ahmad, 1993). The late 1970s was one of the darkest periods in Turkey's modern history, culminating with the 1980 military coup (Ahmad, 1993). During this period (which I will often refer to as "1978-82"), student protests between youth groups on the political right and left turned extremely violent (Zürcher, 2004).

The intensive violence seen from 1978-82 adversely affected post-secondary educational attainment in Turkey in several ways. Firstly, new enrollments declined in the 1978-79 school year, largely due to the closure of teacher-training institutes as a result of their links to student violence. Second,

graduation rates declined following massive student dropouts related to security concerns. Finally, mass student arrests in the wake of the 1980 coup kept many from completing their education.

This chapter examines this drop in post-secondary educational attainment in Turkey from 1978 to 1982 to estimate the impact of education on earnings. I find that male wage earners of age 40-45 years in 2005 (15-20 years old in 1980; born from 1960-65) are the group most affected by this period. Because birth year is random and unrelated to intellectual capacity, motivation, or family characteristics, it seems reasonable to assert that the sole reason for wage decline in this group, after standardizing the experience across the labor market, is the decrease in post-secondary education. For this reason, I use birth year as an instrument in the wage equation.

Using the 2005 Turkish Household Labor Force Survey (HLFS), I find that, for this 40-45 year-old male cohort, the chaos of 1978-82 led to a 6.6-7 percentage points decline in the probability of completing post-secondary education, a 0.22-0.28 decline in mean years of schooling, and a 2.6-3.5 percent decrease in wages. What is more, this educational decline led to a shift from high-income to lower-income jobs.

Using this exogenous source of income variation, my instrumental variables (IV) estimates suggest that the economic returns to education in Turkey range from 11.6-12.8 percent for men. These estimates are slightly above the corresponding ordinary least square (OLS) estimates; however, the equalities are not rejected. These estimates may be a close approximation of the average causal effect of an additional year of schooling in post-secondary education because of some reasons. First, the instrument only affects post-secondary education. Second, those whose schooling attainment is changed by the instrument (the compliant subpopulation) are at least 31 percent of individuals having post-secondary education in the male sample of wage earners of age 40-45. Third, those individuals affected from the 1978-82 upheaval are not

marginal individuals who indifferent between going to university or not because those affected were the dropouts in post-secondary education or would have gone to universities if these events had never happened.

This chapter makes three important contributions. First, I develop a new instrument that affects post-secondary education in Turkey. As far as I know, this is the first study to construct an instrument from the global student protests in the 1960s and 1970s. Recent studies in Turkey (Cesur and Mocan, 2013; Gulesci and Meyersson, 2015; Torun, 2015; Aydemir and Kirdar, 2017) have used the compulsory schooling law of 1997 as an instrument to investigate the causal relationship between education and economic or social outcomes. In fact, individuals who are induced to change their behavior because of the 1997 law even in the last published paper (Aydemir and Kirdar, 2017) are between the ages of 18 and 26. Some of these individuals may still be in college or some of them may recently complete their high school or college education. Therefore, the results based on the law instrument have to be considered carefully. However, in my instrument, those individuals are affected are within the core working-age group of 40 to 45 years. That makes my instrument a more reliable in exploring the causal relationship between education and earnings and also other social outcomes such as health, crime, religiosity and voting preference.

The second contribution of the chapter is about the size of the returns to schooling in a developing country context. The two-stage least squares (2SLS) estimates of this study are close to most estimates found for developed countries, but smaller than estimates in Behrman (1999) and Psacharopoulos and Patrinos (2004) for developing economies. Duflo (2001) and Aydemir and Kirdar (2017) also reach similar results in an IV framework.

My last contribution is to present the main impacts of the 1978-82 upheaval on schooling and the labor market for those affected. These findings clearly

indicate that such political and social upheaval has long lasting effects on wage and occupational distributions in a society.

The chapter proceeds as follows. Section 2 discusses the literature of the returns to schooling. Section 3 provides information about student protests in the late 1970s and the subsequent coup. Section 4 describes the data. Section 5 discusses the main empirical strategy. Section 6 presents the empirical findings on estimating the returns to education and the occupational shift in the labor market. Section 7 presents a conclusion.

2.2. Literature Review

An OLS regression may be unable to consistently estimate the cross-sectional causal relation between education and earnings because of omitted variables correlated with schooling and earnings such as ability, motivation, and family background. A possible solution to this problem is to use the method of instrumental variables that has been extensively employed in the literature.

Institutional features of schooling system have often been used in instrumental variable estimates of the return to schooling. Angrist and Krueger's landmark study (1991) uses quarter of birth as an instrument in the IV estimates. They show that the quarter of birth is related to educational attainment because of a combination of the school start age policy and compulsory school attendance laws in the Unites States (US). Angrist and Krueger point out that approximately 25 percent of potential dropouts continue to their education due to compulsory schooling laws. Their IV estimate of the return to schooling is close to the OLS estimate, suggesting that the OLS estimates have little bias. Their 2SLS return to schooling solely exploit differences in season of birth, which is about 7.5 percent for male workers.

Angrist and Krueger's empirical findings have attracted much interest. Acemoglu and Angrist (2000) use the same compulsory schooling laws for the estimation of human-capital externalities in an IV framework. Some of the

recent literature that exploits these laws to construct instruments are as follows: Bell, Costa, and Machin (2016) analyze the causal relationship between education and crime; Sansani (2015) explores how the effects of compulsory schooling laws on school quality change between black and white schools in the US.

Yet this landmark study has faced criticism. Bound, Jaeger, and Baker (1995) indicates that the IV estimates in Angrist and Krueger's paper may suffer from finite-sample bias and may be inconsistent because several of their models include weakly correlated instruments. Bound and Jaeger (1996) also criticize the same study. They point out that the quarter of birth may be correlated with some unobserved variables such as family background.

Another highly referenced article exploiting institutional features of education system is Oreopoulos (2006). He uses an indicator about whether a cohort faced a school leaving age of 15 at age 14 in the United Kingdom (UK). Oreopoulos (2006) finds that the 2SLS returns to schooling for men range from 7-10 percent in the UK. In contrast, Devereux and Hart (2010) re-analyze the same dataset and find smaller 2SLS returns to schooling (of about 4–7 percent) for men in the same context.

Beside compulsory schooling laws, some other instruments chosen by researchers in estimating the return to schooling are: tuition at 2- and 4-year colleges; distance to nearest high school/college; and living in a university town (Card, 1999). The instruments based on the geographic location of individuals of college or high school going age cannot be valid if the choice of going to school and the location decision are correlated (Heckman, Lochner, and Todd, 2006). Families may choose to locate in areas based on proximity to schools. Average tuition may also be invalid because Carneiro and Heckman (2002) show that the average college quality is correlated with the average tuition in the US.

In addition to features of the school system, family background such as parents' and twin's education are frequently used as instruments in studies of returns to education. For these instruments, it is crucial to presume that potential wages in college and high school regions are independent of family characteristics, but many studies show that these are among the main determinants of ability (Heckman, Lochner, and Todd, 2006). Thus, these instruments are controversial unless the ability is somehow included in the regressions.

Even though a large body of literature investigates the endogeneity of education in the estimation of the returns to schooling in developed countries, few studies deal with this issue in developing countries. The seminal paper by Duflo (2001) is one. Duflo (2001) investigates a dramatic change in education policy that launched a major primary school construction program to target children who had not previously been enrolled in Indonesia. Duflo finds moderate economic returns to education ranging between 6.8-10.6 percent for men. These estimates are close to most estimates found for developed countries.

Fang et al. (2012) is another study in this literature. They construct their instrument by exploiting the China Compulsory Education Law of 1986. Their 2SLS estimates for the return to schooling for men are about 51 percent — or more than five times the corresponding OLS estimate (9 percent). This finding could be controversial due to the large difference between the OLS and 2SLS results.

With a few exceptions, research on evaluating the impact of education on earnings using quasi-experimental designs remains limited in Turkey as well. Torun (2015) and Aydemir and Kirdar (2017) exploit Turkey's compulsory schooling law of 1997 in their study. The law introduced a continuous uninterrupted eight-year education in the same school building. Both studies use an indicator of whether birth cohorts are affected by the policy as an instrument. Torun (2015) and Aydemir and Kirdar (2017) find low returns to schooling estimates about 2–3 percent for men mainly because the 1997 law

changes schooling distribution at the elementary school level (grades 6 through 8). Returns to schooling can in fact be low at these grades. Their local average treatment effects (LATE) may also be invalid since the monotonicity assumption could be failed (this concern is explained in detail in the second essay of the thesis). If the policy adversely affects the population of "defiers", then their LATE results are overestimated, which is more crucial in the female sample estimates because it is most likely that the majority of "defiers" are women.

2.3. Student Protests in the Late 1970s and the Subsequent Coup

2.3.1. Emergence of Civil Conflict in Turkey from 1960 to 1980

The army has always played an outsized role in Turkish politics, ousting elected governments nearly every decade from 1960 to 1980. The 1960 coup marked the beginning of a new phase in Turkey. Ahmad (2003) emphasizes that junior officers carried out this intervention against higher officials and it was Turkey's only successful military coup from outside the army's hierarchical structure. Ahmad (1993, 2003) and (Zürcher, 2004) point out that the professors legitimized the 1960 coup and allowed the military to stay in power.

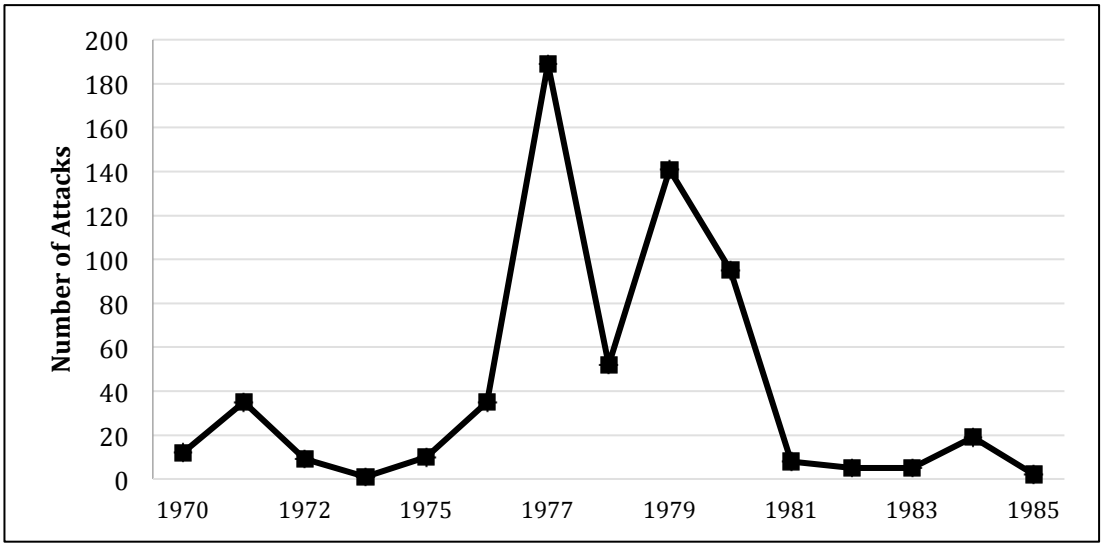
After the intervention, a new constitution was prepared before the free election in 1961. The new constitution was more liberal and people had more civil rights than ever before; universities had greater autonomy; students had the freedom to organize their own associations; workers had the right to strike. Turkey's new freedom enabled something unprecedented: ideological politics.

Left-wing politics started to emerge, especially on university campuses. Trade unionists founded the Workers' Party of Turkey. Zürcher (2004) argues that it forced the other parties to define themselves in ideological terms. In contrast, the right was alarmed by this leftist presence, and began to organize in opposition to it. Turkey's nationalist movement started to grow rapidly in 1969, with the creation of the Nationalist Movement Party (Erken, 2014b).

With a push from the global events of 1968, Turkey's left became more extremist in the hopes of igniting a revolution. But the left's violence was soon met and surpassed by violence from the extremist right (Zürcher, 2004). This violence created the political instability that laid the groundwork for the coup. In March 1971, the army forced the elected government to step down and changed the constitution. Ahmad (1993, 2003) emphasizes that they amended the constitution to strengthen the state against civil society; gained control of the universities to curb radicalism; and pacified trade unions after the dissolution of the Workers' Party. The left soon rallied around the Republican People's Party, which had shifted left in the mid-1960's.

In 1973, the Republican People's Party won parliamentary elections and formed a coalition government. Right-wing parties criticized the government program that sought to heal the wounds left by the military regime. The formation of the coalition coincided with an uptick in right-wing extremist violence. According to Ahmad (1993, 2003), the aim of rightist violence was to decrease the left's potential by eroding support and causing chaos to create a climate for military intervention. Radical leftists responded with acts of violence to further increase instability. After coalition formation, political violence became a regular feature of Turkish life, escalating and becoming more intense in the late 1970s.

Figure 2.1 presents the total terrorist attacks used as a proxy for the civil conflict in Turkey from 1970 to 1985, from the Global Terrorism Database (GTD). According to codebook of the database, "the GTD defines a terrorist attack as the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation". The data shows that attacks declined after the 1971 intervention but they increased after 1974 and were most intense during the upheaval leading up to the 1980 coup.



Source: "National Consortium for the Study of Terrorism and Responses to Terrorism (START). (2016). Global Terrorism Database [GTD from 1970 to 1991]. Retrieved from Https://www.start.umd.edu/Gtd"

Figure 2.1 Total Terrorist Attacks in Turkey from 1970 to 1985

On April 5th, 1977, the two main parties agreed on an early election, sparking more intense political violence. The street terror peaked on May Day (May 1st) 1977, four weeks before the election. The Confederation of Revolutionary Workers' Union organized a huge rally in Istanbul. Shots fired into the crowd killed 36 people and injured hundreds.

The 1977 election did not produce a strong and stable government because no party won a majority. As a result, Turkey experienced one of its darkest periods. By July 1978, the government started to use the army to secure the country. Despite the increasing use of force, the violence continued until the slaughter reached 20 victims a day in the late 1970s (Ahmad, 1993; Kaya, 1981). From 1978 to 1980, some 5241 people were killed and 14,152 people wounded due to the political violence (Kaya, 1981).

The army took control in September 1980 and ruled until the general election of November 1983. The public welcomed the military intervention, and the army crushed almost all movements from the left and right to de-politicize urban

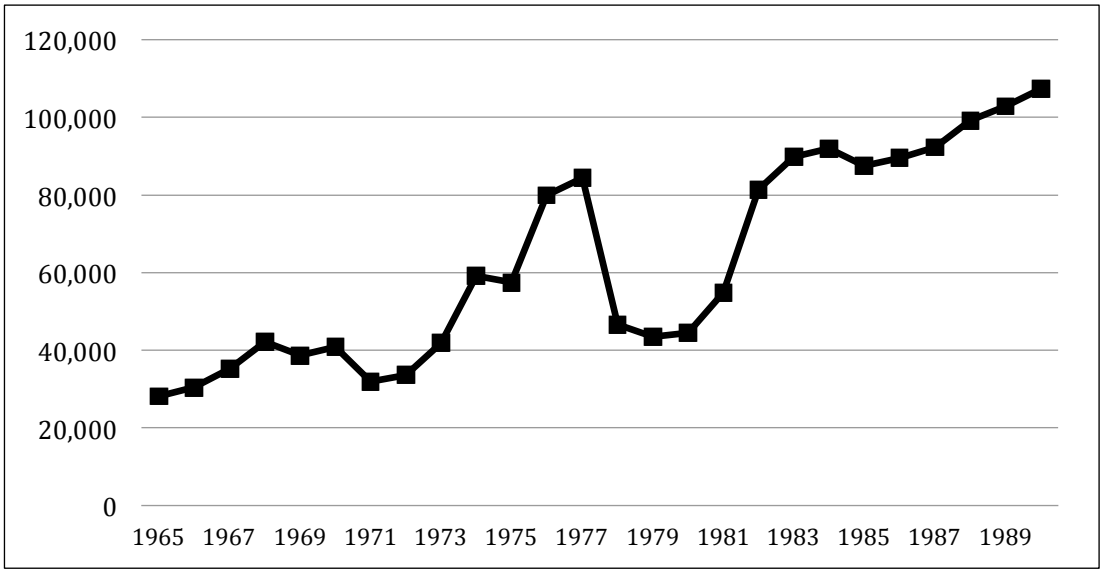
youth (Ahmad, 1993). In the first three months after the coup, some 30,000 people were arrested. After a year the number was 122,600. By September 1982, some 80,000 were still under arrest, with 30,000 awaiting trial (Zürcher, 2004). Meanwhile, the number of terror attacks declined by 90 percent after the intervention (Figure 2.1).

2.3.2. The Effect of the 1978-82 Upheaval on Post-secondary Education

Student protests in Turkey increased with a push from the global events of 1968. But Turkey's protests soon mutated into violence, and the incidence of these acts increased in the late 1970s. University students in particular divided into two opposed groups, "rightists" and "leftists," and built their identities in opposition to each other (Neyzi, 2001). Educated youth saw themselves as the moving force of society and their main mission was to modernize society (Neyzi, 2001; Zürcher, 2004). Youth violence played a key role in creating the political instability that led to military interventions both in 1971 and in 1980 (Ahmad, 2003).

In the early 1970s, extreme leftist students emulating Latin American left-wing radicals robbed banks and kidnapped American soldiers and prominent corporate figures (Ahmad, 1993, 2003). From the military intervention of 1971 through 1973, the student activism led by left-wing students in Turkey went into a period of silence because they were either under arrest or executed (Erken, 2014a). Figure 2.1 shows that terrorist attacks almost disappeared in this period. Student protests started to escalate again after 1974, along with terrorist attacks.

The intense violence seen during the late 1970's adversely affected post-secondary educational attainment in Turkey through several channels. First, new enrollments in post-secondary education declined in the 1978-79 school year, largely due to the closure of teacher-training institutes as a result of their links to student violence (see Figure 2.2). According to the TURKSTAT data (1979, 1980), this decline was 37,715.



Source: Authors' calculations based on National Education Statistics — Higher Education (TURKSTAT, 1969, 1972, 1977, 1979, 1980, 1981, 1982, 1984a, 1984b); Academic Year Higher Education Statistics (OSYM, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992).

Figure 2.2 New Enrollments in all Higher-Education Institutions in Turkey from 1965 to 1990

Civil conflicts and student movements caused deep polarization in Turkey's higher education institutions. Although 11 new universities were established between 1970 and 1980 in major cities, university boards did not increase enrollment capacity enough to meet the demand for higher education. In this period, the higher education system was decentralized and there was no governing authority for higher education institutions. According to Dogramaci (1989), the lack of coordination among higher education institutions made it impossible to address national priorities. The government built academies, vocational schools and teacher-training institutes that were affiliated with certain ministries. Between 1973 and 1977, new enrollments rose 42,570 — 15 percent of this rise occurred in universities, while 85 percent occurred in institutions affiliated with ministries (TURKSTAT, 77, 79).

In 1973, Turkey increased compulsory education from five to eight years, and thus urgently needed elementary school teachers (State Planning Organization, 1974, 1975, 1976,). As a result, 76 percent of the enrollment increase occurred

in teacher training institutions. Yet most violence among students was seen in teacher training institutions (Binbasioglu, 2005; Tekeli, 2010), which led the government to close 41 institutions out of 64 in 1978 (TURKSTAT, 1980). Students enrolled at the closed institutions were allowed to complete their programs of study.

One prominent newspaper covered this issue closely: "administrators, teachers and students in 35 teacher training institutions wanted to reopen the educational institutes. … in the joint statement, they argued that closure of educational institutions after attacks submit to the fascists" (Cumhuriyet, 1978). These institutions were directly affiliated with the Ministry of Education and they were not protected by the constitution like universities. As a result, legally closing them not took some doing. According to Tekeli (2010), the student protests began to turn violent after 1968 and this violence escalated in the late 1970s. Authorities were thus focused on how to prevent student protests. Due to mainly from closing of these institutions, enrollment declined by 37,715 — wiping away about 90 percent of the enrollment increase of 1973-77 (TURKSTAT, 1979, 1980).

After the 1980 coup, the Council of Higher Education was established as a governing board to plan, coordinate, and review the activities of Turkey's higher education institutions (Dogramaci, 1989). This central institution would also determine the enrollment capacity of post-secondary education institutions. Figure 2.2 indicates that enrollments started to increase just after 1982, when all ministry-affiliated higher education institutions were reorganized under the university system.

The second channel that adversely affected educational attainment is that graduation rates declined following massive student dropouts related to security concerns. From 1978 to 1980, an average of 20 young people were killed per day, so many students cancelled their registration in higher education institutions (Kaya, 1981). Some students were unable to finish education

because they were injured or disabled during the student violence. In addition, some families chose not to send their children to higher education in this period due to the risks.

Courses were often suspended or cancelled during this time. For instance, classes were cancelled for 116 days in Ege University and for 421 days in Istanbul University. The School of Dentistry in Hacettepe University was completely closed during 1979-80 school year (Kaptan, 1986). During these periods, faculty offices and student dormitories were often turned into weapons warehouses (Kaya, 1981; Kaptan, 1986) because the law on autonomy gave allowed universities considerable immunity from police oversight (Gunter, 1989).

Finally, mass student arrests in the wake of the 1980 coup kept many from completing their education. According to a Turkish government report (*Anarchy and Terrorism in Turkey,* 1982), by 1981, one year after the coup, 9,760 of the state's "captured terrorists" were students. Moreover, 57 percent of the state's 43,140 "captured terrorists" were age 16 to 25 (and most were men).

In addition to these channels, new enrollments in open education declined 12,479 between 1977 and 1978 (TURKSTAT, 1979, 1980).

2.4. Data

I use the 2005 Turkish Household Labor Force Survey (HLFS), which is nationally representative, in this study. The Turkish Statistical Institute (TURKSTAT) has provided the HLFS micro data in accordance with Eurostat's requirements since 2004 (TURKSTAT, 2007). But since 2004 is a transition year I choose the 2005 data. This ensures that individuals in the sample of the main regressions of section 2.6 are within the core working-age group of 34 to 51 years. This group constitutes both the treatment and comparison groups for this study, which is explained in detail in sections 2.5 and 2.6. The results of the analyses do not significantly change when I use 2004 data.

The average wage for males aged 34-51 is slightly increasing (see Figure A.1). But after age 51 it sharply decreases and tends to be quite volatile. In addition, the number of statistical observations declines significantly after age 51 (a similar pattern is also observed in the 2004 data). Thus, the 2005 HLFS is the latest reliable survey for this study.

There are 490,040 individuals in the sample of survey and the number of wage earners is 73,310. The data provides age, highest level of education completed, labor status, number of hours per week usually worked in the main job, earnings of individuals from the main job during the past month (including any irregular payment like bonus payments and premiums), and main tasks and duties of individuals in workplace.

The data does not have direct information on experience, so I use potential experience, as proposed by Mincer (1974): $exp = \mathrm{A} - \mathrm{S} - \mathrm{B}$, where A is current age, S is years of schooling, and B is age at the beginning of schooling. In Turkey, age seven was approximately the beginning of schooling before 1980 ("İlköğretim ve Eğitim Kanunu" 1961, "Milli Egitim Temel Kanunu" 1973).

The data also does not have years of schooling; instead, it only has highest level of education successfully completed. However, Turkish Demographic and Health Surveys (TDHS) have the information on both graduation and years of schooling. Thus, I estimate the mean years of schooling conditional on the highest completed schooling level by using the 2008 TDHS. I find that the average years of schooling is 0.14 years for illiterates, 1.68 years for literates with no degrees, 5.09 years for primary school graduates, 8.34 years for elementary school graduates, 11.09 years for high school graduates, and 14.63 years for post-secondary school graduates.

Based on this information, I use 0 years for illiterate people, 2 years for those who are literates with no degrees, 5 years for primary school graduates, 8 years for elementary school graduates, 11 years for high-school graduates, and 15

years for post-secondary graduates. In the TDHS estimates, I prefer to restrict the sample of individuals aged 37 to 54 years because my sample of the 2005 HLFS are aged 34 to 51 years. A similar strategy is applied by Aydemir and Kirdar (2017).

The data includes monthly wages (the mean is 588 TL in the 2005 data). Card (1999) indicates that the estimated coefficient of annual earnings could comprise the effect of schooling on hourly earnings, hours per week, and weeks per year. Also, in the US data, individuals with more schooling tend to work more. In contrast, in Turkey there is a negative correlation between schooling and number of hours worked (presented in Table 2.1); as schooling increases, average hours worked in the main job fall. The pairwise correlation coefficient between hours worked and mean years of schooling is also -0.3. Therefore, in this chapter, I choose hourly wages as the measure of income. I compute hourly wages as the monthly wage in the main job divided by (52/12) and then by the number of hours per week usually worked in the main job.

In all analyses, I standardize log hourly wages at 26 years of potential experience because my treatment and comparison groups have different experiences. 26 years is the mean of potential experience of male wage earners aged 34-51. I estimate a log hourly wage equation separately for each educational status defined in the survey data for this cohort. These are no degree, primary (five-year), elementary (eight-year), high school, and post-secondary education graduates. I include a quartic function in potential experience and from these regressions, I compute the predicted log hourly wage for a common experience of 26 and add the residual. Altonji, Bharadwaj, and Lange (2012) use a similar strategy to standardize the potential experience. Lemieux (2006) also proposes to use a quartic function in potential experience instead of a quadratic in a Mincer wage equation based on the US data.

Table 2.1 Average Hours Worked in the Main Job by Educational Attainment in the Sample of Wage Earners in Turkey

Educational Attainment	Observations	Mean
No Schooling	3,305	55.3
Primary School Complete (5-year)	26,065	55.5
Elementary School Complete (8-year)	11,046	54.9
High School Graduate	19,498	51.8
Post-Secondary Degree	13,396	44.1

Source: Authors' calculations based on the 2005 HLFS. Observations are weighted using the sampling weights so that the results are nationally representative.

Table 2.2 provides descriptive statistics for individuals aged 34 to 51 years old. In this cohort, 63 percent of individuals have a primary or elementary school diploma, 14 percent of individuals have a high school diploma and approximately 8 percent has a post-secondary degree. In addition, employment rate is 54 percent and labor force participation rate is 58 percent.

Table 2.2 Descriptive Statistics for Individuals Aged 34-51

Variables	Mean
Elementary/Primary School Graduation Rate	0.63
High School Graduation Rate	0.14
Post-secondary Education Graduation Rate	0.08
Years of Schooling	6.36
Labor Force Participation Rate	0.58
Employment Rate	0.54
Sample Size	115,410

Notes: Observations are weighted using the sampling weights so that the results are nationally representative.

2.5. Empirical Strategy

2.5.1. Visual Evidence for Instrument Validity

Effect on post-secondary educational attainment

Post-secondary education enrollment increased dramatically during the second half of the 20th century all over the world (Psacharopoulos, 1991). But in Turkey, new enrollments and graduation rates in post-secondary education substantially declined between 1978 and 1982 due to the aforementioned upheaval. To find the trend in post-secondary educational attainment for Turkey I use the following linear probability model:

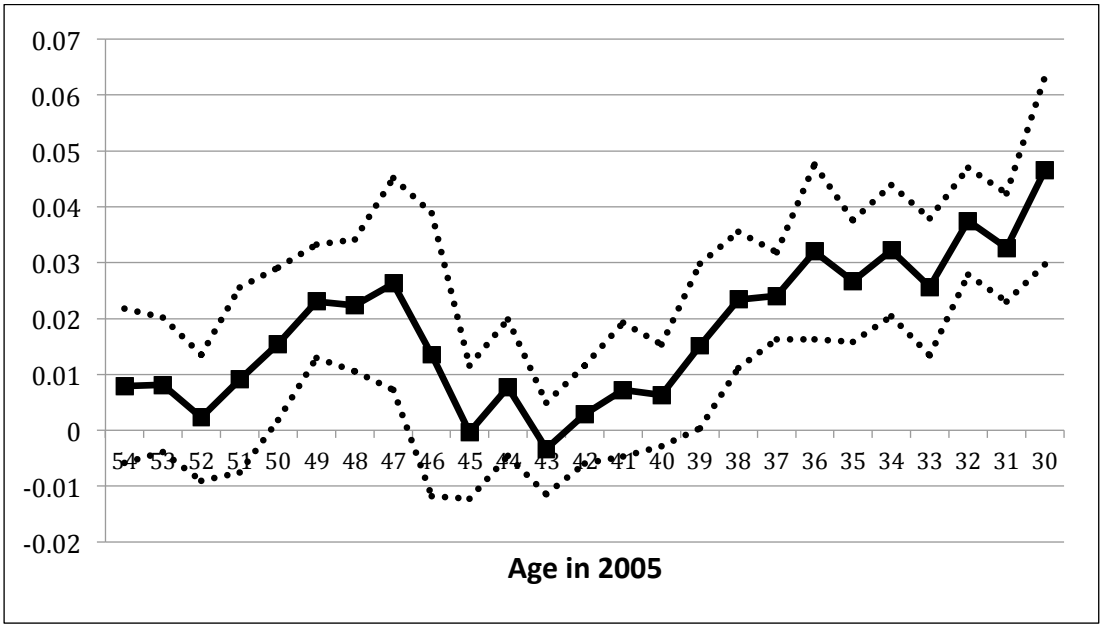
$$s_i = \alpha + \sum_{c=30}^{54} \beta_c d_{ic} + X_i \Pi + \varepsilon_i \qquad (1)$$

where s_i is a dichotomous variable indicating whether individual i has completed post-secondary education (has a postsecondary degree), d_{ic} is a dummy that indicates whether individual i is c years old, X_i is a vector of covariates, and ε_i is an idiosyncratic error term. In this subsection, all figures are plotted based on equation (1).

In this regression, I use age dummies for the age of 30 to 55 using the 2005 Turkish Household Labor Force Survey. In the data, there are no region of birth variables, so I use 26 NUTS2 region of residence dummies and urban/rural dummy as proxies to represent the social and regional variables that affect the schooling choices as the vector of covariates. I also control the gender effect in the whole sample estimation. Individuals aged 55 in 2005 serve as the control group because those individuals were 28 years old in 1978 and they most likely completed their post-secondary education. Each coefficient β_c can be interpreted as an estimate of the probability of completing post-secondary education for the corresponding age relative to age 55. In this estimation, it would normally be expected that the coefficient of age variables increase as the age decreases (over time) without a negative shock on post-secondary education. That means there would be an upward time trend in post-secondary educational attainment.

Figure 2.3 plots β_c for the whole sample. Each dot on the solid line is the coefficient of the probability of completing post-secondary education (broken lines indicate the 95-percent confidence interval). Figure 2.3 indicates that these coefficients increase between age 54 and age 47. After age 47, there is a sharp decline in time trend and they level off between age 45 and age 40, then begin to increase again.

Figure 2.4 and Figure 2.5 display the estimated coefficients (β_c) of equation (1) in the male and female sample, respectively. Even though the trends for completing post-secondary education for men and women have similarities from ages 54 to 30, the effects of 1978-82 were more severe for men. These figures indicate that individuals aged 40 to 45 were most affected by the upheaval. These individuals were born from 1960 to 1965, and were about 13 to 18 years old in 1978. Thus, I choose the group of individuals aged 40-45 in 2005 as the treatment group.



Notes: The specification includes 26 NUTS2 region of residence, urban/rural and gender dummies. Age 55 forms the control group. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

Figure 2.3 Coefficients of Age Dummies in Estimating the Probability of Completing Post-secondary Education

Notes: The specification includes 26 NUTS2 region of residence and urban/rural dummies. Age 55 forms the control group. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

Figure 2.4 Coefficients of Age Dummies in Estimating the Probability of Completing Post-secondary Education for Men

Notes: The specification includes 26 NUTS2 region of residence and urban/rural dummies. Age 55 forms the control group. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

Figure 2.5 Coefficients of Age Dummies in Estimating the Probability of Completing Post-secondary Education for Women

The age 40-45 treatment group has 6 age cohorts. I similarly compose a comparison group that has previous 6 age cohorts (aged 46-51). Figure 2.3 shows that the probability of completing post-secondary education for the treatment group is clearly less than the comparison group. To make the inference of treatment group clearer, I also run similar regressions of equation (1) in which age 48 (middle age in the comparison group) forms the control dummy. Figure A.2, Figure A.3, and Figure A.4 show coefficients of age-dummies for whole, male, and female sample, respectively.

These figures indicate that the probability of completing post-secondary education for the age 40-45 individuals relative to those aged 48 is statistically negative for the whole and male sample (the significance levels are 5 percent except that age 44 is statically negative at 10 percent in the whole sample; ages 44 and 41 are statically negative at 10 percent in the male sample). However, in the female sample, only ages 41 and 43 are statistically negative at 5 and 10 percent level, respectively. This confirms that the protests significantly affected the educational attainment of men. Similar significant results can also be achieved if age 50, age 49, and age 47 are taken as the control dummies in the above regressions.

Figure 2.2 already indicated that first-year enrollments in higher education declined significantly for the first time in 1978 and remained low until 1982. This decline of enrollment in higher education institutions would probably affect young adults age 17 and 18 from 1978 to 1982. Therefore, the affected group was approximately from 13 to 18 years old in 1978, which is line with the findings from Figure 2.3 to Figure 2.5. In addition, student dropouts related to security concerns and mass student arrests after the coup also affected the educational attainment of this age group. Based on these findings, I determine that individuals aged 40 to 45 in 2005 were most affected by the 1978-82 upheaval.

Effects on different levels of educational attainment

To make the inference of treatment group clearer, I compare the age 40-45 individuals with the age 46-51 individuals by using the following linear probability model:

$$s_i = \alpha + \beta z_i + X_i \Pi + \varepsilon_i \qquad (2)$$

where s_i is a dichotomous variable indicating whether individual i has graduated from a school (post-secondary, high school, elementary/primary school) or not, z_i is a dummy that 1 indicates the individual i's age to be between 40-45 and 0 indicates the age to be between 46-51, X_i is a vector of covariates, and ε_{ijc} is an idiosyncratic error term.

In these regressions, I use the same vector of covariates as in the equation (1). The coefficient β can be interpreted as an estimate of the probability difference of graduation from a school between aged 40-45 and aged 46-51. In the estimations, it would normally be expected that the coefficient of z_i is positive without a negative shock on the corresponding dependent variable.

In Table 2.3, I present three different separate estimates of equation (2). Column 1 indicates the result for post-secondary educational attainment, column 2 for high school attainment (individual (i) has only high school diploma) and column 3 for elementary/primary school attainment (individual (i) has only elementary/primary school diploma). Column 1 shows that the probability of completing post-secondary education declined 1.5 percentage points for those aged 40-45 years. In contrast, the probability of graduation from elementary/primary school and high school increased significantly, as expected (Columns 2 and 3). However, the increase in the probability of graduation from high school is 4.5 percentage points, or about twice the increase in the probability of graduation from elementary or primary school. This may also confirm that those individuals affected from the protests would normally have gone to or completed a post-secondary education, but did not as

a result of the 1978-82 upheaval. Thus, the number of high school graduates increased more than its ordinary trend.

Table 2.3 Estimations of the Probability Difference of Graduating between Aged 40-45 and Aged 46-51

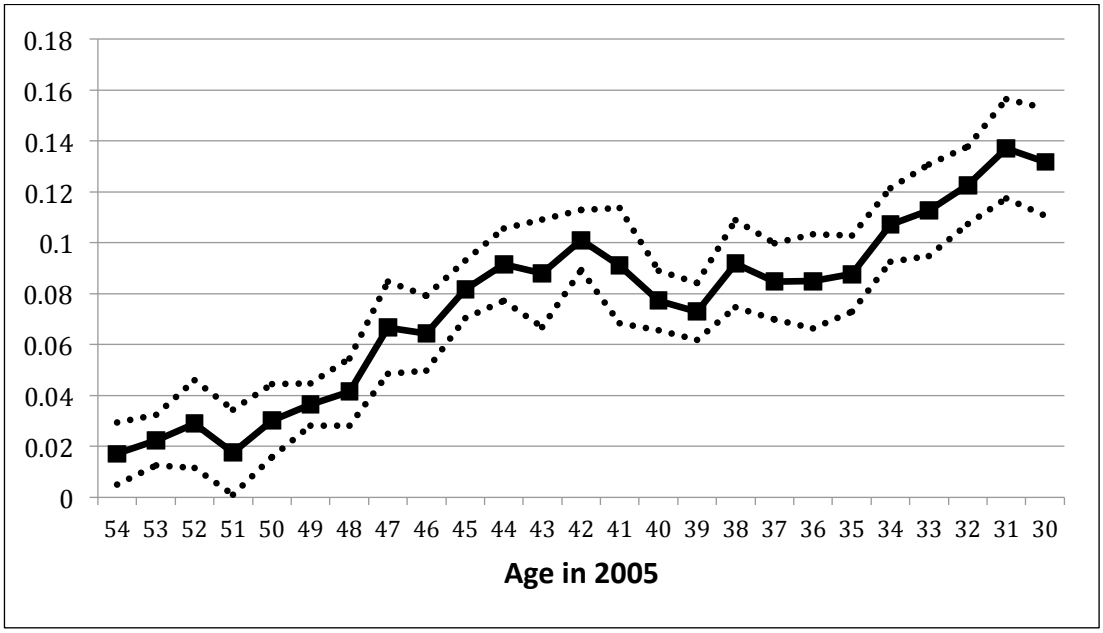
	Dependent Variable		
	Post-secondary Degree (1); Otherwise (0)	High School Diploma (1); Otherwise (0)	Elementary/Primary School Diploma (1); Otherwise (0)
Aged 40-45 Dummy Coefficient	-0.0148*** (0.0051)	0.045*** (0.0027)	0.0325*** (0.0092)
Observations	74903	74903	74903
R-squared	0.0364	0.0375	0.0524

Notes: The specification includes 26 NUTS2 region of residence, urban/rural and gender dummies. Observations are weighted using the sampling weights so that the results are nationally representative. Robust standard errors, clustered on 26 NUTS2 regions, are in parentheses. *** p < 0.01; ** p < 0.05; * p < 0.1

I run a similar regression of equation (2) to compare those aged 46-51 with those aged 52-57. I find that the increase in the probability of graduation from high school is 2.9 percent for those aged 46-51 years. The difference between two trends of 40-45/46-51 and 46-51/52-57 is 1.6 percentage points, or approximately the declining percentage points in completing post-secondary education for those aged 40-45. This tells us that the main group affected from the student protests were those who would have normally gone on to post-secondary education in the absence of these events. I also use equation (1) to visualize the trends in high school and elementary/primary school educational attainment and plot the estimated coefficients of age dummies in Figure 2.6 and Figure 2.7 to confirm the above findings.

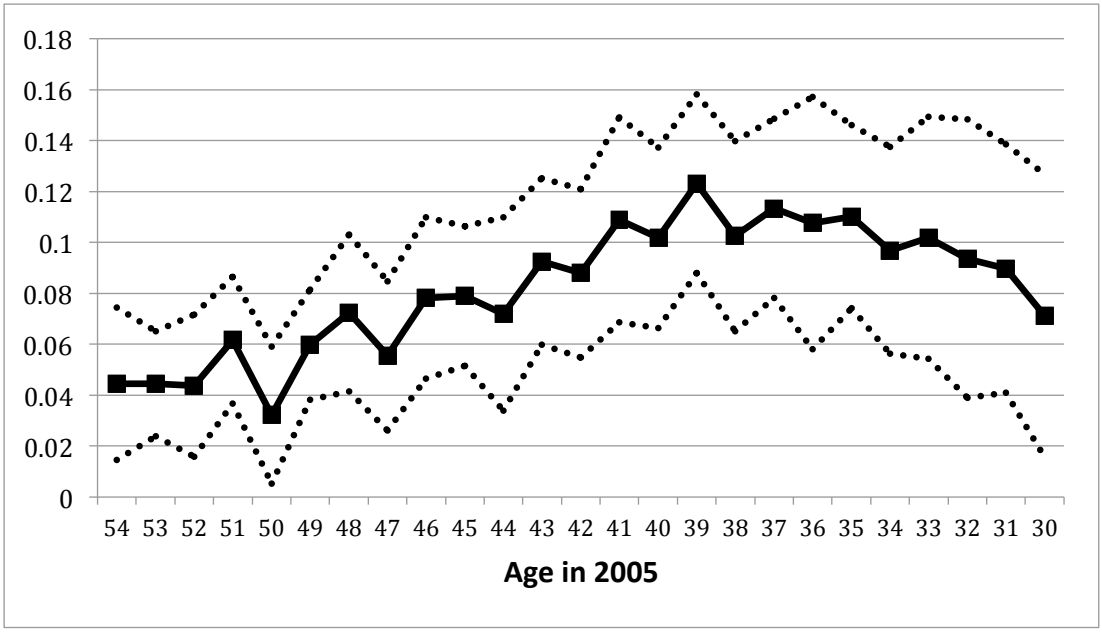
Figure 2.6 shows that the slope of the trend for graduation from high school for those aged 48-44 is much higher than the slope of the trend for those aged 54-49. The estimated coefficients start to decline after age 42 and begin to increase

again after age 39. Figure 2.2 indicates that new enrollments started to increase after 1982 — those aged 39 in 2005 approximately corresponds to 16/17 years old at that time, which is line with the finding from above. However, the trend for graduation from elementary/primary schooling is smooth over the entire range of ages (see Figure 2.7). Therefore, the inference about the affected group is acceptable.



Notes: The specification includes 26 NUTS2 region of residence, urban/rural and gender dummies. Age 55 forms the control group. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

Figure 2.6 Coefficients of Age Dummies in the Estimating the Probability of Graduation From High School

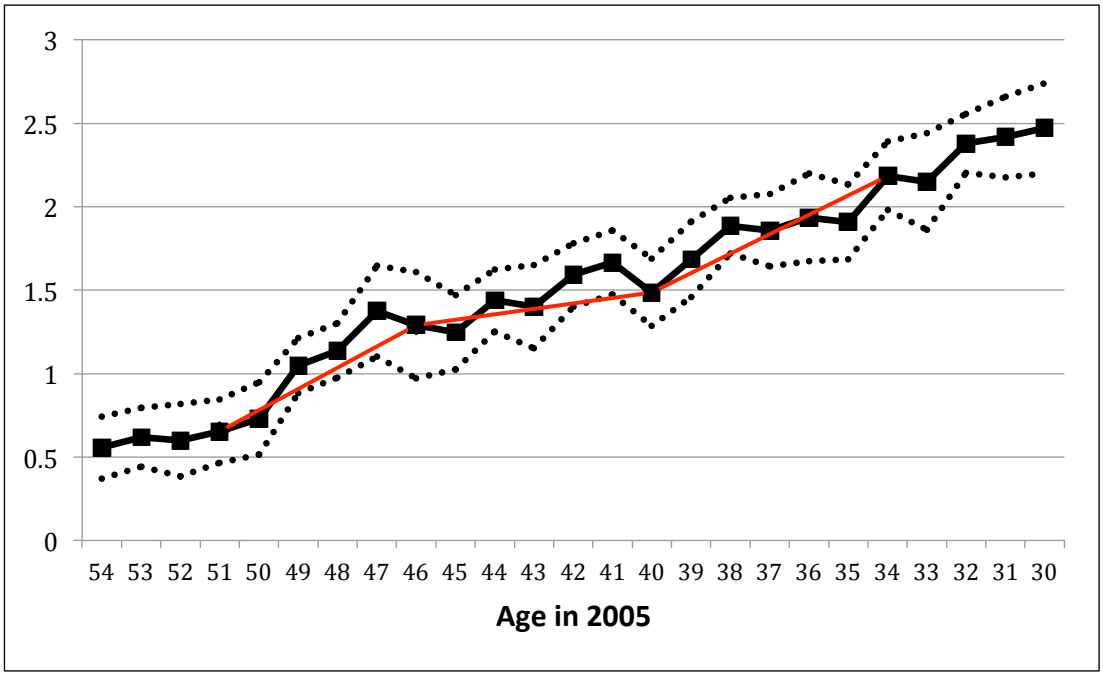


Notes: The specification includes 26 NUTS2 regions of residence, urban/rural and gender dummies. Age 55 forms the control group. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

Figure 2.7 Coefficients of Age Dummies in the Estimating the Probability of Graduation from Elementary/Primary School

Effects on years of schooling

I run a similar regression of equation (1) to visualize the same trend for mean years of schooling. In this regression, the dependent variable is the mean years of schooling. The coefficients of age dummies are plotted in Figure 2.8.



Notes: The specification includes 26 NUTS2 region of residence, urban/rural and gender dummies. Age 55 forms the control group. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

Figure 2.8 Coefficients of Age Dummies in the Estimating Years of Schooling

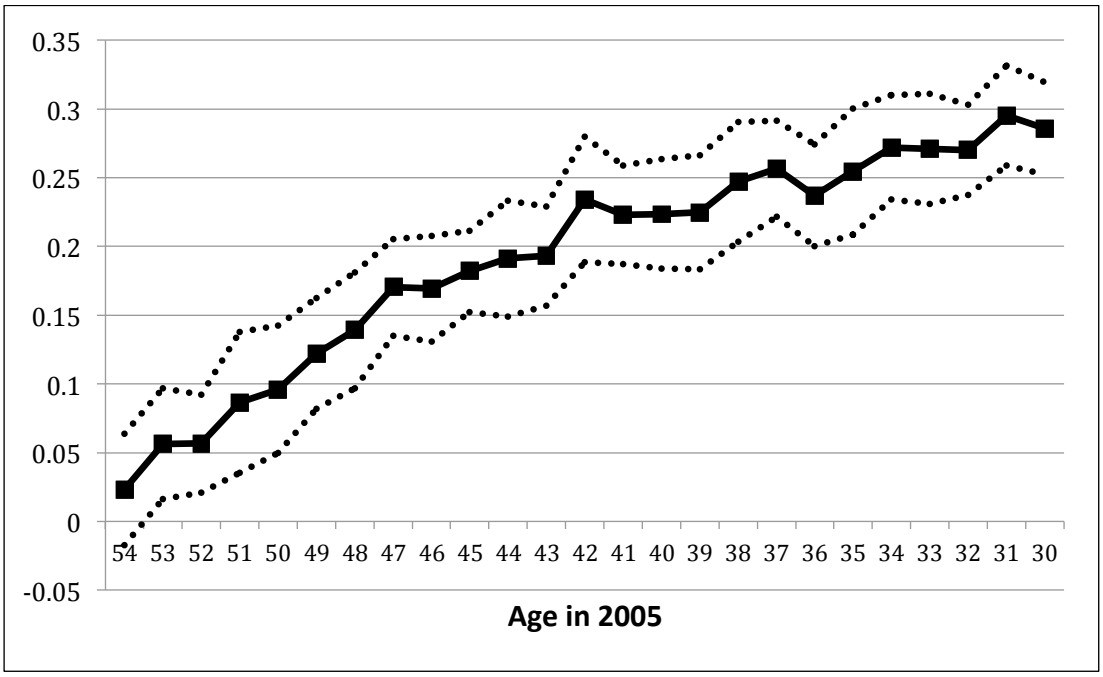
In Figure 2.8, it is clearly seen that the mean years of schooling similarly start to decrease after age 47, and the slope of the line between ages 46-40 is less than the slopes of the line ages 51-46 and 40-34. From ages 45 to 40, the years of schooling increased only 0.24 years relative to age 55. However, the years of schooling rose 0.64 years between the ages of 51-46 and 0.5 years between the ages of 39-34. In all three of these periods, the time interval is five years. I conclude from Figure 2.3 to Figure 2.8 that the sole reason for less increase in years of schooling for those aged 40-45 is the decline in post-secondary educational attainment.

Effects on the probability of wage employment

The analysis above shows that the 1978-82 upheaval substantially declined the post-secondary educational attainment for those aged 40-45. In this subsection, I check whether it has any effects on being wage employed. I run a similar

regression of equation (1) to visualize the trend for the probability of wage employment. In this regression, the dependent variable is a dichotomous variable taking the value of 1 if an individual is wage employed (regular employee and casual employee) and zero otherwise (employer, self employed, and unpaid family worker). The sample in this regression contains all individuals who are employed.

Figure 2.9 displays the estimated coefficients of age dummies. It clearly indicates that the trend of probability of wage employment is smooth over the entire range of ages. The estimated coefficients lie almost on a slightly concave curve. Thus, the 1978-82 upheaval had no effect on the employment status. Similarly, I find that these events did not affect labor force participation, employment, and labor informality (see section 2.6.3).



Notes: The specification includes 26 NUTS2 region of residence, urban/rural and gender dummies. Age 55 forms the control group. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

Figure 2.9 Coefficients of Age Dummies in the Estimating the Probability of Wage Employment

Finally, I run three separate regressions of the equation (2) to better describe the most affected group and present these estimations in Table 2.4. In these regressions, I compare the decline in the probability of completing post-secondary education for sample of wage earners (regular employee and casual employee), non-wage earners (employer, self employed, and unpaid family worker), and for men and women. In all regressions, I find that the coefficients of aged 40-45 dummies are negative. Column 1 and 2 indicates that the decline is 5.9 percentage points for the sample of wage earners. But it is 0.9 percentage point for non-wage earners. This proves that the 1978-82 upheaval significantly affected wage earners. Column 3 and 4 compare the same groups in the male sample and the decline is increased to 6.6 percentage points for men in the sample wage earners. In contrast, column 6 and 7 show that none of the coefficients of aged 40-45 dummies is significant in the female sample.

Table 2.4 Effect of the 1978-82 Upheaval on the Probability of Completing Post-secondary Education

	Dependent Variable: Having Post-secondary Degree (1); Otherwise (0)					
	Total		Men		Women	
	Sample of Wage Earners	Non-wage Earners	Sample of Wage Earners	Non-wage Earners	Sample of Wage Earners	Non-wage Earners
Aged 40-45 Dummy Coefficient	-0.0587*** (0.0075)	-0.0084** (0.0034)	-0.0664*** (0.0114)	-0.0102 (0.0065)	-0.0147 (0.0247)	-0.0031 (0.0053)
Observations	18730	18852	15827	12798	2903	6054
R-squared	0.0476	0.057	0.0298	0.0474	0.078	0.1077

Notes: The specification includes 26 NUTS2 region of residence and urban/rural dummies. It also includes gender dummy for the total sample estimations. Observations are weighted using the sampling weights so that the results are nationally representative. Robust standard errors, clustered on 26 NUTS2 regions, are in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

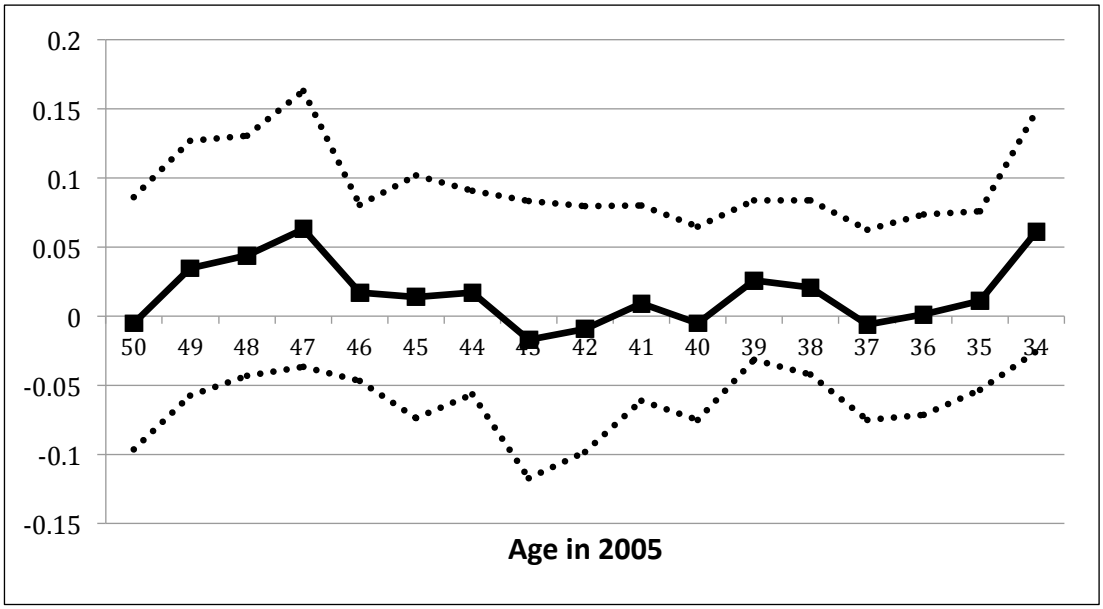
Therefore, I can conclude that the group most affected by the 1978-82 events is male wage earners aged 40-45 in 2005. Thus, I restrict my sample data with

men in the sample of wage earners aged 34-51 for the estimations in section 2.6. Those aged 46-51 and 34-39 are two selected comparison groups that have 6 age cohorts, just like the treatment group.

Effects on Wages

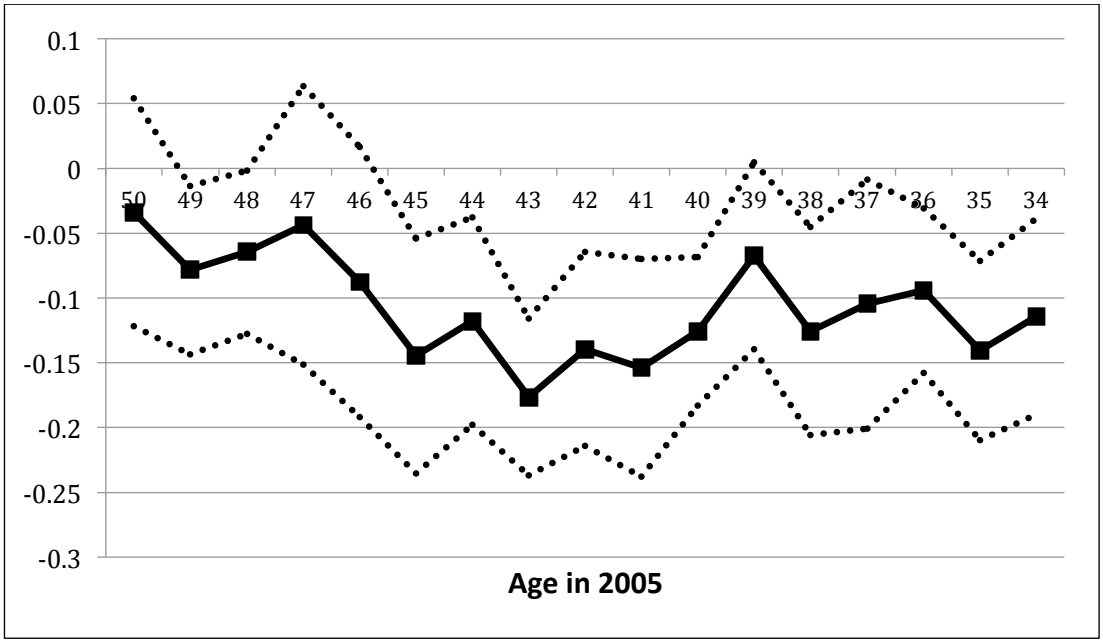
I assess whether the decrease in post-secondary education for men aged 40 to 45 can be translated into a decrease in earnings. To address this question, I run a regression of equation (1) in which the dependent variable is log hourly wage standardized to experience 26 years because individual experiences vary across ages. Age 51 forms the control dummy and the data includes men in the sample of wage earners aged 34-51. The coefficient of ages are plotted in Figure 2.10 and it is clear that the log hourly wage increases from age 50 to age 47 and begins to decline after age 47, similar to the trend in post-secondary educational attainment in Figure 2.3. However, all changes in the log hourly wage are not statistically significant relative to age 51.

On the other hand, Figures 2.3-2.8 show that the only reason for less increase in years of schooling for ages 40-45 is the decline in post-secondary educational attainment. Based on this finding, I run the same regression as mentioned above by using the data restricted to men with at least high school education. The coefficients of ages are plotted in Figure 2.11 and it is clear that the log hourly wages of ages 40-45 are statistically negative relative to age 51. Since the instrument exploiting the student protests affected only post-secondary education, Figure 2.11 confirms that the decrease in post-secondary education leads to a decrease in earnings for men aged 40-45.



Notes: The specification includes 26 NUTS2 region of residence and urban/rural dummies. Age 51 forms the control group. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

Figure 2.10 Coefficients of Age Dummies in the Estimating Log Hourly Wage for Men



Notes: The specification includes 26 NUTS2 region of residence and urban/rural dummies. Age 51 forms the control group. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

Figure 2.11 Coefficients of Age Dummies in the Estimating Log Hourly Wage for Men with at least High School Education

2.5.2. Instrument Validity for the IV Estimation

The following linear equation are generally used to characterize the causal effect of education on labor income:

$$w_i = \alpha + \beta s_i + X_i \Pi + u_i \qquad (3)$$

where w_i is a measure of wage, s_i is a measure of schooling, X_i is a set of other observables variables assumed to affect labor income, and u_i is a disturbance term representing other not explicitly measurable variables, assumed to be distributed independently of the explanatory variables, and i is a particular individual in the sample (Griliches, 1977).

The cross-sectional causal relation between education and labor income may not be consistently estimated by using a standard equation similar to (3) because of omitted variables that are correlated with schooling, such as ability, motivation, and family background. Otherwise, the estimated effect includes not only the impact of schooling, but also the effects of individual and family characteristics that affect the income and also are correlated with the schooling. A possible solution to this causal inference problem is to use the method of instrumental variables. This methodology needs at least one observable covariate that affects labor income only through schooling.

In section 2.3 and 2.5.1, I have indicated that the post-secondary educational attainment significantly declined for individuals aged 40-45 (approximately born between 1960 and 1965 or being the age of 13 to 18 years old in 1978) compared to individuals aged 46-51 years due to the student protests in the late 1970s and the subsequent coup. It would normally be expected that the probability of completing post-secondary education has an upward trend across age cohorts as the age decreases (over time). Therefore, I use a dummy variable z_i that 1 indicates the individual i's age to be between 40-45 and 0 indicates the age to be between 46-51 as an instrument for estimating the returns to schooling.

In a heterogeneous-outcome framework, the instrumental variable method has the potential to estimate the average causal effects of the schooling for the subgroup whose schooling attainment is changed by the instrument; it is called the local average treatment effect (LATE) (Imbens and Angrist, 1994; Angrist, Imbens, and Rubin, 1996; Card, 2001). Two key conditions underlie the aforementioned framework (Imbens and Angrist, 1994).

The first is the existence of the instrument. Because an individual's year of birth is randomly assigned and probably unrelated to individuals' innate ability, motivation, or family characteristics, it seems reasonable to assert that the only reason for wage decline for those aged 40-45 is the decline in post-secondary education after standardizing the experience in the labor market. Thus, potential outcomes in the labor market are independent of the instrument and exclusion restriction assumption is satisfied. Contrary to expectation, a downward time trend is observed for the educational attainment in post-secondary education for individuals aged 40-45. As a result, the instrument is also independent of negative potential treatment assignments in post-secondary education, and thus, z_i is a valid instrument. I have already showed that the completing post-secondary education is a nontrivial function of z_i in section 2.5.1. Therefore, the instrument is also relevant and first condition is satisfied.

The second condition is monotonicity. This assumption ensures that the instrument affects the post-secondary education in a monotone way, which means no one does the opposite of his participation decision to go to a post-secondary school due to the 1978-82 upheaval (Imbens and Angrist, 1994; Angrist, Imbens, and Rubin, 1996). In section 2.5.1, I have also indicated that the chaos of 1978-82 negatively affected all different subsamples of the population such as males, females, wage earners, and non-wage earners. In addition, it is not reasonable that an individual who would have normally not gone to post-secondary education, would have chosen to go as a result of the violence. Thus, the monotonicity condition is also satisfied.

Based on these assumptions, the IV estimates using z_i is the average treatment effects for those did not continue to post-secondary education due to the 1978-82 events, but they would have normally had a post-secondary degree. Because of the instrument, I restrict my sample to males in the sample of wage earners aged 40-51 years in the IV estimations in section 2.6.

2.5.3. First-Stage and Reduced-Form Estimates for Male Wage Earners

In this subsection, I provide inferences about the effect of the 1978-82 events on the probability of completing post-secondary education, years of schooling, and wages. These correspond to the first stage and reduced form estimates for the returns to schooling. I run three different regressions based on the following equation:

$$s_i = \alpha + \beta z_i + X_i \Pi + \varepsilon_i \qquad (4)$$

where z_i is a dummy that 1 indicates the individual i's age to be between 40-45 and 0 indicates the age to be between 46-51, X_i is a vector of covariates, and ε_{ijc} is an idiosyncratic error term.

In the first regression, the dependent variable (s_i) is a dichotomous variable indicating whether the individual has completed post-secondary education or not. In the second and third regression, I use years of schooling and log hourly wage as the dependent variables, respectively. In all regressions, my data is male wage earners aged 40-51 in 2005. In this sample, individuals aged 40-45 are the affected group and those aged 46-51 are the comparison group. In addition, I present specifications that control for 26 NUTS2 region of residence and urban/rural dummies.

The results are presented in Table 2.5. Column (1) to (3) indicates that the probability of completing post-secondary education declined 6.6-7 percentage points, which are highly significant. Similarly, years of schooling decreased 0.22-0.28 years, also significant (columns 4-6). The last three columns

Table 2.5 Effect of the Student Protests in the late 1970s and the Subsequent Coup in 1980 on the Probability of Completing Post-secondary Education, Years of Schooling, and Wage

	Dependent Variable:Having Post-secondary Degree (1); Otherwise (0)			Dependent Variable: Years of Schooling			Dependent Variable: Log(Hourly Wage)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Coefficient on the instrument (z=1 if the individual is between the ages of 40-45; z=0 if the individual is between the ages of 46-51)	-0.0696*** (0.0117)	-0.069*** (0.0119)	-0.0664*** (0.0114)	-0.2765*** (0.0914)	-0.2575*** (0.0915)	-0.2233** (0.0881)	-0.0351** (0.0162)	-0.0329* (0.0164)	-0.0259 (0.0162)
Control Variables:									
Region of Residence Dummies	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Urban/Rural Dummy	No	No	Yes	No	No	Yes	No	No	Yes
Number of observations	15827	15827	15827	15827	15827	15827	15827	15827	15827

Notes: The sample includes male wage earners aged 40-51. Observations are weighted using the sampling weights so that the results are nationally representative. Robust standard errors, clustered on 26 NUTS2 regions, are in parentheses. *** p < 0.01; ** p < 0.05; * p < 0.1

represent the effect of 1978-82 events on wages for men. They all suggest that wages declined 2.6-3.5 percent. Yet, the effect on wages is marginally significant when I include both 26 NUTS2 region of residence and urban/rural dummies as control variables in column (9).

The post-secondary educational attainment rate is 21.1 percent for male wage earners aged 46-51 years. This rate approximately 6.6-7 percentage points below for those aged 40-45 because of the 1978-82 events. In that case, those individuals whose schooling attainment is changed by the instrument are at least 31 (6.6/21.1) percent of individuals having post-secondary education in this cohort. I assume in this calculation that the post-secondary attainment rate for 40-45 cohort would have at least remained the same if the 1978-82 upheaval would not have happened.

2.6. Results and Discussions

In this section, I present the main impacts of the 1978-82 events on wages and occupational shift and show the estimates of the return to schooling using the method of instrumental variables. The first subsection provides the results of IV estimations. The second subsection presents the effects on wage distributions by a counterfactual density estimation. The third subsection explores the effects on occupational shift. The last subsection provides some robustness checks for the estimated results.

Table 2.6 presents the mean of some characteristics to compare the treatment and comparison age groups. The treatment group of age 40-45, which was most affected by 1978-82, has a lower mean of log hourly wages, fewer mean years of schooling, and a lower mean of post-secondary education completion. However, this group has a higher mean of high school graduation compared to the previous (34-39) and subsequent (46-51) age groups. This shows that the schooling decline for the aged 40-45 group comes entirely from a decline in post-secondary education.

Table 2.6 Comparisons of Age Groups for Male Wage Earners

Age Groups	Number of Observations	Mean of Log Hourly Wage	Mean of Years of Schooling	Mean of Post-Secondary Attainment Rate	Mean of High School Graduation Rate
Aged 34-39	10774	1.023	8.363	0.166	0.228
Aged 40-45	10105	1.002	8.198	0.142	0.243
Aged 46-51	5722	1.037	8.475	0.211	0.195

Notes: Observations are weighted using the sampling weights so that the results are nationally representative.

2.6.1. Estimating Returns to Education

2.6.1.1. Estimating Returns to Education for an Additional Year of Schooling

The identification assumption that the evolution of wages and education across cohorts aged 40 to 51 in 2005 would not have varied systematically in the absence of 1978-82 upheaval is sufficient to estimate the impact of these events. Additionally, if I assume that these events had no effect on wages other than by causing a decline in post-secondary educational attainment, I can use this exogenous source of income variation to estimate the causal impact of additional years of schooling on wages by the method of instrumental variables. I have already shown that the instrument of the dummy variable z_i that 1 indicates the individual i's age is between 40-45 and 0 indicates the age between 46-51 is a valid and relevant instrument in section 2.5. The first stage and reduced form of this IV specification already presented in Table 2.5. It indicates the instrument has good explanatory power in the first stage.

Estimates of the return to schooling for an additional year are presented in Table 2.7. In all regressions, the dependent variable is log hourly wages standardized to experience 26 and the data is male wage earners aged 40-51. The first line presents OLS estimates of equation (3). Column (1) indicates that the estimated return to schooling is 11.2 percent and is not affected by

introducing region of residence and urban/rural dummies as control variables (column 2 and 3). These two dummies represent the social and regional variables that likely affect schooling and wages.

The second line of Table 2.7 presents 2SLS estimates. In column (1), there is no control variable and the point estimate (12.7 percent) is slightly above the OLS estimate, though the equality is not rejected. Because the protests could be more widespread across some regions due to some unobservable cultural differences that have been correlated with schooling and labor market outcomes, regional effects are also included in the IV regressions. Including region of residence and urban/rural dummies as control variables (column 2 and 3) do not change the results significantly, but including these dummies weaken the explanatory power of the instrument.

Table 2.7 OLS and 2SLS Estimates of the Returns to Education

	Dependent Variable: Log(Hourly Wage)		
	(1)	(2)	(3)
OLS	0.1123*** (0.0045)	0.1125*** (0.0041)	0.111*** (0.0039)
2SLS	0.1271** (0.0537)	0.1278** (0.0592)	0.1161* (0.0673)
Control Variables:			
Region of Residence Dummies	No	Yes	Yes
Urban/Rural Dummy	No	No	Yes
F (Excluded Instrument)	9.2	7.9	6.4
Number of observations	15827	15827	15827

Notes: The sample includes male wage earners aged 40-51. Observations are weighted using the sampling weights so that the results are nationally representative. Robust standard errors, clustered on 26 NUTS2 regions, are in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

In a heterogeneous-outcome framework, the estimates of economic returns to education ranging from 11.6 to 12.8 percent are the average causal effects of an additional year of schooling for those affected by 1978-82 upheaval. They would have completed a post-secondary degree if these events had not occurred. I have already shown in Table 2.6 that the treatment group of age 40-45 has fewer mean years of schooling, and a lower mean of post-secondary attainment rate, but a higher mean of high school graduation rate compared to the previous and subsequent age groups. Figures 2.3-2.8 have provided more evidence to support this claim. Therefore, my instrument only affects post-secondary education. This leads to the inference that these estimates are most likely the average causal effects of an additional year of post-secondary schooling among those affected from 1978-82 events.

The individuals whose schooling attainment is changed by the instrument are at least 31 percent of individuals having post-secondary education in the male sample of wage earners aged 40-45. Average treatment effect on the treated is a weighted average of effects on "always-takers" and "compliers" (Angrist and Pischke, 2009). In addition, those individuals affected from the 1978-82 upheaval are not marginal individuals who indifferent between going to university or not. Those affected were the dropouts in post-secondary education or would have gone to universities if these events had never happened. Carneiro (2003) show that the return to education for the average student in college is systematically above the return to education for marginal individual in the US. Therefore, the estimations of 11.6-12.8 percent may be close approximations of the average causal effects of an additional year of schooling in post-secondary education.

My estimations for returns to post-secondary schooling are similar to those reported for developed countries. Belzil and Hansen (2002) use a structural dynamic programming model to estimate marginal[1] returns to schooling in the

[1] The marginal returns to schooling refer to the percentage wage increase per additional year of schooling.

US. They find that log wage regression is convex in schooling and estimate that marginal returns are less than 1 percent per year until grade 11, rise to 3.7 percent in grade 12, increase to 6 percent in grade 13, and range from 10.8-12.7 percent between grade 14 and grade 16. Psacharopoulos (2004) also points out that average returns to higher education is 18.2 for Asian (Non-OECD) countries, 18.8 percent for Europe/Middle East/North Africa (Non-OECD) countries, and 11.6 percent for OECD countries.

The convexity of the log wage regression function implies that marginal returns are increasing with the level of schooling up. The instrument that I use in this chapter only affects post-secondary education. Since different instruments may define different "effects" of schooling on earnings in a heterogeneous-outcome framework (Heckman, Lochner, and Todd, 2006), the findings of this chapter would be compatible with low returns to elementary school grades of Torun (2015) and Aydemir and Kirdar (2017) in the light of Belzil and Hansen (2002). Thus, the log wage regression may also be convex in schooling in Turkey. In order to make this conclusion clearer, more evidence is needed on the causal impact of education on earnings in Turkey.

I repeat the same regressions with the dependent variable of log monthly wage instead of log hourly wage. The results are presented in Table A.1. Because there is a negative correlation between hours worked and mean years of schooling in Turkey, the returns to schooling for an additional year for log monthly wage are approximately 2-3 percentage points lower than those of the regressions taking log hourly wage as the dependent variable. However, the 2SLS estimates in both regressions are slightly above the OLS estimates, although the equalities of them are not rejected.

2.6.1.2. Estimating Returns to Education for a Degree in Post-Secondary Education

In this subsection, I estimate the effects of a post-secondary degree on wages in the sample of male individuals aged 40 to 51 having at least high school education. The survey data includes information on the highest completed level

of schooling, but there is only one level for post-secondary schooling. I define a dichotomous variable d_i that 1 indicates the individual i completes post-secondary education and 0 indicates the individual i completes high school.

I estimate the mean years of schooling for the post-secondary education as four years based on the 2008 TDHS. This indicates that completion of post-secondary education in Turkey corresponds to completing a four-year college. Therefore, in this subsection, I estimate the effect of obtaining a four-year college degree relative to a high school diploma.

The results are presented in Table 2.8. In all regressions, the dependent variable is log hourly wages standardized to experience 26. I regress log hourly wage on the dichotomous variable d_i and similarly include the same control variables as in the previous subsection. The first line shows the OLS estimates. Column (1) indicates that the estimated returns to a four-year college degree are 50 percent greater than those for high school education and not affected by introducing region of residence and urban/rural dummies as control variables (column 2 and 3).

The second line of Table 2.8 presents 2SLS estimates. In column (1), there is no control variable and the point estimate (58 percent) is slightly above the OLS estimate, although the equality is not rejected. Including region of residence and urban/rural dummies as control variables (column 2 and 3) do not change the results significantly. The first-stage F-statistics for all regressions are close to 50, confirming the strength of the instrument in this section.

In a heterogeneous-outcome framework, the estimate of approximately 58 percent of returns to four-year college education is for those who otherwise would have completed a college due to 1978-82 events. Because of the aforementioned reasons, the estimation of 58 percent may be a close approximation of the average causal effect for completing a four-year college degree relative to a high school education for individuals who go to college.

Table 2.8 OLS and 2SLS Estimates of the Returns to College

	Dependent Variable: Log(Hourly Wage)		
	(1)	(2)	(3)
OLS	0.5022*** (0.032)	0.5062*** (0.0304)	0.5025*** (0.0311)
2SLS	0.5795*** (0.0965)	0.579*** (0.0935)	0.5716*** (0.0935)
Control Variables:			
Region of Residence Dummies	No	Yes	Yes
Urban/Rural Dummy	No	No	Yes
F (Excluded Instrument)	49.7	51.5	52.8
Number of observations	6309	6309	6309

Notes: The sample includes male wage earners aged 40-51. Observations are weighted using the sampling weights so that the results are nationally representative. Robust standard errors, clustered on 26 NUTS2 regions, are in parentheses. *** p < 0.01; ** p < 0.05; * p < 0.1

2.6.2. Counterfactual Density Estimation

In this subsection, I implement a semi-parametric procedure to analyze the role of the decline in post-secondary educational attainment for men aged 40-45 on the distribution of wages. I apply the density reweighting procedure introduced by DiNardo, Fortin, and Lemieux (1996) to estimate a counterfactual density of labor income by applying weighted kernel methods for the sample aged 40-45 if the post-secondary attainment rate of this sample had remained the same as in the sample of those aged 46-51.

In this method, I basically reweight the sample of aged 40-45 to have the same distribution of post-secondary education as the sample of aged 46-51. I then compare how labor income is distributed in the reweighted sample of aged 40-45 and in the actual distribution of the same sample. This semi-parametric

estimation method provides a visually clear representation of how the changes in post-secondary attainment affect the density of wages.

The actual and counterfactual density estimates are obtained by the kernel density estimator. Let W_1, …, W_n be a random sample of size n, with weights θ_1, …, θ_n drawn from some distribution with an unknown density f, its kernel density estimator is defined as follows;

$$\hat{f}_h(w) = \sum_{i=1}^{n} \frac{\theta_i}{qh} K\left(\frac{w - W_i}{h}\right)$$

where $q = \sum_{i=1}^{n} \theta_i$, h is the bandwidth and $K(.)$ is the kernel function. I choose analytic weights in the estimation because weights are rescaled so that $\sum_{i=1}^{n} \theta_i = n$. This ensures that the Stata kernel density estimation is compatible with the estimator proposed by DiNardo, Fortin, and Lemieux (1996). In my data, the weights are the HLFS sampling weights.

I prefer to use notations and explanations similar to the original seminal paper (DiNardo, Fortin, and Lemieux, 1996) to ensure compatibility. In the estimation procedure, each individual observation belongs to a joint distribution $F(w, d, z)$; where w is wages, d is individual attributes and z is a time variable. The joint distribution of wages and individual attributes at one point in time is the conditional distribution $F(w, d|z)$. In that case, it can be written the density of wages at a point in time, $f_z(w)$, as the integral of the density of wages conditional on individual attributes and a time z_w, $f(w|d, z_w)$, over the distribution of the individual attributes $F(d|z_d)$ at time z_d as follows;

$$f_z(w) = \int_{d \in \Omega_d} dF\left(w, d \middle| z_{w,d} = z\right)$$

$$= \int_{d \in \Omega_d} f(w|d, z_w = z) dF(d|z_d = z)$$

$$= f(w; z_w = z, z_d = z)$$

where Ω_d is the domain of the individual attributes. To be compatible with the previous subsections, z is a dichotomous variable that 1 indicates the individual is between aged 40-45 and 0 indicates individual is between aged 46-51. Thus, the expression of $f(w; z_w = 1, z_d = 1)$ represents the actual density of wages for individuals aged 40-45, whereas $f(w; z_w = 1, z_d = 0)$ represents the counterfactual density of wages for those aged 40-45 if the characteristics of these workers had remained as in individuals aged 46-51 without changing the wage schedule observed for the those aged 40-45. In this setting, the general equilibrium effects of changes in the distributions of attributes are ignored.

Under the assumption of conditional density $f(w|d, z_w = 1)$ does not depend on the distribution of attributes, the counterfactual density $f(w; z_w = 1, z_d = 0)$ is

$$f(w; z_w = 1, z_d = 0) = \int_{d\in\Omega_d} f(w|d, z_w = 1) dF(d|z_d = 0) \qquad (5)$$
$$= \int_{d\in\Omega_d} f(w|d, z_w = 1)\psi_d(d) dF(d|z_d = 1)$$

where the reweighting function $\psi_d(d) = dF(d|z_d = 0)/dF(d|z_d = 1)$. As seen in equation (5), the counterfactual density is obtained by reweighting the actual density. The sole difference between them is the reweighting function $\psi_d(d)$.

The conditional density of wages may depend on the distribution of attributes due to non-random selection. Therefore, I assume that the distribution of the unobserved attributes conditional on the observed attribute d is the same for the two groups (aged 40-45 and 46-51), which means that the difference between the cohorts in the distribution of d can account for any difference between the cohorts in the marginal distribution of vector of unobserved skills (Altonji, Bharadwaj, and Lange 2012).

After estimating $\widehat{\psi_d}(d)$, the counterfactual density is estimated by weighted kernel methods as follows;

$$\hat{f}(w; z_w = 1, z_d = 0) = \sum_{i \in I_1} \frac{\theta_i}{qh} \widehat{\psi_d}(d_i) K\left(\frac{w - W_i}{h}\right)$$

where I_1 is the set of indices of individuals aged 40-45. In the empirical analysis, I analyze the effects of the decline in post-secondary educational attainment. Thus, the individual attribute in this study is a dichotomous variable that 1 indicates the individual completes a post-secondary education. In that case, the difference between the actual density and the counterfactual density indicates the effect of the decline in post-secondary attainment on the distribution of wages for those affected.

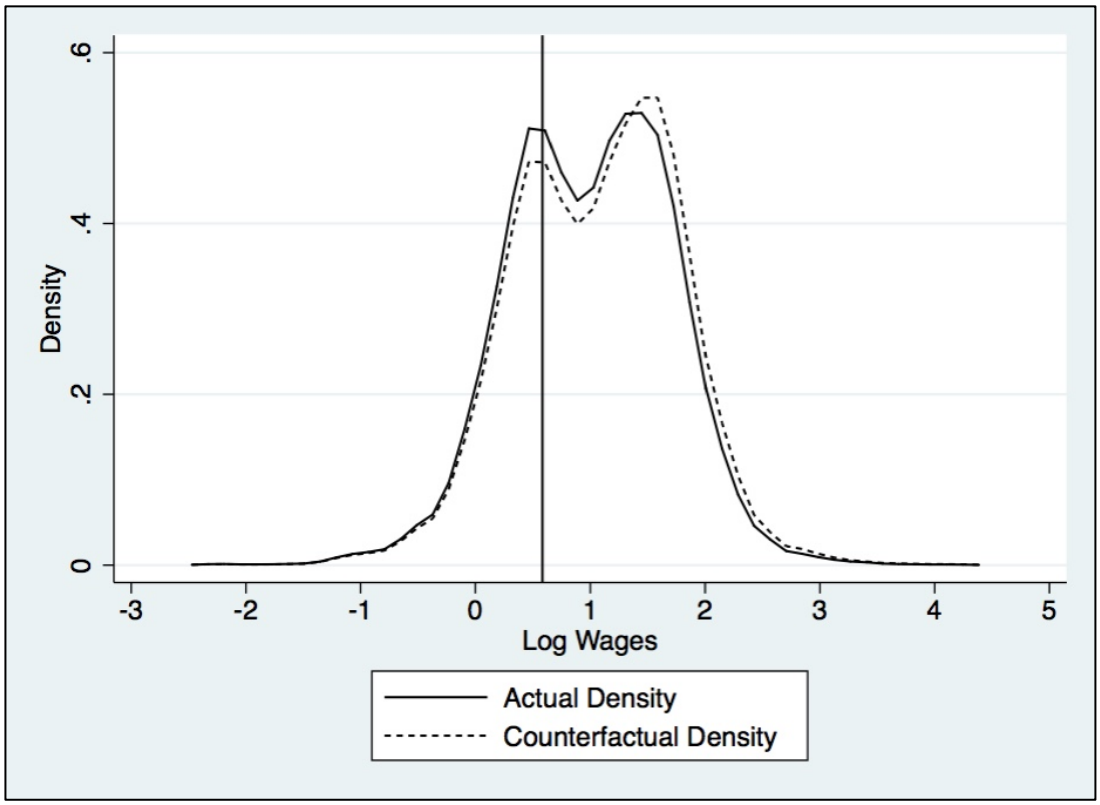
The reweighting function $\psi_d(d) = dF(d|z_d = 0)/dF(d|z_d = 1)$, by Applying Bayes' rule, can be rewritten as follows;

$$\psi_d(d) = \frac{\Pr(z_d = 0|d)}{\Pr(z_d = 1|d)} \cdot \frac{\Pr(z_d = 1)}{\Pr(z_d = 0)}$$

A probit or logit model can estimate the probability of being in period z, given the individual attributes d. $\Pr(z_d = 1)$ is equal to the weighted number of observations in the aged 40-45 group divided the weighted number of observations in both the aged 40-45 and 46-51 groups.

I apply the probit model as in the DiNardo, Fortin, and Lemieux (1996) to estimate the reweighting function and plot the weighted kernel density estimates of the counterfactual (dotted line at Figure 2.12) and the actual (solid line at Figure 2.12) densities of wages. I choose wages as log hourly wages standardized to experience 26 for men as in the previous subsections. Both figures are superimposed in Figure 2.12. The Stata optimal bandwidth is chosen, but the results are not sensitive to the choice of bandwidth. I also consider bandwidths half and two times as large. Those densities are plotted in Figure A.5 and Figure A.6, respectively. Gaussian kernel function is chosen but the results are similarly not sensitive to the choice of functions.

The vertical line indicates the minimum log wage in 2005. It is computed by the net monthly minimum wage (350 TL for 45 hours per week) divided by (52/12) and then by 45 ("Asgari Ucret Tespit Komisyonu Karari (The Decision of the Minimum Wage Determination Commission)", 2004). It is clear that the minimum wage in Turkey compresses the lower tail of the density of the male wage earners. Thus, the distribution is twin-peaked, with the first peak settling around the minimum wage. The second peak is around 1.45 log wage value, where the mean of this sample is approximately 1.01 log value.



Notes: The sample includes male wage earners aged 40-51. Observations are weighted using the sampling weights so that the results are nationally representative.

Figure 2.12 The Actual and Counterfactual Density of Log Wages for Male Individuals Aged 40-45

The difference between actual (solid line) and counterfactual density (dotted line) represents the effect of the decline in post-secondary educational attainment for individuals aged 40-45 on the distribution of wages. It is clear

that the decline in post-secondary education pushed these individuals from the high-income group to the minimum wage group. Those individuals who otherwise would have completed a post-secondary degree would have earned much more than average income in the sample of wage earners if the 1978-82 violence had not occurred.

2.6.3. A Shift in Occupations

In this subsection, I explore the impact of 1978-82 on occupational shift. Before this analysis, I will address the following question: Does this quasi-experimental event affect other labor market outcomes such as labor force participation, employment, and labor informality? In order to answer this question, I run three regressions based on the following linear probability model:

$$s_i = \alpha + \sum_{c=30}^{54} \beta_c d_{ic} + X_i \Pi + \varepsilon_i$$

where s_i is a dichotomous variable, d_{ic} is a dummy that indicates whether individual i is c years old, X_i is a vector of covariates, and ε_i is an idiosyncratic error term. The HLFS data used in this analysis is restricted to men aged 34-51. In all regressions of this subsection, I use 26 NUTS2 region of residence dummies and urban/rural dummy that represent the social and regional variables that affect the dependent variable as the vector of covariates. Individuals aged 51 in 2005 serve as the reference group.

In the first regression, the dependent variable is a dichotomous variable whether a man participates the labor force. Each coefficient β_c can be interpreted as an estimate of the probability of being in in the labor force for the corresponding age relative to age 51. The coefficients of ages between 34 and 50 years are plotted in Figure 2.13, which shows that the trend for participation of labor force is smooth over the entire range of ages. Thus, the decline in post-secondary educational attainment did not affect the labor force participation for men. In the second regression, the dependent variable is dichotomous that 1 indicates the individual to be employed and 0 indicates the individual to be

unemployed or not to be in the labor force. In the third regression, the dependent variable is also dichotomous that 1 denotes the individual to be registered with any social security institution related to his job and 0 denotes that he is not registered or unemployed or not in the labor force. Age coefficients of the last both regressions are plotted in Figure A.7 and Figure A.8, respectively. Both figures point out that the decline in post-secondary educational attainment did not similarly affect employment and labor informality in the labor market.

Notes: The specification includes 26 NUTS2 region of residence and urban/rural dummies. Age 51 forms the control group. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

Figure 2.13 Coefficients of the Age Dummies in the Estimating the Probability of Being in the Labor Force

I indicate in this subsection that this quasi-experimental event did not affect some labor market decisions such as labor force participation, employment, and labor informality. It did however lead to a significant shift in occupations. The data contains 27 sub-major divisions of occupations and they are classified

according to International Standard Classification of Occupations (ISCO-88). I compute the mean of log wage for each occupation for men and then I separately find the percentage of individuals of each occupation in the age groups (Aged 34-39, Aged 40-45, Aged 46-51). I sort the occupations based on their mean log wage values and accordingly I construct five main occupation groups. The first two groups can easily be defined because they contain similar sub-major divisions. The occupations in the last three groups are in different majors. Thus, I classify them based on mean log wage values.

I use average log (hourly) wage value (1.02) of the sample of male aged 34-51 and minimum log wage value (0.58) in 2005 to classify the last three groups. Table 2.9 presents the percentage of occupation groups. For instance, among those aged 34-39, 13.73 percent are corporate managers and professionals, among those aged 40-45 it is 12 percent and for ages 46-51 it is 18.68. The same table with 27 sub-divisions is presented in Table A.2.

Table 2.9 Classification of Occupations and Their Percentages in the Age Groups

		Percentage in His Age Group		
ISCO-88 Codes	**Classification of Occupations**	**Aged 34-39**	**Aged 40-45**	**Aged 46-51**
22, 12, 21, 23, 24	Corporate Managers and Professionals (1.53<Log Wage<2.07)	13.73	12.00	18.68
31, 32, 34, 41, 33, 42	Technicians and Associate Professionals and Clerks (1.29<Log Wage<1.45)	15.12	17.39	16.66
72, 81, 11, 51, 13	Average Wage Earners (0.92<Log Wage<1.1)	20.32	20.72	18.40
82, 83, 73, 91, 71	Between the Minimum Wage and the Average Wage (0.69<Log Wage<0.87)	33.29	34.37	31.28
74, 52, 93, 61, 92, 62	Approximately Less than the Minimum Wage (Log Wage<0.61)	17.54	15.52	14.98

Notes: Log (hourly) wage values are the mean of individuals in the corresponding occupation.

The first group is corporate managers and professionals and their mean log wage values are over 1.5, approximately corresponding to the second peak in distribution of wages in Figure 2.12. 12 percent of those aged 40-45 are in this category. This ratio is less than the other two comparison groups, and nearly 7 percentage points lower than those aged 46-51. This difference is compatible with the difference between actual and counterfactual density estimations in the previous sub-section. Thus, it can be concluded that individuals aged 40-45 have less high-paying jobs.

The second occupation group is technicians, associate professionals and clerks. It can be inferred that these occupations needs less education than the first group. The percentage of this group in aged 40-45 is higher than the other two comparison groups and this result is also compatible with the counterfactual density estimation plotted in Figure 2.12. The third and fourth groups have also confirmed the same result because the percentages for those aged 40-45 are higher.

If I combine the sub-major divisions whose mean log wage values between minimum wage and 1.5 (the second peak in Figure 2.12), the percent of individuals in aged 34-39, aged 40-45, and aged 46-51 are 68.7, 72.5, and 66.3, respectively. This indicates that those aged 40-45 have more less-paying jobs. Therefore, I conclude that the decline of post-secondary attainment led to a shift in occupations from high-paying to low-paying jobs.

2.6.4. Robustness Checks for Missing Data

The wage data contains missing values. About 2 percent of male individuals aged 40-51 did not declare their wages because they may have started their current job within the survey month or did not want to make it known. I define a dichotomous variable that 1 indicates that the wage data is missing for male wage earners. I regress this variable on age cohorts, 6 schooling dummies, 27 sub-major divisions of individuals' occupations, 26 NUTS2 region of residence

dummies and urban/rural dummy. I find that some variables are significant, and thus the missing values are not random.

Table 2.10 OLS and 2SLS Estimates of the Returns to Education with Adjusting Missing Values

	Dependent Variable: Log(Hourly Wage)	
	Effect of Additional Years of Schooling	Effect of Post-Secondary Education
Panel A: Sample of Male Wage Earners with Missing Values		
OLS	0.111*** (0.0039)	0.5025*** (0.0311)
2SLS	0.1161* (0.0673)	0.5716*** (0.0935)
F (Excluded Instrument)	6.4	52.8
Number of observations	15827	6309
Panel B: Sample of Male Wage Earners with Adjusting Missing Values		
OLS	0.1112*** (0.0039)	0.5037*** (0.031)
2SLS	0.1119 (0.0709)	0.5744*** (0.0935)
F (Excluded Instrument)	6	52.7
Number of observations	15827	6309
Control Variables:		
Region of Residence Dummies	Yes	Yes
Urban/Rural Dummy	Yes	Yes

Notes: The sample includes male wage earners aged 40-51. Observations are weighted using the sampling weights so that the results are nationally representative. Robust standard errors, clustered on 26 NUTS2 regions, are in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Even though the fraction of missing data in my sample is very low, I re-estimate sampling weights to adjust for these missing wage values. I run a linear probability regression on the same set of variables mentioned above relating missing values, and I adjust the sampling weights. (Altonji, Bharadwaj, and Lange 2012) also prefer a similar strategy, but they use a probit model. In my case, since the probit model drops observations more than the number of missings, I choose the linear probability model.

Finally, I check whether the results are robust to missing data for a set of the previous estimations. The comparison is presented in Table 2.10. The Panel A has two results from Table 2.7 and Table 2.8 with full covariates. The Panel B represents the same estimations with the adjusted sampling weights. It is clear that my estimates are robust to the case without adjusting sampling weights.

2.7. Conclusion

Turkey experienced historically violent student protests between 1978 and 1980, with almost 20 youths killed daily. This violence ultimately helped lead to a military intervention in 1980. The chaos of 1978-82 adversely affected post-secondary educational attainment in Turkey. In this study, I exploit the exogenous drop in the number of graduates and new admissions to estimate the causal impact of education on earnings.

I use the 2005 Household Labor Force Survey of Turkey in this study. I find that the group most profoundly affected by the 1978-82 upheaval is male wage earners aged 40-45 in 2005, who were 15-20 years old in 1980. These events led to a 6.6-7 percentage points decline in the probability of completing post-secondary education, a 0.22-0.28 decline in mean years of schooling, and a 2.6-3.5 percent drop in wages for the affected group. I also find that the decline in post-secondary educational attainment led to a shift in occupations from higher-paying to low-paying jobs. That provides evidence that such upheavals can permanently affect income distribution in a society.

Combining the effect of the decline in post-secondary educational attainment on years of schooling and wages produces 2SLS estimates of the returns to education ranging between 11.6-12.8 percent. This finding contributes to the literature arguing that the rate of return to education in developing economies is similar to estimates reported for developed economies.

The volume of work devoted to the return to schooling controlling unobserved ability is very few in Turkey and in other developing countries. More empirical studies are needed to accurately understand the causal impact of education on earnings. Therefore, quasi-experimental designs based on different instruments that especially affect high school and beyond or structural dynamic programming techniques allow the uncovering of all marginal returns to schooling could drive future studies in Turkey and other developing countries.

CHAPTER 3

THE IMPACT OF PRIMARY SCHOOL CONSTRUCTION ON HIGH SCHOOL ATTAINMENT AND LABOR FORCE PARTICIPATION

3.1. Institutional Setting

These days, education research in developed countries tends to center on quality (Hanushek, 2002). However, Turkey and many other developing countries remain focused on attainment. In 2015, the share of 25-64 year-olds in Turkey with upper secondary education was 37 percent compared to the OECD average of 78 percent. In the past 20 years, Turkey has dramatically increased the resources devoted to boosting its average level of schooling. Nonetheless, few studies have analyzed the causal impact of these large governmental programs.

This study examines the spillover effect of Turkey's large-scale primary school construction program on high school attainment and labor force participation. The government launched this program in 1997, as part of that year's compulsory schooling law. Attended by high political expectations, the law passed quickly through parliament. It was widely perceived that the major motivation for the law was to restrict religious education by closing the three-year lower secondary Imam Hatip schools (Gunay, 2001; Pak, 2004). It was different from other traditional compulsory schooling laws because it did not increase the legal dropout age, which remained 15, or extend the duration of compulsory schooling. Instead, it introduced an uninterrupted eight-year education in the same school building. Before the 1997 law, basic compulsory education meant a five-year primary education and three-year lower secondary education predominantly in separate schools. Crucially, three-year lower

secondary schooling was rarely enforced due to a lack of physical infrastructure (Dulger, 2004; MONE-Baskent University, 2002).

The implementation of this law thus required a major expansion of school infrastructure. First, 1.5 million out-of-school lower-secondary children needed to be schooled (MONE, 1996). Second, the implementation of the law resulted in unutilized school facilities due to the closure of many five-year primary schools and three-year lower secondary schools within high schools. For instance, by the 2002-2003 school year, over 15,000 primary schools were closed down in small villages (MONE, 1996, 2003).

This expansion requirement led to a government strategy focused on building new classrooms. With help from private contributions, the government increased the number of classrooms by 67,014 from 1998 to 2002 (an average of 6.2 classrooms per 1,000 children aged 6 to 13) — an approximately 31 percent increase in classrooms over this period (MONE, 1999, 2000, 2001, 2002, 2003).

Following Duflo (2001), in this study, I employ a difference-in-differences strategy that exploits provincial differences in the intensity of the construction program and the variation in exposure across birth cohorts resulting from program timing. The intensity of the construction program refers to the net increase in the number of classrooms from 1998 to 2002 per 1,000 children aged 6-13. The analyses rely on a unique dataset generated by combining the 2011 Population and Housing Census (PHC) and provincial educational data from National Education Statistics books published by the Ministry of National Education (MONE). The year of birth and the province of birth jointly determine an individual's exposure to the school construction program. After controlling for birth province and cohort fixed effects, the coefficients of interactions between cohort dummies and the net increase in the number of classrooms in primary education are plausibly exogenous variables because the timing of the policy was driven by political choices.

The analysis indicates that primary school construction has significant spillover effects on high school attainment for both men and women. The addition of one extra classroom of basic education per 1,000 children aged 6-13 increased high school attainment rates by 0.34-0.38 percentage points for men and by 0.37-0.40 percentage points for women for those exposed to the program. Since the program added 6.2 classrooms per 1,000 children from 1998-2002, the total increase in high school attainment rates was 2.1-2.4 percentage points for men and 2.3-2.5 percentage points for women.

My findings also suggest that the construction program impacts only female labor force participation. The program's additional investments in educational infrastructure led to a 0.35-0.42 percentage points rise in female labor force participation for every additional classroom. The addition of 6.2 classrooms in basic education per 1,000 children resulted in an increase of 2.2-2.6 percentage points in female labor force participation. The program did not significantly affect male labor force participation.

These findings have important implications for the literature on the impact of school construction on educational attainment in developing countries. This study is the first empirical analysis focusing on school construction programs in Turkey. Crucially, I isolate the treatment effect of the construction program by using a difference in difference strategy and including other governmental programs such as programs for boarding schools and school transportation in the model.

Research on evaluating the causal impact of large educational investment programs in developing countries remains limited. Duflo (2001) and Li and Liu (2014) examine the impact of primary school construction programs in Indonesia and China, respectively. Both studies show that these programs have some spillover effects on lower secondary school attainment. The common point for all three studies (mine included) is that large school construction

programs often affect not only the attainment rates of the targeted level of schooling but also that of the next-level education.

This chapter also adds to the literature examining the role of school construction in improving gender equality in the labor market for developing countries. As the level of educational attainment rises, female labor force participation increases in Turkey, as in most developing countries. This study indicates that Turkey's school construction program boosts labor force participation only for women, not men.

Importantly, this study is one of the few empirical analyses to use the 2011 Population and Housing Census data. The richness of the 2011 data enables more reliable estimates compared to other compulsory schooling law of 1997 studies using household surveys. While household surveys in Turkey provide statistics at 26 NUTS 2 regions level, the census provides at 81-province level. Thus, the census provides more robust standard errors when the standard errors are clustered on place of birth.

However, the study has a limitation to estimate the exact magnitude of the effects on the labor force participation. The 1992 and 1993-born cohorts in the treatment group recently completed their high schools or some individuals in these two cohorts were more likely to continue their college education at the time of census survey being conducted in 2011. My estimates for labor force participation must therefore be seen as early outcomes.

The rest of the chapter proceeds as follows. Section 2 discusses the literature applying the same methodology and discusses previous studies of Turkey's compulsory schooling law of 1997. Section 3 provides information about the compulsory schooling laws in Turkey, the school construction program, and statistics about school enrollment rates. Section 4 discusses the data and the identification strategy. Section 5 exhibits the empirical findings of the construction program on educational attainment. Section 6 presents the

estimates of the program effect on labor force participation. Section 7 analyzes the quality bias problem. Section 8 presents a conclusion.

3.2. Literature Review

In this chapter, I examine the effect of a large-scale school construction program on high school attainment and labor force participation. Following Duflo (2001), I employ a difference-in-differences strategy in my analysis that exploits provincial differences in the intensity of the construction program and the variation in exposure across birth cohorts induced by the timing of the program.

Duflo (2001) investigates a dramatic change in education policy that launched a major primary school construction program to target the children who had not previously been enrolled in Indonesia. Duflo finds some spillover effects for the lower secondary schooling. Similarly, Li and Liu (2014) examine the impact of constructing primary schools in rural areas of China in the late 1980s and early 1990s. They find that increasing primary school availability has significant positive spillover effects on girls' lower secondary school attainment.

There has been an extensive literature that studies on the effects of different programs or natural experiments following the same strategy. Some of them are as follow: the effect of a large-scale construction of pre-primary school on pre-primary school attendance and labor supply in Argentina (Berlinski and Galiani, 2007); the impact of female education on fertility exploiting the Nigeria's Universal Primary Education program (Osili and Long, 2008); the effects of violent conflict on schooling outcomes exploiting temporal exposure to the 1992–98 armed conflict in Tajikistan (Shemyakina, 2011); the effect of Turkey's 30-year-long "internal armed conflict" on the educational attainment (Berker, 2012); the effects of education policy on early fertility in Sweden (Gronqvist and Hall, 2013); the effect of wars and armed conflicts on children in terms of the educational attainment, future health, and labor market outcomes (Akbulut-Yuksel, 2014).

The impact of the 1997 Turkish compulsory schooling law has been widely analyzed by researchers in Turkey. Kirdar, Dayioglu, and Koc (2011) estimate the impact of the law on marriage and fertility of teenage women in Turkey. Their methodology is based on the discontinuity of the time trends in schooling outcomes by comparing the birth-cohorts that were affected by the law with those that were not. They find that the compulsory education policy substantially reduces the probability of marriage and childbirth for teenage women. In another study, Kirdar, Dayioglu, and Koc (2016) investigate the impact of the law on schooling disparities by gender and rural/urban residence using a similar strategy. They find that the compulsory schooling law substantially equalizes the educational attainment of urban and rural children, but they find no evidence of a narrowing gender gap. Caner et al. (2016) use the 1997 law to examine the effect of the law on mothers' traditional views in determining children's educational attainment. They find that the law is helpful to reduce school dropout rates.

There have also been a number of studies using the Turkish compulsory schooling law of 1997 as an instrument and investigating causalities between education and other outcomes. Torun (2015) and Aydemir and Kirdar (2017) estimate the returns on schooling. Cesur and Mocan (2013) estimate the effect of education on religiosity and voting preference. Gulesci and Meyersson (2015) estimate the impact of education on religiosity and women's empowerment. In these studies, the instrument is basically a policy dummy, which is equal to one for those who affected from the compulsory schooling law of 1997.

However, there could be some problems in these instrumental variable studies. First, the fuzzy period is about 24 years because the compulsory schooling in Turkey had already been 8 years since 1973. Although the compulsory education for lower secondary schooling was not enforced fully by the government due to lack of facilities before the compulsory schooling law of 1997, the period between 1973 and 1997 can be thought as a transitional period. A variety of programs were launched, such as building eight-year

primary education schools including YIBO and PIO schools where primary and secondary schools operated under the same management (MONE-Baskent Univeristy, 2002; Dulger, 2004). In this period, independent lower secondary schools or those within a high school such as lower secondary religious and vocational schools continued to provide education.

Second, the monotonicity assumption could be failed in a heterogeneous treatment effect. In that case, the instrumental variable estimates could not be the average causal effect for the compliers (LATE). This assumption ensures that the instrument affects the educational attainment in a monotone way, which means no one does the opposite of his or her participation decision to go to school due to the compulsory schooling law (Imbens and Angrist, 1994; Angrist, Imbens, and Rubin. 1996). In Turkey's case, the closure of over 15,000 primary schools in small villages had a negative impact especially for girls on educational outcomes. For example, some parents in small villages felt uneasy about their daughters getting on shuttles according to the MONE-Baskent University research project. In the 2001-2002 school year, when school transportation program reached its highest level, the ratio of female students who used shuttles was 39 percent as compared to 61 percent male students, and therefore, 1,200 of the primary schools in villages reopened in the 2003-2004 school year (Dulger, 2004).

In addition, although abolishing primary schooling and lower secondary schooling diplomas and introducing the eight-year primary education diploma had great positive effects on enrollment after the fifth grade, it also had some negative effects. The MONE-Baskent University research project (2002) argues that some parents in rural areas who sent their daughters to schools normally until fifth grade tended not to send their daughters to schools after the third grade because five-year primary school diploma could not be received any more. These parents thought that eight-year basic education was too long and learning how to read and write was enough.

The third problem for the monotonicity is the closing of religious and vocational lower secondary schools and changing the apprenticeship age from 12 to 15. Many families in the rural areas dared to send their girls to Imam Hatip Schools because of the pious atmosphere (Ozdalga, 1999). It is possible that these families could not send their daughters to schools after fifth grade with this new policy. The student apprenticeship scheme that trains students for low-paid work provided numerous job opportunities for poor students (Dulger, 2004). According to the MONE-Baskent University research project, some poor families sent their boys to work after the fifth grade because these parents thought that eight-year primary education was too long. Even though eight-year primary education is compulsory, sanctions were not imposed (Dulger, 2004).

Gunes (2015) also applies the instrumental variable method to investigate the causality between maternal education and child health, exploiting the 1997 Turkey's compulsory schooling law. Even though Gunes' first-stage of two-stage least square is similar to my strategy, there are serious data problems in her study. Gunes claims that the Turkish Statistics Institute provided the number of classrooms' data at the province level. However, TURKSTAT officially rejects that it has any such data. Moreover, Gunes argues "More than 58,000 classrooms were constructed within the first year of the change in the law (between the 1997/1998 and the 1996/1997 Academic Year)". In reality, the law passed on August 16, 1997 (Law: 4306), a month before the beginning of the 1997-1998 school year. The jump in the number of classrooms and in the investment of the Ministry of National Education were seen after the 1998-1999 school year, as I explain below (Figure 3.4 and Figure 3.5).

3.3. The School Construction Program

3.3.1. Compulsory Schooling Laws in Turkey

From the beginning, the Turkish Republic mandated five-year primary education as compulsory. In 1973, Turkey extended the compulsory education to eight years ("Milli Egitim Temel Kanunu" 1973), but the law required that the compulsory schooling consists of two different parts: primary school (five

years) and lower secondary school (three years). Students received diplomas at the end of each level. The law also stated that schools for two compulsory schooling levels could be constructed independently or together depending on the facility conditions.

However, the compulsory three-year lower secondary schools were not enforced fully by the governments due to the lack of physical infrastructure before 1997 (MONE-Baskent University, 2002; Dulger, 2004). On the other hand, the period of 24 years between 1973 and 1997 can be thought as a transitional period including a variety of programs for the preparation of the eight-year compulsory education in the community (MONE-Baskent University, 2002).

In 1996, the Welfare Party won the election and emerged as a principal partner in the coalition government. However, this party was seen as an Islamist party by the military and other key state institutions in Turkey (Onis, 1999). After one year, an indirect military intervention forced the collapse of the coalition government (Onis, 1999). The Turkish parliament soon passed a new compulsory schooling law (4306) requiring eight years of uninterrupted secular education. This was one of the main recommendations of the National Security Council, which was dominated by the military. This council announced 18 recommendations designed to stop the perceived growth of Islamism in Turkey on February 28, 1997 (Gunay, 2001).

The compulsory schooling law of 1997 is different from traditional compulsory schooling laws as it did not increase the legal dropout age, which remained 15, or extend the compulsory schooling duration. Instead, it introduced a continuous uninterrupted eight-year education in a single building. In addition, this new law abolished primary schooling and lower secondary schooling diplomas and instead introduced eight-year primary education diploma.

This legislation was widely perceived as targeting the Imam Hatip three-year lower secondary religious schools, which were subsequently closed in line with this requirement because some claimed that these schools, although state sponsored, were dominated and used effectively as indoctrination centers by Islamists and seen as a potential threat to the secular establishment (Gunay 2001; Pak 2004). Therefore, although the experts warned that there would not be enough available facilities for an uninterrupted eight-year education implementing in a single building, the government applied a "big bang" approach to introducing the reform and wanted to implement it as widely and rapidly as possible, rather than a step-by-step approach, which ran the risk of creating the political targets (Dulger, 2004). Thus, the government initiated a new school construction campaign relying on the temporary earmarked taxes (Law: 4306).

The closing down of three-year lower secondary religious schools triggered a big debate in Turkey. The government thus closed down all vocational three-year lower secondary schools by showing that it did not target only religious Imam Hatip lower secondary schools.

Fifteen years after introducing eight years of compulsory education, Turkey increased its compulsory education to twelve years in 2012. It also changed the structure of compulsory schooling from an uninterrupted eight-year basic education plus four years of high schools to three 4-year length components: primary school, lower secondary school, and high school. With this new structure, 4-year lower secondary religious Imam Hatip Schools were re-introduced into the education system. It will be beneficial then to consider briefly what the upcoming results can be expected in the light of this study.

3.3.2. The School Construction Program

Implementing an uninterrupted eight-year compulsory education in the same building would require a major expansion of school infrastructure. There were a couple of reasons for this expansion requirement. First, there were

approximately 1.5 million out-of-school lower-secondary school children that needed to be schooled (MONE, 1996). Second, the implementation of the law led to unutilized school facilities due to the closure of the five-year primary schools in small villages and the closure of the lower secondary schools within high schools. For instance, by the 2002-2003 school year, over 15,000 primary schools were closed down in small villages (MONE, 1996, 2003). This expansion requirement led to a government strategy that focused on building new schools.

A temporary set of earmarked taxes was used to finance the school construction program. These new taxes raised $2 billion in new revenues to support the construction program (Dulger, 2004). With the encouragement of the government, the private sector also provided substantial donations. Annual expenditures for the program were estimated at over $3 billion for the first four years (Dulger, 2004).

Through a combination of government resources and private contributions, the government increased the number of classrooms by 67,014 between the 1998-1999 and the 2002-2003 school years (an average of 6.2 classrooms per 1,000 children aged 6 to 13). This corresponds to approximately a 31 percent increase in the number of classrooms from 1998 to 2002. Approximately 70 percent of this increase was occurred in urban areas due to the closure of primary schools in small villages (MONE, 1999, 2000, 2001, 2002, 2003).

It is expected that the program mainly targeted children who had not been schooled. The allocation rule for the construction program among the provinces was on the basis of schooling age children and non-enrollment (Dulger, 2004). Table 3.1 indicates a regression of the logarithm of the net increase in the number of classrooms in each province on the logarithm of the number of children and the logarithm of the non-enrollment rate. The rule implies that both coefficients would be close to 1 (Duflo, 2001).

Table 3.1 shows that the coefficient of the number of children is very close to 1. However, the coefficient of the non-enrollment rate is not significant and also not the expected sign. I also ran the regressions for the urban (predominantly urban and intermediate provinces) and rural (predominantly rural) provinces separately based on the OECD definition: the coefficient of the non-enrollment rate is positive but not significant for urban provinces, while it is negative for rural provinces. The reason could be that over 15,000 rural schools were closed down after the 1997 law, making the correlation negative after controlling for the number of children.

Table 3.1 The Allocation of Classrooms to the Provinces

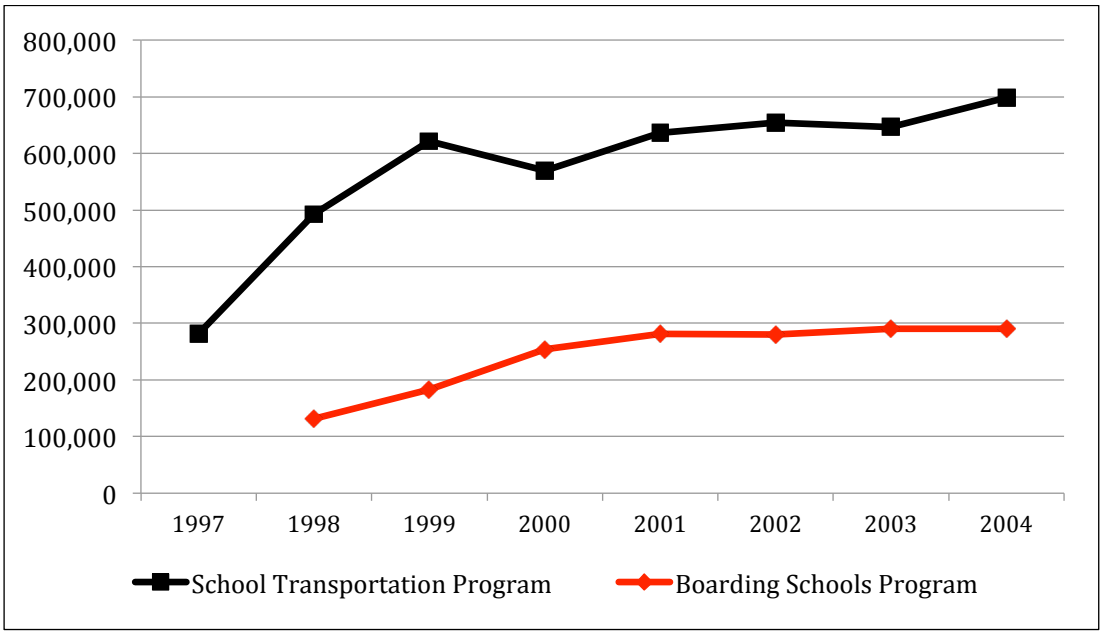
	Dependent Variable: Log (Number of Classrooms)
Log (Number of Children Aged Years 6-13 in the Province)	0.86 (0.07)
Log (Non-Enrollment Rate in the Primary Education in 1997)	-0.09 (0.06)
Number of Observations	77
R-Square	0.70

Notes: The dependent variable is the log of the net increase in the number of classrooms in each province between 1998 and 2002. The non-enrollment rate=1-enrollment rate in primary education. The enrollment rate is the number of children enrolled in primary school in 1997 divided by number of children aged 6-13 in the provinces in 2000. If the enrollment rate is 1 or over, log (non-enrollment rate) is chosen 0 due to the definition of the logarithm function. Robust standard errors are in parentheses.

In addition to the school construction program, two other programs were implemented to improve access for children in rural areas. These were the school transportation program and the establishment of boarding schools. With the transportation program, students in small villages where primary schools had been closed were transferred daily from their homes to the primary education schools in nearby villages. If the distances were too great, children

were boarded at free regional Boarding Primary Education Schools (YIBO). These schools boarded only their own students. In addition to this opportunity, children could also be accommodated in Primary Education Schools with Pension Housing (PIO), which boarded students attending different students and were available in relatively larger towns (Dulger, 2004).

Figure 3.1 presents the statistics of these two programs. The number of students transported increased sharply after the law introduced in 1997. It almost doubled in between 1997 and 2002 and increased from 281,833 to 654,093. The number of students enrolled within Boarding Schools Program also doubled in this period and it increased from 131,458 to 279,791 between 1998 and 2002. After 2002, the level of students benefited from the two programs remained almost the same.



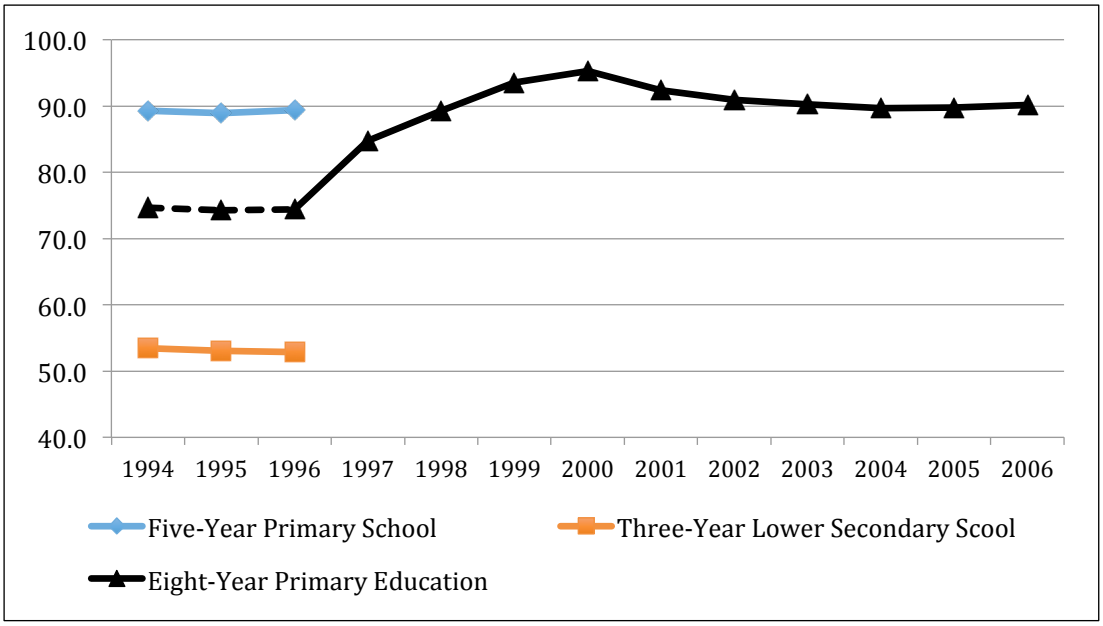
Source: The number of students transported in 1997 is obtained from MONE-Ankara University (2002); all other data are based on National Education Statistics books (MONE 1998, 1999, 2000, 2002, 2003, 2004, 2005)

Figure 3.1 The Number of Students Transported within School Transportation Program and The Number of Students Enrolled in Boarding Schools Program

3.3.3. School Enrollment Rates in Turkey

The Ministry of Education has provided net enrollment rates since 1994. Figure 3.2 represents these rates for compulsory schooling between 1994 and 2006. Before the 1997 law, the rate was separate for five-year primary and three-year lower secondary schools. After the law, the data has been provided for eight-year primary education. I also computed an approximate net schooling rate for primary education for 1994, 1995, and 1996 based on the net enrollment rate and the number of students enrolled in these years.

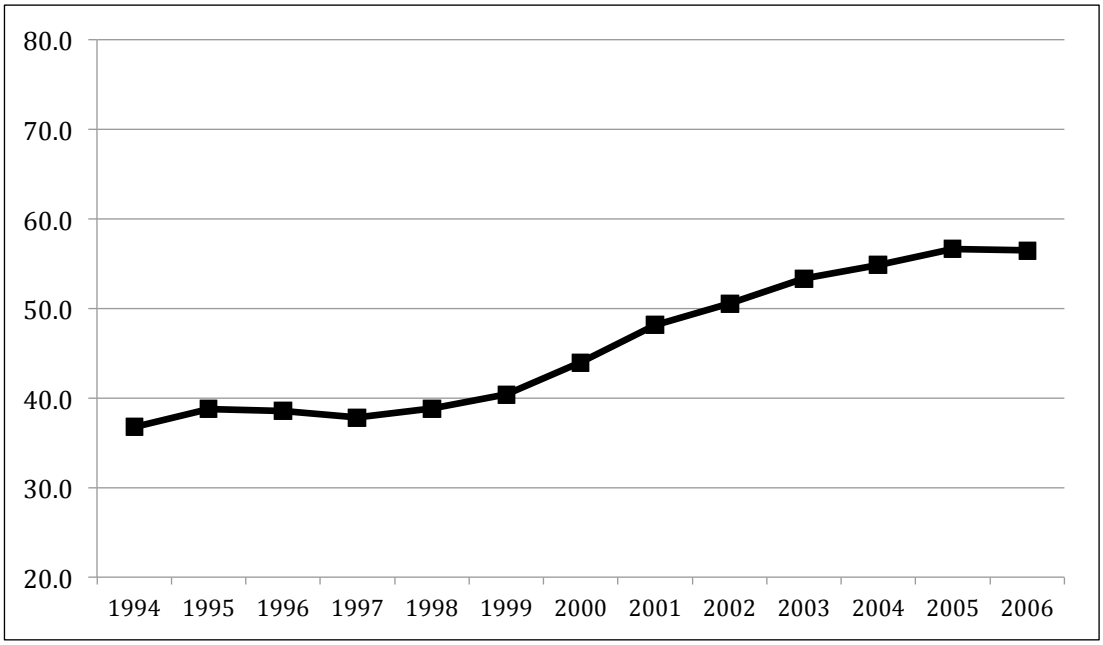
Figure 3.2 clearly indicates that the law and implementing educational programs increased the net enrollment rate from approximately 75 percent in 1996 to 91 percent in 2002, an increase of 1.3 million students rise in primary education (MONE, 2007). The Figure also shows that net enrollment increased to 95 percent in 2000, but fell to 91 by 2002. Investment from the Ministry of National Education in Total Public Capital Investments from 1995 to 2004 follows a similar trend (see Figure 3.5). That may show that net enrollments increase with more resources devoted to education. In addition, Figure 3.2 shows that both five-year primary schools' and three-year lower secondary schools' enrollment rates had not changed in the three years prior to 1997. Therefore, the law and implementing educational programs are the main drivers behind the enrollment increase after 1997.



Source: Authors' calculations based on National Education Statistics — Formal Education 2006-2007

Figure 3.2 Net Enrollment Rate in Compulsory Schooling (1994-2006)

Figure 3.3 plots the high school net enrollment rate. The law was applied in August 1997, it is thus expected that the spillover effect would be seen with the 1998-1999 school year. Indeed, the high school net enrollment rate started to increase in 1998 and rose to 57 percent in 2006 from 38 percent in 1997. Similarly to compulsory schooling rates, high school net enrollment rates had not changed in the four years prior to 1998.



Source: Based on National Education Statistics — Formal Education 2006-2007

Figure 3.3 Net Enrollment Rate in High School (1994-2006)

3.4. Data and the Identification Strategy

3.4.1. Data

The study relies on a unique dataset generated by combining the 2011 Population and Housing Census (PHC) and provincial educational data from the National Education Statistics books published by MONE. The census dataset includes a large set of standard individual characteristics including province of birth, province of residence, year of birth, educational attainment, labor force condition, and other variables.

According to Turkish Statistical Institute (TURKSTAT, 2013), the 2011 census survey was based on Address Based Population Registration System (ABPRS) and National Address Database registers and involved face-to-face interviews, with netbooks and paper-based questionnaires for data collection. Some 195,192 enumeration areas consisting of 100 dwellings were defined. Subsequently 22,861 sample enumeration areas (11.7 percent) were selected and 2.2 million households were interviewed. In all, about 9 million people were interviewed, with October 2, 2011, accepted as the reference day.

In this study, I focus on individuals born between 1971 and 1993. This identification ensures that individuals in the sample completed high school. Table 3.2, panel A presents summary statistics for this sample. There are 2,872,593 individuals in the sample. I match the individual census data with the provincial level data using information on province of birth. In 1998, Turkey had 80 provinces. The net increase in the number of classrooms in each province between 1998-2002 and other provincial data are provided from the National Education Statistics Data books published by MONE. However, the number of primary education schools' classrooms is not available in the 1998 MONE book, so the total number of classrooms for this year is provided from the Ministry of Education. For the population of children by age groups, the 1990 or 2000 census can be used. I choose the closest census to 1997, which is the 2000. Enrollment rates are computed by the number of children enrolled in the school year 1997-1998 to the 2000 census' children aged 6-13, which is primary school age in Turkey. Table 3.2, panel B presents provincial level summary statistics.

3.4.2. Identification Strategy

For the 1997-1998 school year, Turkey began to implement a nationwide compulsory schooling law that introduced an eight-year uninterrupted primary education. This law passed very quickly and rather unexpectedly. The timing of the policy was driven by political choices and was thus independent of potential returns to educational attainment. Implementing an uninterrupted eight-year compulsory education in a single building created a major deficiency in the number of school classrooms after 1997. Thus, the government started a big school construction campaign by financing a temporary additional tax law and also encouraging private donations. I am exploiting this exogenous political development to study the spillover effects of the primary school construction program by focusing on high school attainment.

Table 3.2 Summary Statistics

Variable	Mean
Panel A: Individual (Born Between 1971 and 1993) Level Means in 2011 (N=2,872,593)	
Primary Education Attainment Rate	0.75
High School Attainment Rate	0.48
Labor Force Participation Rate	0.58
Panel B: Provincial Level Means (N=80)	
Net Increase in the Number of Classrooms in Primary Education Between 1998-2002	67,014
Net Increase in the Number of Classrooms in Primary Education Between 1998-2002 for 1000 Children (Aged 6-13)	6.2
Net Increase in the Number of Students Boarded at Primary Education Between 1998-2002	148,333
Net Increase in the Number of Transferred Students in Primary Education Between 1999-2002	32,107
Number of Student per Teacher in the 1998-1999 School Year	28.6
Number of Student per Teacher in the 2002-2003 School Year	25.4
Enrollment Rate in Primary Education in the 1997-1998 School Year	82.8
Male Enrollment Rate in Primary Education in the 1997-1998 School Year	88.8
Female Enrollment Rate in Primary Education in the 1997-1998 School Year	76.2

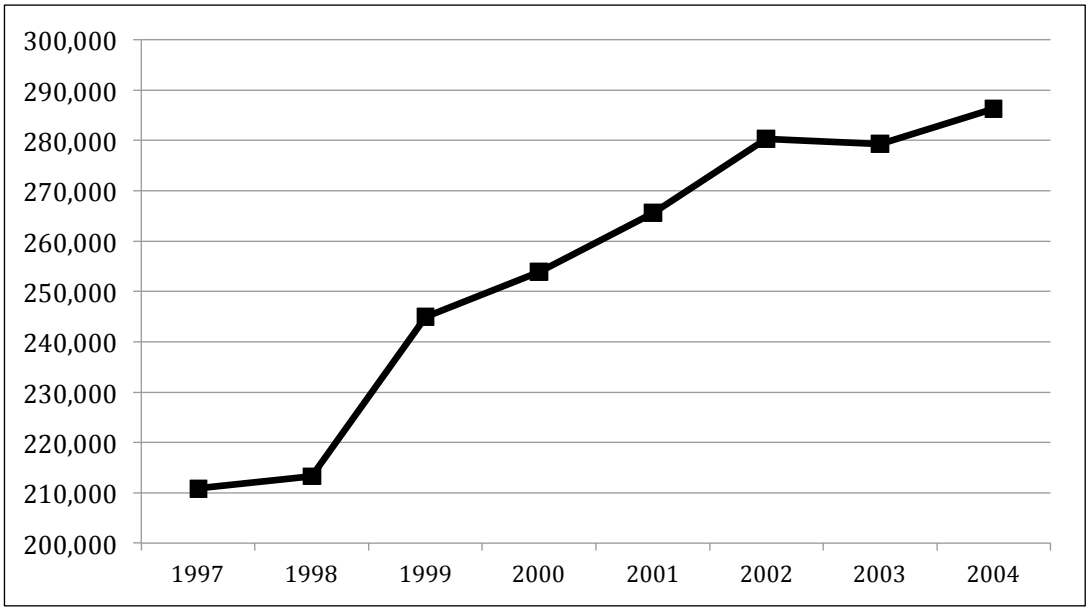
Source: Authors' calculations based on the 2011 Population and Housing Census (TURKSTAT) and National Education Statistics books (MONE 1999, 2000, 2001, 2002, 2003)

The school construction campaign started in August 1997 with the law's passage in parliament. I would expect that at least one year later, I would see an

exogenous increase in the number of classrooms in primary schools. This is confirmed in Figure 3.4, which represents Turkey's total number of primary education classrooms from the 1997-1998 school year through the 2004-2005 year, from MONE statistics books. In the first year of the law, the net increase in the number of classrooms was about 2,338 — a 1 percent increase from 1997. The next year saw 31,715 new classrooms — a 15 percent increase. As the figure shows, the increase levels off after 2002.

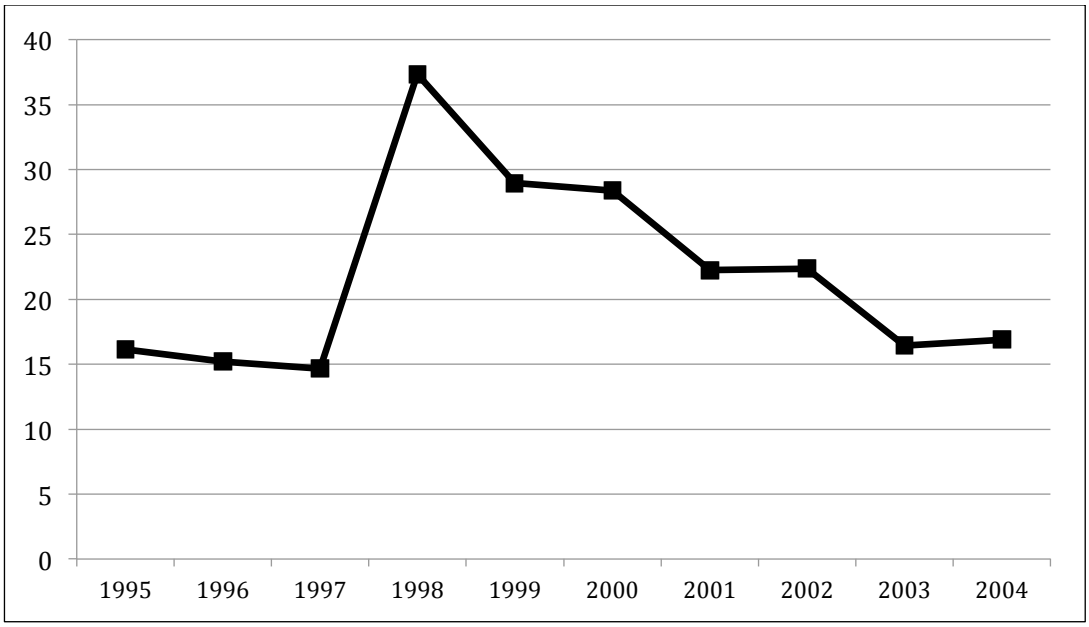
This exogenous increase can also be observed from Figure 3.5, which shows the share of the investment of the Ministry of Education in total public capital investments. In 1998, the share of investment of the Ministry jumps 23 percentage points. This increase comes back to its previous position in 2003. Dulger (2004) claims that in the first four years of the program, the government spent about $2 billion more than its planned expenditure to accelerate its construction campaign. Therefore, I take the 1998-2002 period as the exogenous increase in the primary school construction program.

The year of birth and the province of birth jointly determine an individual's exposure to the school construction program. Variation in program exposure across children occurs both because provinces differ in the timing of the program and because children within provinces differ in their dates of birth (Rosenzweig and Wolpin, 1986; Duflo, 2001). This identification strategy exploits variation in educational investment across provinces and cohorts that benefited from the program.



Source: Based on National Education Statistics books (MONE, 1998, 1999, 2000, 2002, 2003, 2004, 2005)

Figure 3.4 The Total Number of Classrooms in Turkish Primary Education (1997-2004)



Source: Based on Dulger, 2004.

Figure 3.5 Share of the Investment of the Ministry of National Education in Total Public Capital Investments (1995-2004)

The 1988-born cohort is the first cohort definitely affected by the investment program. The 1997 law abolished the five-year primary school diploma and replaced it with an eighth-grade diploma for incentive. Therefore, the 1988-born cohort was forced to remain in school after 5th grade because only 0.1 percent of this age cohort has only a five-year primary school diploma (see Table 3.3). The 1987 and 1986 cohorts were similarly affected.

Table 3.3 Number and Percentage of the Population Who Have Primary School Diploma (Five-Year) and Born Between 1980 and 1989

Year	Observations	Primary School Diploma (5-Year)	Percent
1980	141,602	39,149	27.6
1981	147,557	40,065	27.2
1982	132,881	33,942	25.5
1983	127,519	31,886	25.0
1984	127,857	30,058	23.5
1985	126,181	25,957	20.6
1986	125,842	18,042	14.3
1987	123,586	8,365	6.8
1988	121,894	67	0.1
1989	119,178	0	0.0

Source: Authors' calculations based on the 2011 Population and Housing Census. The percent is the ratio of the number of observations who have primary school diploma to the total number of observations in the same born cohort.

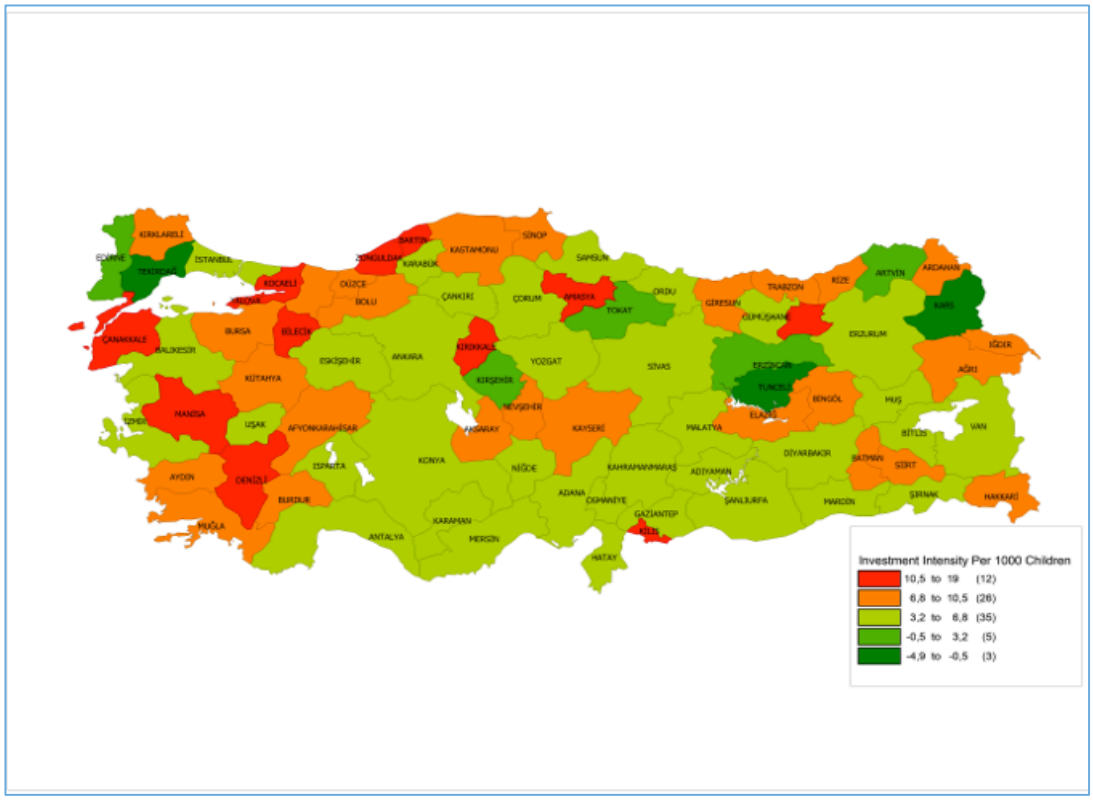
On the other hand, the 1982-born cohort did not benefit from the program. They were 14-15 years old in June 1997 and had moved on from the eight-year primary education. This can also be confirmed from students enrollment in the 1998-1999 school year in primary education. Table 3.4 indicates that the percent of students enrolled in this year and born in 1982 or before was only 0.4 percent. Accordingly, cohorts born in 1982 and before did not benefit from the program, the cohorts born from 1983-1987 were partially affected, and those born in 1988 and after were completely affected.

Table 3.4 Born Cohorts and the Number and Percentage of the Students Who Enrolled in the 1998-1999 School Year in Primary Education (Eight-Year)

Year	Number of Students	Percent
1993 and after	71,362	0.8
1992	1,126,852	11.8
1991	1,224,931	12.9
1990	1,235,245	13.0
1989	1,228,213	12.9
1988	1,230,472	12.9
1987	1,190,560	12.5
1986	989,392	10.4
1985	808,324	8.5
1984	277,175	2.9
1983	92,300	1.0
1982 and before	37,218	0.4

Source: Authors' calculations based on National Education Statistics 1999. The percent is the ratio of the number of enrolled students in a born cohort to the total number of enrolled students in the 1998-1999 school year.

The intensity of the program is defined as the net increase in the number of classrooms in primary education between 1998-2002 for 1,000 children aged 6-13, and it substantially varies across provinces (see Figure 3.6). This is the second source of variation for educational attainments among individuals. The provinces with red and orange color saw the highest increase in the number of classrooms, whereas provinces with dark green saw the lowest increase.



Source: Authors' calculations based on National Education Statistics books (MONE 1999, 2000, 2001, 2002, 2003)

Figure 3.6 Net Increase in the Number of Classrooms in Primary Education Between 1998-2002 for 1,000 Children (Aged 6-13)

3.5. Effect on High School Completion

3.5.1. Basic Results

One of the objectives of this study analyzes the impact of the school construction program on high school attainment. The variation in treatment intensity across provinces and born cohorts is exploited. I compare the difference between high school attainment of a young cohort exposed to the program (1988-1993 born cohorts) and that of an older cohort not exposed to the program (1977-1982 born cohorts). If additional classrooms led to an increase in educational attainment, the difference between two cohorts will be positively related to the additional number of classrooms in each province. Following Duflo (2001), I run the following regression:

$$S_{ijc} = \alpha + \delta_j + \gamma_c + \beta(p_j \cdot d_{ic}) + (X_j \cdot d_{ic})\Pi + \varepsilon_{ijc} \quad (1)$$

- S_{ijc} is a dichotomous variable indicating whether the individual i born in province j in year c has at least completed high school
- δ_j is a province of birth dummy variable
- γ_c is a cohort dummy variable
- p_j denotes the intensity of the construction program in province j
- d_{ic} is a dichotomous variable that 1 indicates the year c to be between 1988-1993 and 0 indicates the year c to be between 1977-1982
- X_j is a vector of province-specific variables
- ε_{ijc} is an idiosyncratic error term

The province of birth dummy variables control for cohort invariant province-specific unmeasured variables. The cohort dummy variables control for nationwide changes specific to cohorts and the country-level trends in schooling. It is also important to control for the number of children who are at the primary education age group and the pre-program enrollment rate since these are the determinant variables of the program.

The first-order effect of a higher enrollment rate in 1997 is a difference in level of education, which should affect all cohorts identically, and thus be captured by the province of birth fixed effect. However, changes in enrollment rates within in a province can be correlated with levels, thus controlling for the enrollment rate in 1997 interacted with year dummies is important only in this context (Duflo, 2004). In all specifications, I choose the linear probability model due to easy interpretation and the presence of a huge data set.

The cross correlation among the error terms of all individuals in a given province experiencing the same shocks may bias the standard errors downward (Moulton, 1986, 1990; Bertrand, Duflo, and Mullainathan, 2004). Thus, in all specifications of this study, all standard errors are clustered by the individual's province of birth. I also alternatively apply two-way clustering on the

individual's province of birth and year of birth using cgmreg command in Stata, but I do not cluster the standard errors on the province-year pairs. As Cameron and Miller (2015) point out that clustering should not be on province-year pairs because, for example, the errors for individuals born in Istanbul in 1990 are likely to be correlated with the errors for individuals born in Istanbul in 1991. In the two-way clustering method, three different cluster-robust variance matrices are obtained for the estimator: two one-way clustering and the intersection of the first and second. The two one-variance matrices are added and subtracted from the intersection for double counting (Cameron and Miller, 2015).

Table 3.5 displays the estimates obtained from equation (1) for the whole sample as well as for men and women separately. All control variables also changed with respect to gender identity. In panel A, I compare individuals born in 1988-1993 with individuals born in 1977-1982. Column (1) has the estimates of the effects of the construction program controlling for the interactions between the year of birth dummies with two control variables: the number of children and the pre-enrollment rate in the province of birth. This specification shows that in the whole sample, the addition of one extra classroom for 1,000 children increased the high school attainment rate by 0.37 percentage points for individuals exposed to the construction program. Since the total addition is 6.2 classrooms per 1,000 children during 1998-2002, the total effect of the program was a 2.3 (=6.2*0.37) percentage points increase in the high school attainment. The program had statistically similar effects on men (column 5) and women (column 9).

The regression estimates are based on two assumptions. First, the evolution of completing high school across birth cohorts would not have varied systematically across provinces in the absence of the construction program (Besley and Case, 2000; Duflo, 2001). Crucially, the program is an exogenous shock to the education system and independent of potential returns to educational attainments. This assumption is tested in Panel B of Table 3.5 in

which I compare individuals born in 1977-1982 with individuals born in 1971-1977. If, before the construction program was started, high school attainment increased faster in provinces that obtained more classrooms by the construction program of 1997, panel B would show positive significant coefficients. However, the effect of the increase of one extra classroom for 1,000 children is very small and never significant. These coefficients in panel B are statistically different from those coefficients in panel A. This identification assumption is more explored in the next sub-section. All these results provide some suggestive evidence of the strategy that I follow in this analysis is reasonable in estimating the causal effect of the construction program.

The second assumption of the regression estimations requires that there are no omitted time varying and province-specific effects correlated with the construction program. This assumption can be violated without controlling for the allocation rules of the construction of the primary schools to each province. In that case, the estimate can potentially confound the effect of the program with mean reversion that has occurred even in its absence (Besley and Case, 2000; Duflo, 2001). Thus, in all specifications, I include the interactions between the year of birth dummies with two control variables of the determinant of the construction program: the number of children and the pre-enrollment rate in the province of birth.

This identification assumption is also violated if other governmental programs in relation to the compulsory schooling law of 1997 correlated with the construction of the primary schools to each province, such as programs for boarding schools and school transportation. For these programs, I interact the year of birth dummies with the net increase in the number of students who benefited from these programs for 1,000 children between 1998 and 2002. Due to separate data availability for men and women, I take the period for school transportation program as 1999-2002. Controlling for these programs (columns 2 and 3; 6 and 7; 10 and 11) does not significantly change the estimates. The

two-way clustering method increases the standard errors, but the coefficients are still significant (column 4, 8, and 12).

In this analysis, I match the individual census data with the provincial level data using information on birth province. Unlike the province of education, the province of birth is not endogenous with respect to the construction program because all individuals in my sample were born before the construction program started. The sample data does not have the province of education, however, I run the regressions for individuals whose province of birth and province of residence are the same, and I get significantly similar results. That shows that the estimates are robust to the interprovincial migration due to the construction program.

Table 3.5 Effect of the Program on High School Attainment

	Obs. (Total)	Dependent Variable: High School Completion											
		Total				Men				Women			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Treatment Experiment (Individuals Born in 1988-1993 versus in 1977-1982)	1,499,701	0.0037 (0.0017) **	0.0037 (0.0016) **	0.0037 (0.0016) **	0.0037 (0.0018) **	0.0037 (0.0018) **	0.0034 (0.0019) *	0.0038 (0.0017) **	0.0038 (0.0020) *	0.0040 (0.0018) **	0.0040 (0.0018) **	0.0037 (0.0017) **	0.0037 (0.0020) *
Panel B: Control Experiment (Individuals Born in 1977-1982 versus in 1971-1977)	1,520,010	0.0008 (.00010)	0.0011 (0.0010)	0.0011 (0.0009)	0.0011 (0.0011)	0.0012 (.00010)	0.0014 (0.0010)	0.0014 (0.0010)	0.0014 (0.0011)	0.0004 (.00011)	0.0006 (0.0011)	0.0007 (0.0011)	0.0007 (0.0012)
Control Variables:													
Year of Birth*Boarding Schools Program		No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year of Birth*School Transportation Program		No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Standard Error:													
Cluster-Robust Standard Errors		√	√	√		√	√	√		√	√	√	
Two-way Cluster-Robust Standard Errors					√				√				√

Notes: All specifications include province of birth and year of birth dummies, the interactions between the year of birth dummies with two control variables of the determinant of the construction program: the number of children and the pre-enrollment rate in the province of birth. Clustered robust standard errors are in parentheses. In (1), (2), (3), (5), (6), (7), (9), (10), (11), the standard errors are clustering on the individual's province of birth. In (4), (8), (12), the standard errors are clustering on the individual's province of birth and year of birth. * $p < 0.10$. ** $p < 0.05$.

3.5.2. Reduced-Form Evidence

The identification assumption can also be tested with a generalized interaction terms analysis as follows (Duflo, 2001):

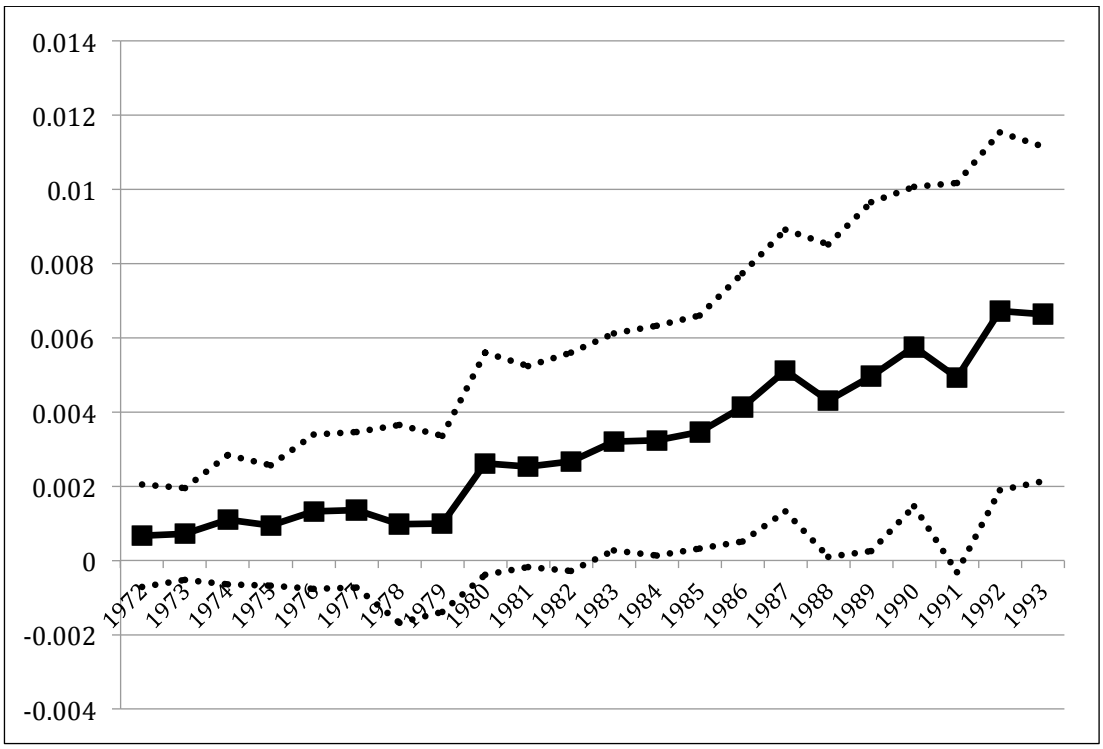
$$S_{ijc} = \alpha + \delta_j + \gamma_c + \sum_{c=1972}^{1993} \beta_c (p_j \cdot d_{ic}) + \sum_{c=1972}^{1993} (X_j \cdot d_{ic}) \Pi_c + \varepsilon_{ijc} \quad (2)$$

- S_{ijc} is a dichotomous variable indicating whether the individual i born in province j in year c has at least completed high school
- δ_j is a province of birth dummy variable
- γ_c is a cohort dummy variable
- p_j denotes the intensity of the investment in province j
- d_{ic} is a dummy that indicates whether individual i was born in year c
- X_j is a vector of province-specific variables
- ε_{ijc} is an idiosyncratic error term

In an estimation of equation (2), individuals born in 1971 serve as the control group. Each coefficient of the interaction variable between the cohort dummy and program intensity (β_c) can be interpreted as an estimate of the effect of the program (the increase of one extra classroom for 1,000 children) on the given cohort. These estimations provide a robustness check for the identification assumption. I claim that the cohorts born in 1982 and before did not benefit from the program, the cohorts born from 1983-1997 were partly affected, and the cohorts born in 1988 and after were definitely affected by the construction program. Thus I would expect the exposure of the program is increasing with cohorts of children born after 1982.

Figure 3.7 draws β_c coefficients with a 95-percent confidence interval by broken lines. The coefficients for the cohorts born before 1982 fluctuate around 0. However, after 1982, the effects of the program start to increase and all coefficients are significantly different from 0 except the 1991-born cohort. This systematic increase in the figure indicates that the increase in high school

attainment is most likely due to the program. Thus, my identification strategy seems reasonable.



Notes: All specifications include province of birth and year of birth dummies, and interactions between the year of birth dummies and all control variables that could have correlations with the construction program including the number of children in the province of birth, the pre-enrollment rate in the province of birth, the net increase in the number of students who benefited from boarding schools and school transportation program. Broken lines indicate the 95-percent confidence interval based on clustered (on provinces) robust standard errors.

Figure 3.7 Coefficients of the Interactions Cohort Dummies with the Intensity of the Construction Program in the Province of Birth for the High School Attainment

3.6. Effect on Labor Force Participation

Female labor force participation in Turkey is particular low. It was 29 percent in 2011, compared to 72 percent for males. Among sectors, agriculture has the highest female employment: 29 percent in my sample (individuals born between 1971 and 1993). The agricultural sector is dominated by small-scale family run establishments, and thus, the women employed in this sector are predominantly unpaid family workers (SPO and World Bank 2009; Uraz et al.

2010; Dayioglu and Kirdar 2010). Furthermore, these studies point out that female labor force participation is weakly associated with educational attainment in rural regions. Therefore, I exclude the agriculture sector in my sample to get more reliable results for the impact of the construction program on labor force participation.

I also regress the labor force participation (a dichotomous variable whether an individual participates the labor force) on the educational attainment controlling for province of birth and year of birth dummies to provide a picture for the associations between two variables. In these regressions, I omit individuals who have no lower secondary school diplomas and make them as reference groups. Table 3.6 shows that the relation between labor force participation and educational attainment is low for men, whereas, this relation is very high for women. Getting a high school diploma increases the associations between labor force participation and educational attainment by 15 percentage points.

Table 3.6 Associations between Labor Force Participation and Educational Attainment in Turkey

Educational Attainment	Dependent Variable: Labor Force Participation			
	Men		Women	
	Percent	Coefficient	Percent	Coefficient
No Lower Secondary School Degree	14.92	Reference	31.45	Reference
Lower Secondary (8-year)	28.49	0,068 (0,003)**	24.62	0,078 (0,003)**
High school or equivalent	36.46	-0,001 (0,004)	27.69	0,149 (0,002)**
Higher Education	20.14	0,051 (0,003)**	16.24	0,532 (0,010)**

Notes: The regression includes province of birth and year of birth dummies. Robust standard errors, clustered on 81 provinces, are in parentheses. * $p < 0.10$. ** $p < 0.05$.

3.6.1. Basic Results for Labor Force Participation

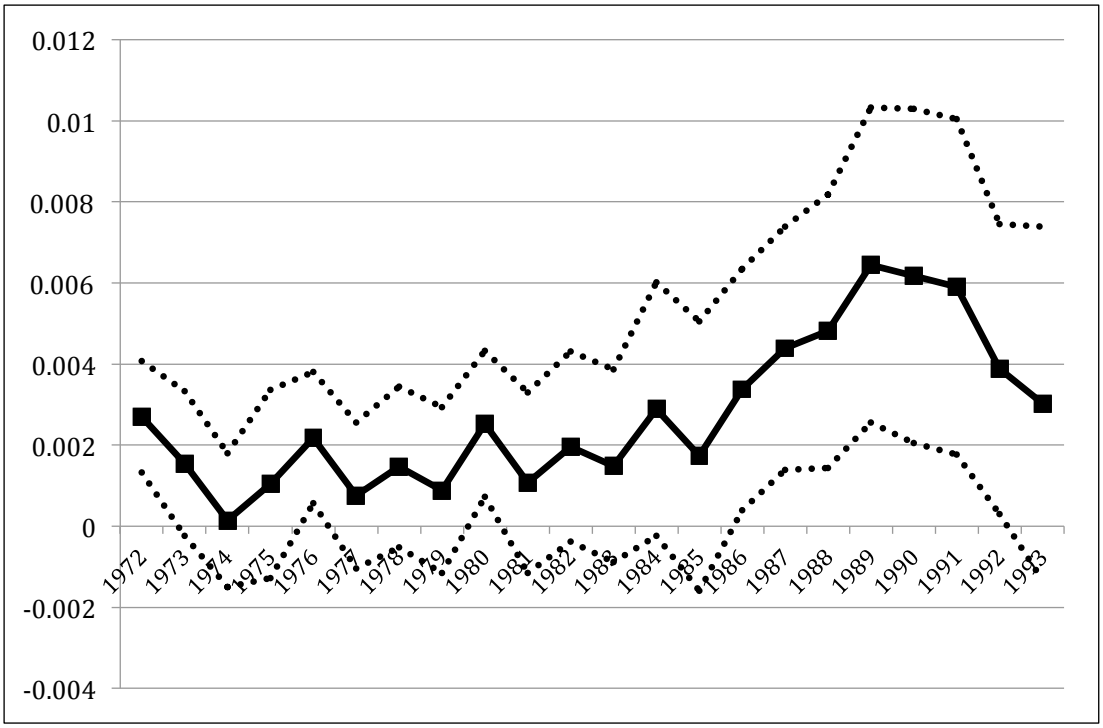
The impact of the program on the labor force participation excluding agriculture sector is found by replacing the dependent variable S_{ijc} in the equation (1) with W_{ijc} (is a dichotomous variable indicating whether the individual i born in province j in year c is in the labor force in 2011).

Table 3.7 presents estimates of the regressions. In panel A, I compare individuals born in 1988-1993 with individuals born in 1977-1982. These estimates show that the construction program affects only women. All total sample and men's coefficients are not significantly different from 0. The addition of one extra classroom for 1,000 children lead to a 0.35-0.42 percentage points rise in female labor force participation (excluding agriculture sector). Thus, the total addition of 6.2 classrooms in basic education per 1,000 children makes the total effect range from 2.2 (=6.2*0.35) to 2.6 (=6.2*0.42) percentage points increase in female labor force participation. I also check the results by running the regressions for individuals, whose province of birth and province of residence are the same, and I get significantly similar estimates.

In panel B, I present the control experiment by comparing individuals born in 1977-1982 with individuals born in 1971-1977. The interaction coefficients are small and not significantly different from zero in all specifications.

3.6.2. Reduced-Form Evidence for Labor Force Participation

The identification assumption can also be tested with a generalized interaction terms analysis for the labor force participation. I follow a similar strategy in 3.5.2 and plot the coefficients of the interactions cohort dummies with the program intensity in Figure 3.8. In this estimation, the dependent variable S_{ijt} in the equation (2) is replaced with W_{ijt} (is a dichotomous variable indicating whether the individual i born in province j in year c in the labor force in 2011).



Notes: All specifications include province of birth and year of birth dummies, and interactions between the year of birth dummies and all control variables that could have correlations with the construction program including the number of children in the province of birth, the pre-enrollment rate in the province of birth, the net increase in the number of students who benefited from boarding schools and school transportation program. Broken lines indicate the 95-percent confidence interval based on clustered (on provinces) robust standard errors.

Figure 3.8 Coefficients of the Interactions Cohort Dummies with the Intensity of the Construction Program in the Province of Birth for the Female Labor Force Participation (Excluding Agriculture Sector)

In this estimation, individuals born in 1971 serve as the control group. There is no systematic increase for the cohorts born before 1982 and these coefficients fluctuate around 0. However, after 1982, the effects of the program start to increase and all coefficients of the cohorts born from 1986-1992 are significantly different from 0. However, the effects of the program significantly decrease with the 1992-born cohort due to the fact that the 1992 and 1993-born cohorts recently completed their high schools or some individuals from these two cohorts would still be in college.

Table 3.7 Effect of the Program on Labor Force Participation (Excluding Agriculture Sector)

	Obs. (Total)	Dependent Variable: Labor Force Participation											
		Total				Men				Women			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Treatment Experiment (Individuals Born in 1988-1993 versus in 1977-1982)	1,389,469	0.0012 (0.0014)	0.0008 (0.0014)	0.0008 (0.0013)	0.0008 (0.0015)	-0.0010 (0.0018)	-0.0016 (0.0018)	-0.0017 (0.0018)	-0.0017 (0.0019)	0.0042 (0.0016) **	0.0039 (0.0017) **	0.0035 (0.0015) **	0.0035 (0.0017) **
Panel B: Control Experiment (Individuals Born in 1977-1982 versus in 1971-1977)	1,386,921	0.0004 (0.0004)	0.0005 (0.0005)	0.0005 (0.0004)	0.0005 (0.0006)	0.0002 (0.0002)	0.0003 (0.0002)	0.0003 (0.0002)	0.0003 (0.0003)	0.0002 (0.0005)	0.0002 (0.0006)	0.0003 (0.0006)	0.0003 (0.0008)
Control Variables:													
Year of Birth*Boarding Schools Program		No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year of Birth*School Transportation Program		No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Standard Error:													
Cluster-Robust Standard Errors		√	√	√		√	√	√		√	√	√	
Two-way Cluster-Robust Standard Errors					√				√				√

Notes: All specifications include province of birth and year of birth dummies, the interactions between the year of birth dummies with two control variables of the determinant of the construction program: the number of children and the pre-enrollment rate in the province of birth. Clustered robust standard errors are in parentheses. In (1), (2), (3), (5), (6), (7), (9), (10), (11), the standard errors are clustering on the individual's province of birth. In (4), (8), (12), the standard errors are clustering on the individual's province of birth and year of birth. * $p < 0.10$. ** $p < 0.05$.

3.7. Quality Bias

Estimates of the impacts of the program are biased if the construction program also affects the quality of education. With the program, approximately 70,000 new primary school teachers were recruited between 1998 and 2002. According to Dulger (2004), taking a "big bang" approach for applying the law, however, the government missed opportunities to make incremental changes that could have supported the program. After the law was passed, the five-year primary school and three-year lower-secondary general education curricula were joined. Cancelling all vocational and religion course electives made the curriculum a standard package for all students and there was no attention to upgrade the national curriculum (Dulger, 2004).

Previous studies (Card and Krueger 1992; Altonji and Dunn 1996) use teacher/student ratio, average length of school term, average annual teacher salary, and total expenditures per student as school quality measures. The teacher/student ratio and the average teacher salary account for the majority of variations in total expenditures per student (Card and Krueger, 1992). In the period from 1998 to 2002, the average length of school term and average annual teacher salary did not significantly change. Yet teacher/student ratio declined from 28.6 to 25.4 because of recruiting more teachers (Table 3.2). Reduction in this ratio could improve the quality of classroom instruction. I check the results by adding the net increase in the average student/teacher ratio between 1998 and 2002 as a control variable in the regressions. New estimations are presented in Table 3.8. It clearly indicates that the effects of the program do not significantly change with adding this control variable (Column 2 and 4). Therefore, there is no suggestive evidence that the construction program significantly changes the quality of education.

Table 3.8 Effect of the Program on High School Attainment and Labor Force Participation with Adding a Quality Variable

	High School Attainment Rate (Total sample)		Female Labor Force Participation Rate	
	(1)	(2)	(3)	(4)
Panel A: Treatment Experiment (Individuals Born in 1988-1993 versus in 1977-1982)	0.0037 (0.0016) **	0.0037 (0.0016) **	0.0035 (0.0015) **	0.0040 (0.0014) **
Panel B: Control Experiment (Individuals Born in 1977-1982 versus in 1971-1977)	0.0011 (0.0009)	0.0009 (0.0009)	0.0003 (0.0006)	0.0002 (0.0006)
Control Variables:				
Year of Birth*Boarding Schools Program	Yes	Yes	Yes	Yes
Year of Birth*School Transportation Program	Yes	Yes	Yes	Yes
Year of Birth*Net Increase in the Teacher/Student Ratio	No	Yes	No	Yes

Notes: All specifications include province of birth and year of birth dummies, the interactions between the year of birth dummies with two control variables of the determinant of the construction program: the number of children and the pre-enrollment rate in the province of birth. Robust standard errors, clustered on 81 provinces, are in parentheses. * $p < 0.10$. ** $p < 0.05$.

3.8. Conclusion

In developing countries, the level of basic education is still low and gender equality needs to be addressed. Therefore, improving education is often a priority. Turkey has increased education funding dramatically over the last twenty years. In this chapter, I evaluate the causal impact of a large-scale primary school construction program on high school attainment and labor force participation. This program launched in 1997 as part of the compulsory schooling law of 1997.

Through a combination of government resources and private contributions, the government increased the number of classrooms by 67,014 between the 1998-1999 and the 2002-2003 school years (an average of 6.2 classrooms per 1,000 children aged 6 to 13). This corresponds to approximately a 31 percent increase in the number of classrooms from 1998 to 2002. The program increased the high school attainment rate by 2.1-2.4 percentage points for men and by 2.3-2.5 percentage points for women. Furthermore, the program led to a 2.2-2.6 percentage points increase in female labor force participation, excluding agriculture. The program did not significantly affect male labor force participation. Therefore, the program has improved gender equality in the labor market.

Turkey has recently increased its compulsory education from eight to 12 years and also changed the structure of the compulsory schooling from an uninterrupted eight-year to three 4-year components: primary school, lower secondary school, and high school. It is likely that increasing compulsory schooling and constructing high schools programs will improve Turkey's average level of schooling dramatically in the future. Based on Duflo's (2001), Li and Liu's (2014) and my findings, I conclude that the new programs will have spillover effects on college attainment. Due to the high correlation between college attainment and female labor force participation in Turkey, these developments will further address gender inequality in the labor market. Evaluating programs of the new increase in compulsory schooling, the construction of high schools, and the re-introduction of 4-year lower secondary religious Imam Hatip Schools will be the objects of future works.

CHAPTER 4

CONCLUSION

Turkey experienced historically violent student protests between 1978 and 1980, with almost 20 youths killed daily. This violence ultimately led to a military intervention in 1980. The chaos of 1978-82 adversely affected post-secondary educational attainment in Turkey. In the first essay of the thesis, I exploit the exogenous drop in the number of graduates and new admissions to estimate the causal impact of education on earnings.

The first study relies on data from the 2005 Household Labor Force Surveys of Turkey. I find that the group most profoundly affected by the 1978-82 upheaval is male wage earners aged 40-45 in 2005, who were 15-20 years old in 1980. These events adversely affected the probability of completing post-secondary education, mean years of schooling, and wages for the affected group. I also find that the decline in education led to a shift in occupations from higher-paying to lower-paying jobs. That provides evidence that such upheaval has long lasting effects on income distributions in a society.

The 2SLS estimates of economic returns to education range between 11.6-12.8 percent in Turkey by combining the effects of the decline in post-secondary educational attainment and wages. This finding contributes to the literature arguing that the rate of return to schooling in developing countries need not to be higher than the estimates reported for developed countries.

Different instruments may define different “effects” of schooling on earnings in a heterogeneous-outcome framework (Heckman, Lochner, and Todd, 2006). In

this study, the estimates of the return to schooling for Turkey may be a close approximation of the average causal effect of an additional year of schooling in post-secondary education for some reasons. First, the instrument that I use in this study only affects post-secondary education. Second, those whose schooling attainment is changed by the instrument is high out of individuals having post-secondary education of male wage earners aged 40-45 in 2005. Third, those individuals affected from the 1978-82 upheaval were not marginal individuals who indifferent between going to university or not because the affected individuals were the dropouts in post-secondary education from security reasons or would have gone to universities if these events had never happened.

The volume of work devoted to the return to schooling controlling for unobserved ability is very few in Turkey and other developing countries. More empirical studies are needed to accurately understand the causal impact of education on earnings. Therefore, quasi-experimental designs based on different instruments that especially affect high school and beyond or structural dynamic programming techniques allow the uncovering of all marginal returns to schooling could drive future studies in Turkey and other developing countries.

In the second essay of thesis, I evaluate the causal effect of a large-scale primary school construction program on high school attainment and labor force participation. This program launched in 1997 as part of that year's compulsory schooling law. The program increased the high school attainment rate by 2.1-2.4 percentage points for men and by 2.3-2.5 percentage points for women. Furthermore, the program led to a 2.2-2.6 percentage points increase in female labor force participation, excluding agriculture. The program did not significantly affect male labor force participation. Thus, the program improved gender equality in the labor market.

In 2012, Turkey increased its compulsory education from eight to 12 years and changed the structure of compulsory schooling from an uninterrupted eight-

year stint to three 4-year components: primary school, lower secondary school, and high school. Increasing compulsory schooling and building new high schools is likely to improve Turkey's average level of schooling dramatically. Due to the high correlation between female labor force participation and high school and post-secondary attainment in Turkey, these developments will further address gender inequality in the labor market. Evaluating programs related to the increase in compulsory schooling, the construction of high schools, and the re-introduction of 4-year lower secondary religious Imam Hatip Schools will be the objects of future works.

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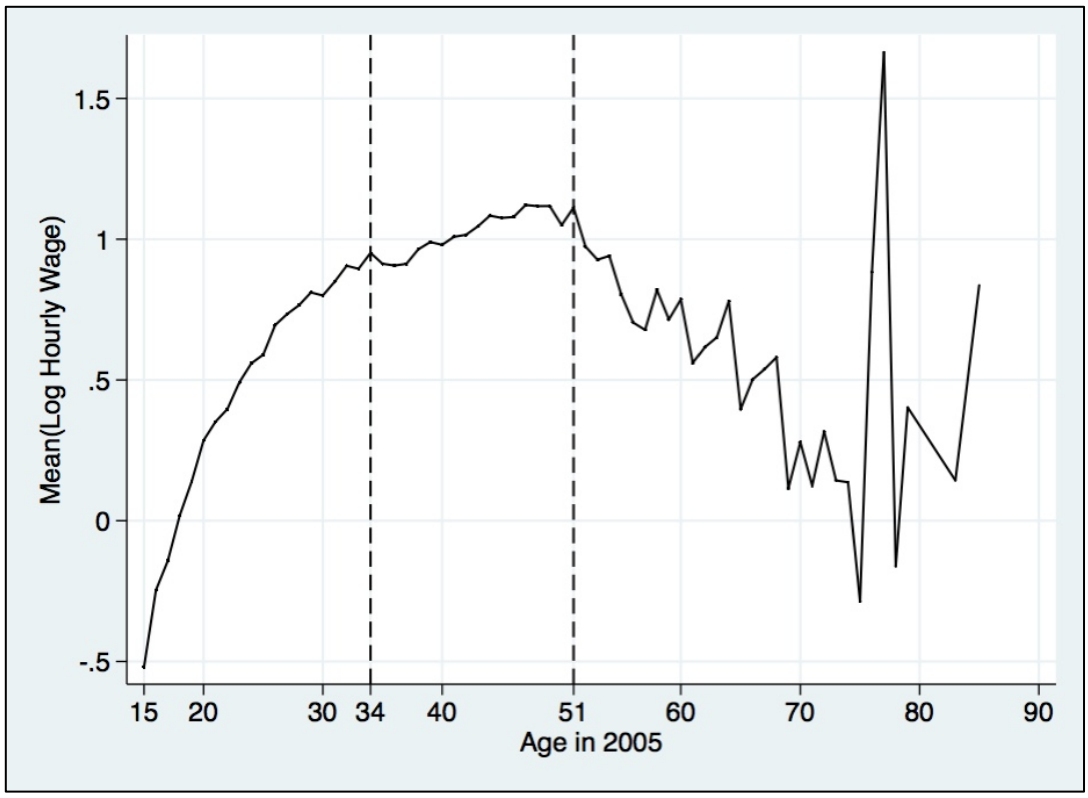
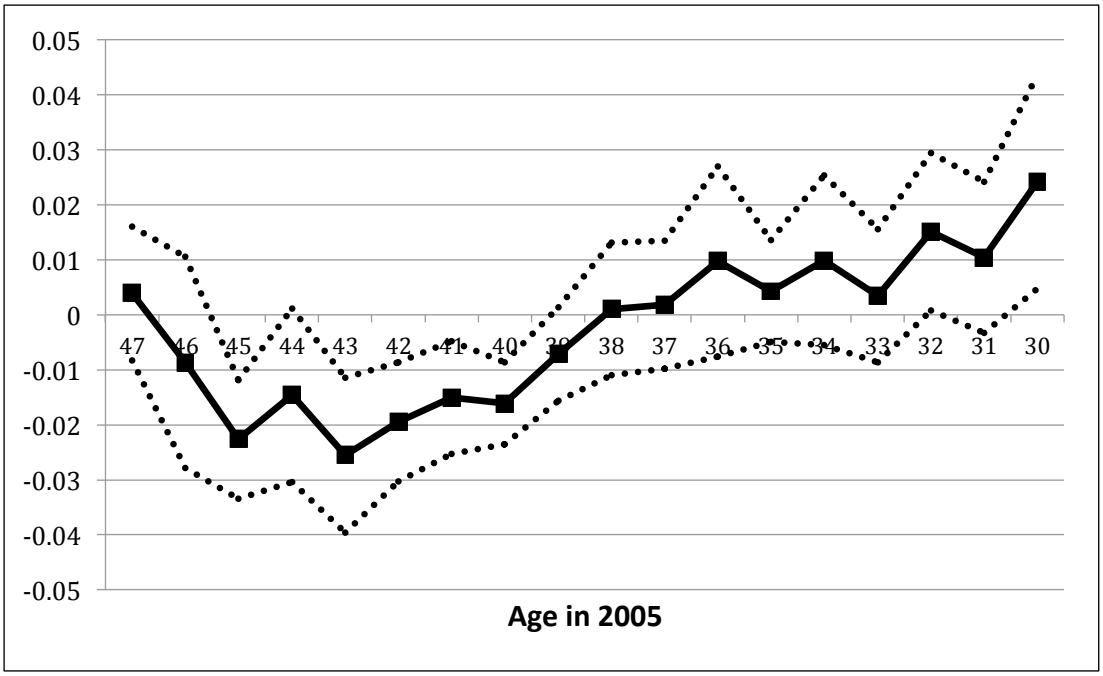
APPENDICES

APPENDIX A: TABLES AND FIGURES



Source: Authors' calculations based on the 2005 Turkish Household Labor Force Survey.

Figure A.1 Average Log Hourly Wage for Men by Age in 2005



Notes: The specification includes 26 NUTS2 region of residence, urban/rural and gender dummies. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

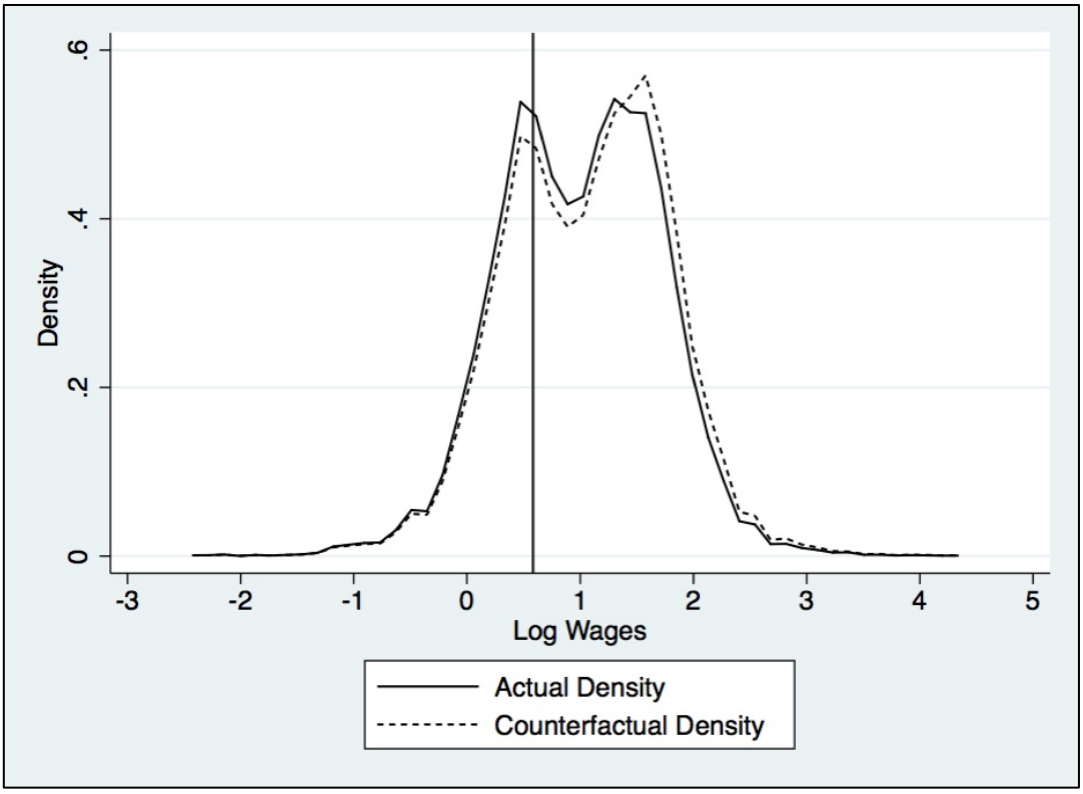
Figure A.2 Coefficients of Age Dummies in Estimating the Probability of Completing Post-secondary Education (Age 48 forms the control group)

Notes: The specification includes 26 NUTS2 region of residence and urban/rural dummies. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

Figure A.3 Coefficients of Age Dummies in Estimating the Probability of Completing Post-secondary Education for Men (Age 48 forms the control group)

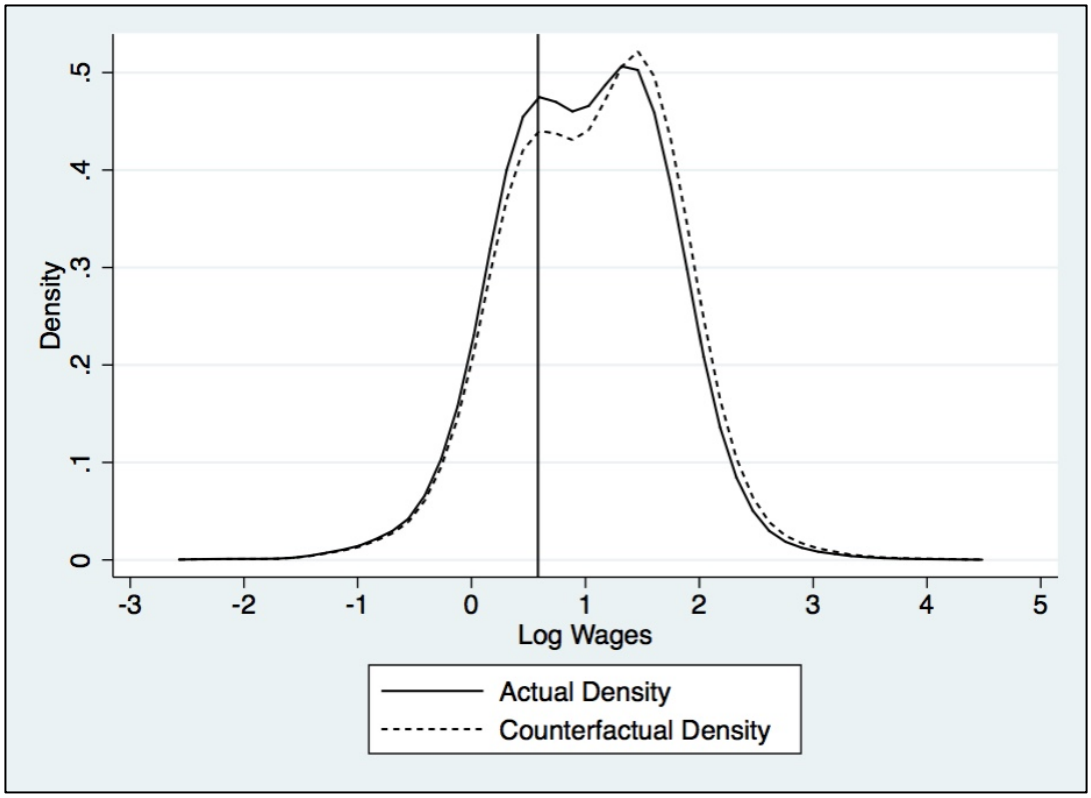
Notes: The specification includes 26 NUTS2 region of residence and urban/rural dummies. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

Figure A.4 Coefficients of Age Dummies in Estimating the Probability of Completing Post-secondary Education for Women (Age 48 forms the control group)



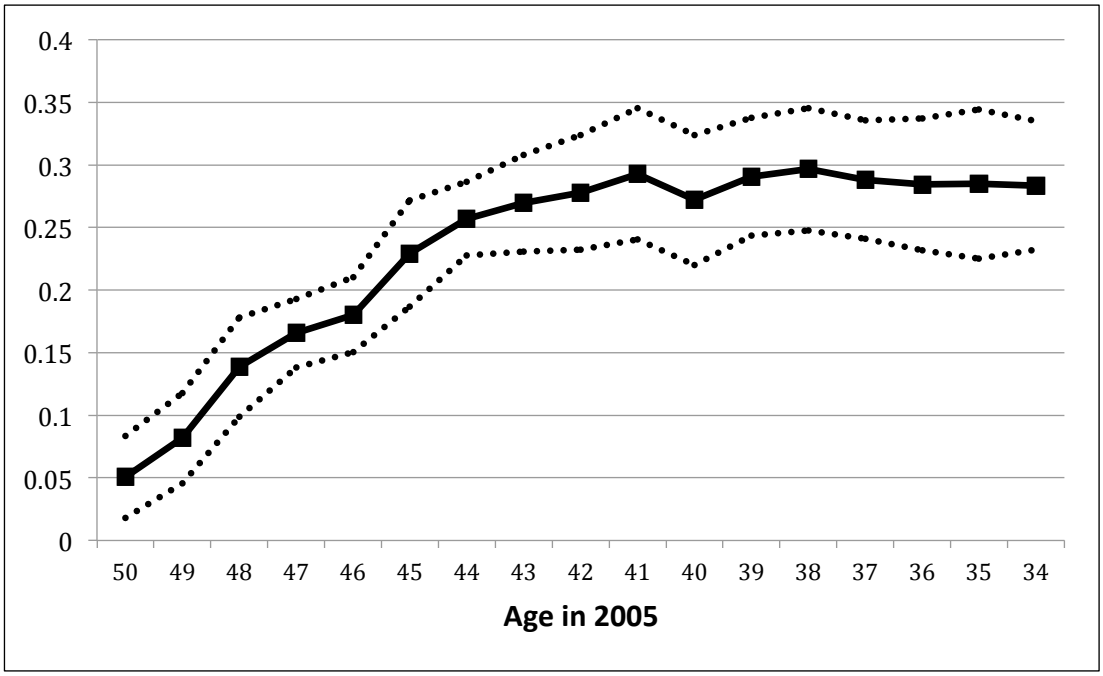
Notes: Observations are weighted using the sampling weights so that the results are nationally representative.

Figure A.5 The Actual and Counterfactual Density of Log Wages for Male Individuals Aged 40-45 with Half of Stata Optimal Bandwidth



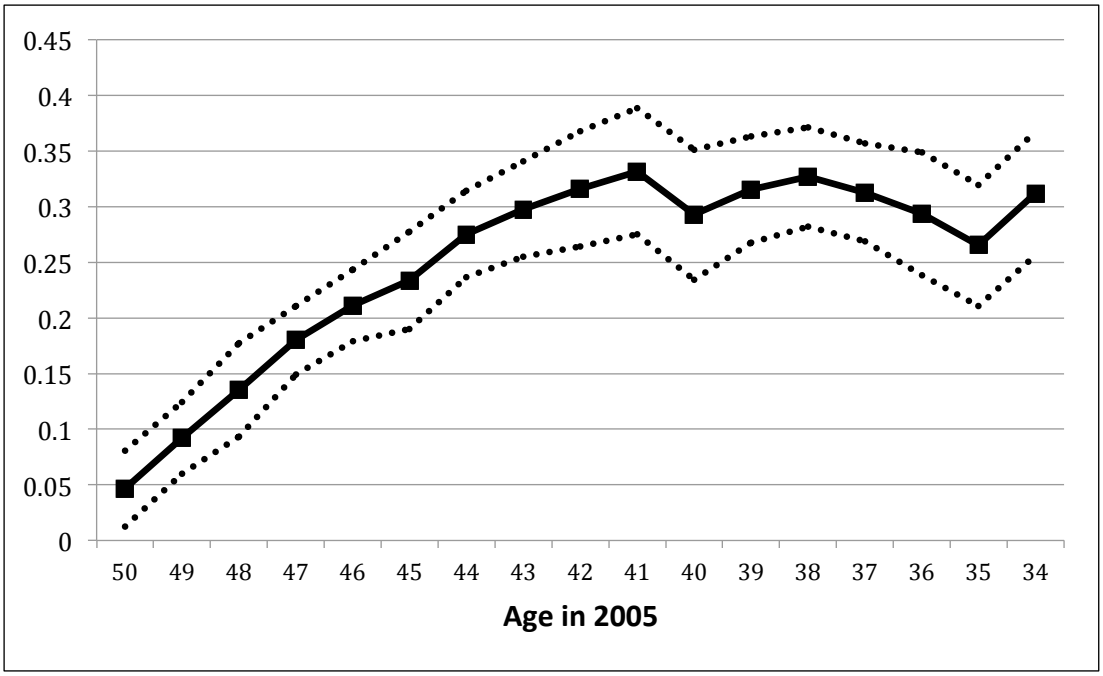
Notes: Observations are weighted using the sampling weights so that the results are nationally representative.

Figure A.6 The Actual and Counterfactual Density of Log Wages for Male Individuals Aged 40-45 with Two Times of Stata Optimal Bandwidth



Notes: The specification includes 26 NUTS2 region of residence and urban/rural dummies. Age 51 forms the control group. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

Figure A.7 Coefficients of Age Dummies in the Estimating the Probability of Being Employed



Notes: The specification includes 26 NUTS2 region of residence and urban/rural dummies. Age 51 forms the control group. Observations are weighted using the sampling weights so that the results are nationally representative. Broken lines indicate the 95-percent confidence interval based on clustered (on NUTS2 regions) robust standard errors.

Figure A.8 Coefficients of Age Dummies in the Estimating the Probability of Being Formal Employed

Table A.1 OLS and 2SLS Estimates of the Returns to Education

	Dependent Variable: Log(Monthy Wage)		
	(1)	(2)	(3)
OLS	0.0829***	0.0837***	0.082***
	(0.0028)	(0.0023)	(0.0021)
2SLS	0.0981**	0.1036**	0.0912
	(0.0447)	(0.051)	(0.0578)
Control Variables:			
Region of Residence Dummies	No	Yes	Yes
Urban/Rural Dummy	No	No	Yes
F (Excluded Instrument)	9.2	7.9	6.4
Number of observations	15827	15827	15827

Notes: Observations are weighted using the sampling weights so that the results are nationally representative. Robust standard errors, clustered on 26 NUTS2 regions, are in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table A.2 Classification of Occupations with 27 Sub-Divisions and Their Percentages in the Age Groups

ISCO-88 Code	Classification of Occupations	Mean of Log Hourly Wage of Aged 34-51	Percentage in His Age Group		
			Aged 34-39	Aged 40-45	Aged 46-51
11	Legislators and Senior Officials	0.95	0.85	1.14	2.50
12	Corporate Managers	1.86	3.00	3.30	5.37
13	General Managers	0.92	0.95	1.04	0.86
21	Physical, Mathematical and Engineering Science Professionals	1.85	0.94	0.96	1.35
22	Life Science and Health Professionals	2.07	1.30	1.02	1.22
23	Teaching Professionals	1.83	4.83	4.17	8.49
24	Other Professionals	1.54	3.67	2.56	2.25
31	Physical and Engineering Science Associate Professionals	1.44	3.18	3.39	2.62
32	Life Science and Health Associate Professionals	1.43	1.00	0.64	0.54
33	Teaching Associate Professionals	1.31	0.06	0.03	0.17
34	Other Associate Professionals	1.40	3.54	3.97	3.77
41	Office Clerks	1.34	5.59	6.98	6.62
42	Customer Services Clerks	1.30	1.74	2.38	2.92
51	Personal and Protective Services Workers	0.94	9.78	10.02	8.46
52	Models, Salespersons and Demonstrators	0.59	4.05	2.86	2.59
61	Market-Oriented Skilled Agricultural and Fishery Workers	0.42	0.85	1.19	1.28
62	Subsistence Agricultural and Fishery Workers	-0.26	0.04	0.02	0.00
71	Extraction and Building Trades Workers	0.70	7.72	8.25	7.71
72	Metal, Machinery and Related Trades Workers	1.09	6.92	6.88	5.40
73	Precision, Handicraft, Printing and Related Trades Workers	0.79	0.65	0.64	0.40
74	Other Craft and Related Trades Workers	0.61	4.89	3.58	3.81
81	Stationary-Plant and Related Operators	1.03	1.81	1.64	1.19
82	Machine Operators and Assemblers	0.87	6.14	3.39	2.46
83	Drivers and Mobile-Plant Operators	0.84	10.79	12.38	12.25
91	Sales and Services Elementary Occupations	0.73	8.00	9.70	8.46
92	Agricultural, Fishery and Related Labourers	0.02	1.84	2.09	2.34
93	Labourers in Mining, Construction, Manufacturing and Transport	0.55	5.88	5.78	4.96

Source: Authors' calculations based on the 2005 Turkish Household Labor Force Survey.

APPENDIX B: TURKISH SUMMARY / TÜRKÇE ÖZET

TÜRKİYE'DE EĞİTİMİN GETİRİSİ: 1970'LERİN SONUNDAKİ ÖĞRENCİ EYLEMLERİ VE SONRASINDAKİ 1980 DARBESİNDEN YARI DENEYSEL BİR ÇALIŞMA

Giriş ve Değerlendirme

Türkiye, 1970'lerin sonunda yoğun şiddet içeren öğrenci olayları ve sonrasında bir darbe deneyimi yaşadı. Bu olaylar yükseköğretim düzeyini önemli ölçüde olumsuz etkiledi. 1978-80 arasında ortalama her gün 20 genç sokaklarda ya da üniversite kampüslerinde katledildi. Darbeden sonra, toplu öğrenci tutuklamaları gerçekleşti. Tezimin birinci bölümünde, bu trajik olaylar (1978-82 karışıklıkları/olayları) kullanılarak eğitimin gelir üzerindeki etkisi nedensellik bağlamı çerçevesinde tahmin edilmiştir.

1960 ve 1970'lerde öğrenci hareketleri küresel ölçekte yaygındı. Avrupa ve Amerika'da bu hareketler 1970'lerin ortasından itibaren azalırken (Barker, 2012), Türkiye'de şiddetlenmeye başladı (Ahmad 1993). 1980 darbesiyle neticelenen 1970'lerin sonu modern Türkiye tarihinin en karanlık dönemlerinden birini oluşturmaktadır (Ahmad 1993). Bu dönem (1978-82) boyunca sağ ve sol politik düzlemde yer alan öğrenci olayları oldukça şiddet içeren eylemlere dönüşmüştür (Zürcher 2004).

1978-82 döneminde görülen yoğun şiddet olayları, yükseköğretim mezuniyetlerini birçok açıdan olumsuz etkilemiştir. Birincil olarak 1978-79 ders yılında yeni kayıtlar sağ ve sol çatışmaların en yoğun yaşandığı öğretmen enstitülerinin kapatılması nedeniyle azalmıştır. İkinci olarak güvenlik kaygıları nedeniyle öğrenci kayıtlarının silinmesinden dolayı mezuniyet oranlarının

düşmesidir. Son olarak 1980 darbe sonrası tutuklanan öğrencilerin eğitimlerini tamamlayamamasıdır.

Tezin birinci bölümünde, yükseköğretim mezuniyetlerde yaşanan bu azalmalar analiz edilerek eğitimin gelir üzerindeki etkisi tahmin edilmiştir. Yapılan analizlerde, 1978-82 karışıklığından en çok etkilenen grubun 2005 yılında 40-45 yaş aralığında olduğu belirlenmiştir. Bu kişiler, ortalama olarak 1960-65 arasında doğmuş veya 1980 yılında 15-20 yaş aralığındadır. Doğum yılının kişinin yeteneği, motivasyonu ve aile karakteristikleri ile ilişkisiz olması nedeniyle olaylardan etkilenen grubun işgücü piyasasındaki tecrübelerin arındırılmasından sonra gelir seviyelerindeki düşüşünün nedeninin yükseköğretim mezuniyetlerindeki kayıptan kaynaklandığını varsaymak anlamlıdır. Bu amaçla, ücret denkleminde doğum yılı bir araç olarak kullanılmıştır.

2005 yılı Türkiye Hanehalkı İşgücü Anketi kullanılarak (HİA) yapılan analizlerde, 1978-82 olaylarının 40-45 yaş aralığında yer alan erkeklerin yükseköğretim yüzde mezuniyet olasılığını 6.6-7 puan arasında, ortalama okuma yılını 0.22-0.28 arasında ve ücretleri yüzde 2.6-3.5 arasında düşürdüğü tespit edilmiştir. Ayrıca, öğrenci olayları nedeniyle yükseköğretim mezuniyetlerinde yaşanan azalma bu olaylardan etkilenen grubun yüksek ücretli mesleklerden düşük ücretli mesleklere itilmesine yol açtığı tespit edilmiştir.

Gelirdeki bu dışsal değişim kullanılarak araç değişken yöntemiyle (IV) yapılan analizlerde, Türkiye'de erkekler için eğitimin getirisi (eğitim nedeniyle gelirdeki yüzde artış) yüzde 11.6-12.8 arasında tahmin edilmiştir. Bu tahminler, doğrusal en küçük kareler yöntemiyle (OLS) elde edilen tahminlerin biraz üzerinde olmakla birlikte istatistiksel olarak farklı değildir. Araç değişken yöntemiyle elde edilen bu tahminlerin nedensellik bağlamında yükseköğretimdeki bir yılın eğitim getirisinin yakın bir tahmini olabileceği düşünülmektedir. Bunun birinci nedeni, geliştirilen araç sadece yükseköğretim seviyesini etkilemektedir.

İkincisi, araç değişkeni nedeniyle eğitim tercihlerini değişen bireylerin 40-45 yaş aralığında yükseköğretime gidebilecek kişilerin en az yüzde 31'ini oluşturmasıdır. Üçüncüsü, 1978-82 olaylarından etkilenen kişiler, yükseköğretime gidip gitmeme konusunda farksız olan marjinal kişiler değildir. Çünkü olaylardan etkilenen kişiler, üniversite terkleri ya da kontenjanların düşmesi nedeniyle gidemeyen kişilerden oluşmaktadır. Bu kişiler, 1978-82 karışıklıkları olmasaydı üniversite mezunu olacak kişilerdir.

Tezin ilk bölümünde yapılan çalışma, araç değişken tahmincileriyle yapılan eğitimin gelir üzerindeki etkisini nedensellik bağlamında araştıran diğer önemli araştırmalarla ilgilidir. Angrist and Krueger (1991) Amerika Birleşik Devletleri'ndeki (ABD) doğum dönemini, Duflo (2001) doğum yılı ve yatırımın doğum yerleri arasındaki yoğunluk farkları ile etkileşimini ve Oreopoulos (2006) ise Birleşik Krallıktaki okulda kalma yaşını araç değişkeni olarak çalışmalarında kullanmışlardır.

Bu bölüm literatüre üç önemli katkı sağlamıştır. Birincil olarak Türkiye'deki yükseköğretimi etkileyen yeni bir araç geliştirilmiştir. Bilindiği kadarıyla, 1960 ve 1970'lerde küresel ölçekte yaygın öğrenci hareketlerinden araç geliştirilen ilk çalışmadır.

Türkiye'de eğitimin ekonomik ve sosyal sonuçlarla nedensellik ilişkisi, 1997 yılı sekiz yıllık zorunlu eğitim yasasını kullanarak geliştirilen bir araç ile son yıllarda araştırılmaktadır (Cesur ve Mocan 2013; Torun 2015; Gulesci ve Meyersson 2015; Aydemir ve Kirdar 2017). Ancak, 1997 yılı yasasından dolayı eğitim tercihlerini değiştiren kişilerin yaşları son yayınlanan çalışmada (Aydemir ve Kirdar 2017) dahi 18 ile 26 arasındadır. Bu kişilerden bir kısmı liseyi yeni bitirmiş ve bir kısmı da hala yükseköğretimdedir. Dolayısıyla, 1997 yasasını araç olarak kullanan çalışmaların sonuçlarına dikkat edilmelidir. Diğer taraftan, tezin bu bölümünde geliştirilen araçtan etkilenen bireyler aktif olarak çalışan 40 ile 45 yaş arasındaki bireylerden oluşmaktadır. Bu da geliştirdiğim aracın eğitim ile gelir ve diğer sosyal parametrelerle (sağlık, suç, din ve oy

tercihleri) arasındaki nedensellik ilişkisinin daha iyi incelenmesine olanak sağlamaktadır.

Bu bölümün ikinci katkısı eğitimin geri dönüşünün büyüklüğüyle ilgilidir. Araç değişken yöntemiyle bu çalışmada bulunan eğitimin geri dönüş tahminleri gelişmiş ülkeler için Behrman (1999) ve Psacharopoulos and Patrinos (2004) tarafından bildirilen değerlere daha yakındır. Dolayısıyla, gelişmekte olan ülkelerin eğitim geri dönüşlerinin aynı bağlamdaki gelişmiş olan ülkelerin değerlerinden daha büyük olma zorunluluğu olmadığını bu çalışma ortaya koymaktadır. Duflo (2001) ve Aydemir and Kirdar (2017) araç değişken yöntemleriyle benzer sonuçlara ulaşmışlardır.

Çalışmanın bir diğer katkısı 1978-82 karışıklıkların eğitim ve işgücü piyasasına etkisinin ortaya konulmasıdır. Çalışmada ortaya konulan sonuçlar açıkça göstermiştir ki bu boyuttaki politik ve sosyal karışıklıklar gelir ve meslek dağılımı üzerinde toplumda kalıcı hasarlara yol açabilmektedir.

Gözlemlenemeyen yetenek ve diğer ailevi karakteristiklerinin kontrol edilerek yapılan eğitimin geri dönüş çalışmaları gerek Türkiye'de gerekse de diğer gelişmekte olan ülkelerde oldukça azdır. Eğitimin nedensellik bağlamında gelir üzerindeki etkisine odaklanan daha çok uygulamalı çalışma yapılmalıdır. Bundan dolayı, hem Türkiye hem de gelişmekte olan ülkeler için özellikle lise sonrası eğitim düzeyini etkileyen yarı deneysel metotları esas alan çalışmalar ile bütün marjinal eğitim geri dönüşlerinin tahminine izin veren yapısal dinamik programlama teknikleri ile yapılabilecek araştırmalar gelecek çalışmalar olarak düşünülmektedir.

1970'lerin Sonundaki Öğrenci Eylemleri ve Sonrasındaki 1980 Darbesi

Türkiye'de ordu her zaman politik arenada önemli bir rol üstlenmiştir. 1960 ile 1980 arasında her on yılda bir darbe yapmıştır. 1960 darbesi Türkiye'de yeni bir dönemin başlangıcını oluşturmaktadır. Ahmad (1993), alt rütbeli subayların bu darbeyi üstlerine karşı yaptığını ve bu darbenin ordu hiyerarşisinden

bağımsız yapılmış Türkiye'de tek başarı darbe olduğunu söylemektedir. Ahmad (1993, 2003) ve Zürcher (2004), üniversite profesörlerinin 1960 darbesinin meşruiyetini sağladığını ve bu sayede askerin gücü elinde bulundurmaya devam ettiğini vurgulamışlardır.

Darbeden sonra, 1961 seçimlerinden önce yeni bir anayasa hazırlanmıştır. Yeni anayasa daha liberal düzenlenmiştir. Böylece, insanlar daha fazla sivil haklar, üniversiteler geniş özerklikler, öğrenciler kendi organizasyonlarını kurma haklarını ve işçiler ise grev haklarını elde etmişlerdir. Türkiye'deki bu yeni özgürlük ortamı daha önce rastlanmamış bir olgunun oluşmasına sebep olmuştur: ideoloji temelli siyaset.

Sol siyaset özellikle üniversite kampüslerinde 1960'lardan itibaren oluşmaya başlamıştır. Bazı sendikacılar Türkiye İşçi Partisini kurmuşlardır. Zürcher (2004), bu partinin diğer partilerin kendilerini ideolojik temelde tanımlamalarını zorladığını ifade etmektedir. Diğer taraftan, sağ, solun bu oluşumuna karşı alarm durumuna geçerek hızlı bir şekilde organize olmaya başlamıştır. Türkiye'de milliyetçi hareketler, 1969 yılında Milliyetçi Hareket Partisinin kurulmasıyla hızlı bir şekilde büyümüştür (Erken, 2014b).

1968 küresel olayların kıvılcımıyla Türkiye solu bir devrim yaratma umuduyla aşırı uçlara kaymıştır. Ancak, soldan gelen şiddet onu da aşacak şekilde radikal sağdan gelen şiddetle karşılaşmıştır (Zürcher, 2004). Bu karşılıklı şiddet politik belirsizliği artırarak yeni bir darbeye zemin hazırlamıştır. 1971 yılında, ordu, seçilmiş hükümeti devirerek tekrar darbe yapmış ve anayasayı değiştirmiştir. Ahmad (1993, 2003) askerin anayasa değişikliğiyle devletin sivil toplum karşısında güçlenmesini; üniversitelerdeki kontrolü elde ederek radikalizmi kontrol etmeyi, Türkiye İşçi Partisinin tasfiyesinden sonra sendikaları pasifize etmeyi amaçladığını belirtmiştir. Sol, bir süre sonra 1960'ların ortasından itibaren sola kayan Cumhuriyet Halk Partisinin etrafında toplanmaya başlamıştır.

1973 yılında, Cumhuriyet Halk Partisi parlamento seçimlerini kazanarak bir koalisyon kurmuştur. Sağ partiler, askeri darbe sonrası oluşan sol yaralarının iyileştirilmesini amaçladığını belirttikleri hükümet programını eleştirmişlerdir. Koalisyonun kurulmasıyla radikal uçta yer alan sağ şiddeti artmıştır. Ahmad'a (1993, 2003) göre, sağ şiddetin amacı desteği azaltarak solun potansiyelini düşürmek ve kargaşa üreterek darbe ortamını hazırlamaktır. Radikal uçta yer alan sol ise bu şiddete eklemlenerek politik belirsizliğin daha da artmasına sebep olmuştur. Koalisyondan sonra, politik şiddet Türkiye hayatının düzenli bir parçası olmaya başlamış, 1970'lerin sonunda ise şiddet iyice artmıştır.

5 nisan 1977 yılında, iki büyük parti erken seçim için anlaşmaları politik şiddetin alevlenmesine yol açmıştır. Sokak terörü seçimlerden dört hafta önce 1 Mayıs 1977 yılında zirve yapmıştır. Türkiye Devrimci İşçi Sendikaları Konfederasyonu İstanbul'da büyük bir miting düzenlemiştir. Kalabalığa ateş edilerek 36 kişi katledilmiş yüzlercesi ise yaralanmıştır.

1977 seçimlerinde bir partinin çoğunluğu elde edememesi sebebiyle güçlü ve istikrarlı bir hükümet kurulamamıştır. Türkiyeö 1970'in sonunda en karanlık dönemlerinden birini yaşamıştır. 1978 ile birlikte hükümet orduyu güvenliği sağlamak amacıyla kullanmaya başlamıştır. Güç kullanımı artmasına rağmen şiddet, 1970'lerin sonunda her gün 20 kişinin öldüğü ortama kadar devam etmiştir (Ahmad, 1993; Kaya, 1981). 1978-80 arasında politik şiddet nedeniyle ortalama 5241 kişi öldürülmüş ve 14.152 kişi yaralanmıştır (Kaya, 1981).

Ordu, 1980 Eylül'ünde darbe yaparak Kasım 1983 seçimlerine kadar ülkeyi yönetmiştir. Halk askeri darbeyi memnuniyetle karşılamıştır. Ordu kentli geç nüfusu politikadan uzaklaştırmak amacıyla hemen hemen sağ ve sol tüm hareketleri bastırmıştır (Ahmad, 1993). Darbenin ilk üç ayında, 30 bin kişi tutuklanmıştır. Bir yıl sonra, bu rakam 122.600'e ulaşmıştır. Eylül 1982 ile birlikte 80 bin kişi hala tutuklu, bunlardan 30 bin kişi ise duruşma için beklemektedir (Zürcher, 2004).

Öğrenci eylemleri 1968 küresel hareketlerin kıvılcımıyla Türkiye'de artmıştır. Ancak, Türkiye'deki eylemler bir süre sonra şiddete evrilmeye başlamıştır. Bu şiddet eylemlerin yoğunluğu 1970'lerin sonunda zirve yapmıştır. Üniversite öğrencileri özellikle "sağ" ve "sol" olarak karşılıklı iki gruba ayrılmış ve bu gruplar kendi kimliklerini birbirlerine karşı konumlandırarak oluşturmuşlardır (Neyzi, 2001). Eğitimli gençler, toplumu modernleştirme noktasında kendilerini toplumun itici gücü olarak görmüşlerdir (Neyzi, 2001; Zürcher, 2004). Genç şiddeti, 1971 ve 1980 darbe ortamına götüren politik belirsizliğin oluşmasında önemli bir role sahiptir (Ahmad, 2003).

1970'lerin başında, radikal uçta yer alan sol öğrenciler Latin Amerika sol aşırılıkçılarını izleyerek bankaları soyma ve Amerikalı askerleri ya da önemli kişileri kaçırma eylemlerini yapmışlardır (Ahmad, 1993, 2003). 1971 darbesinden 1973 yılına kadar, solun sürüklediği öğrenci hareketleri eylemcilerin tutuklanmaları ya da infaz edilmeleri nedeniyle bir sessizlik dönemine girmiştir (Erken, 2014a).

1970'lerin sonunda yaşanan yoğun şiddet, Türkiye'deki yükseköğretim mezuniyetlerini birçok yoldan olumsuz etkilemiştir. Birincisi 1978-79 ders yılında yeni kayıtların düşmesidir. Bunun temel nedeni, öğretmen enstitülerinde yaşanan yoğun şiddet hareketleri sebebiyle enstitülerin kapatılmasıdır (Grafik 2.2'ye bakın). Türkiye İstatistik Kurumunun (TÜİK) verilerine göre yeni kayıtlarda yaşanan azalma 37.715 kişidir.

Sosyal çatışma ve öğrenci hareketleri, Türkiye'de yükseköğretimde derin bir kutuplaşmanın oluşmasına yol açmıştır. 1970 ile 1980 arasında büyük şehirlerde 11 yeni üniversite kurulmasına rağmen üniversite senatoları yükseköğretimdeki talebi karşılayacak oranda kontenjanları artırmamışlardır. Bu dönemde, yükseköğretim sistemi parçalı bir yapıya sahip olup herhangi bir yönetim otoritesine sahip değildir. Doğramacı'ya (1989) göre, yükseköğretim kurumları arasındaki koordinasyon eksikliği ülkenin önceliklerine odaklanmayı imkansızlaştırmıştır. Hükümet çeşitli bakanlıklarla ilişkili akademiler, meslek

yüksekokulu ve öğretmen enstitülerini kurmuştur. 1973 ile 1977 arasında yeni kayıtlardaki artış sayısı 42.570 kişidir. Bu artışın yüzde 15'i üniversitelerde olurken yüzde 85'i bakanlıklar ilişkili kurumlarda olmuştur (TURKSTAT, 77, 79).

1973 yılında, Türkiye zorunlu eğitim süresini beş yıldan sekiz yıla çıkarmıştır. Bu nedenle, ortaokul öğretmenlerine acil ihtiyaç duymuştur (State Planning Organization, 1974, 1975, 1976). Bu nedenle, 1973-77 yılındaki artışın yüzde 76'sı öğretmen enstitülerinde yaşanmıştır. Ancak, şiddetin büyük bir bölümü öğretmen enstitülerinin öğrencileri arasında gerçekleşmiştir (Binbasioglu, 2005; Tekeli, 2010). Bundan dolayı, hükümet 1978 yılında 64 enstitüden 41'ini kapatmıştır (TURKSTAT, 1980). Mevcut kayıtlı öğrencilerin okullarını bitirmelerine olanak sağlanmıştır.

Cumhuriyet gazetesi 1978 yılında bu olayı şöyle haberleştirmiştir: 35 eğitim enstitüsünün yöneticileri, öğretmenleri ve öğrencileri eğitim enstitülerin yeniden açılmasını istediler, … yapılan ortak açıklamada, eğitim enstitülerinin kapatılması faşist saldırılarına teslim olmaktır (Cumhuriyet, 1978). Bu enstitüler doğrudan Milli Eğitim Bakanlığına bağlı olup üniversiteler gibi Anayasa ile korunmuyorlardı. Bu nedenle, yasal olarak kapatılmaları kolaydı. Tekeli'ye (2010) göre, öğrenci protestoları 1968'den sonra şiddete dönüşmeye başlamış ve 1970'lerin sonunda yoğunluğu artmıştır. Yönetimdekiler dolayısıyla öğrenci eylemlerinin durdurulmasına odaklanmışlardı. Önemli oranda Eğitim enstitülerinin kapatılmasıyla, yeni kayıtlar 37.715 düşerek 1973-77 arasındaki artışın yüzde 90'nı süpürülmüştür (TURKSTAT, 1979, 1980).

Yükseköğretimdeki mezun seviyesini etkileyen ikinci kanal ise güvenlik riski nedeniyle üniversite terklerinden kaynaklı mezun oranlarının düşmesidir. 1978 ile 1980 arasında ortalama her gün 20 genç insan öldürülmüştür. Bundan dolayı, bazı öğrenciler yükseköğretimdeki kayıtlarını silmişlerdir (Kaya, 1981). Bazı öğrenciler çatışmalarda yaralandıkları ya da sakat kaldıkları için

eğitimlerini tamamlayamamışlardır. Ayrıca, bazı aileler çocuklarını üniversiteye göndermemeyi tercih etmiş olabilecekleri düşünülmektedir.

Dersler, bu dönemde sık sık ertelenmiş ya da iptal edilmiştir. Örneğin, Ege Üniversitesinde 116 gün, İstanbul Üniversitesinde 421 gün dersler iptal edilmiştir. Hacettepe Dişçilik Fakültesi ise 1979-80 ders yılında tamamen durdurulmuştur (Kaptan, 1986). Bu dönemde, fakülte binaları ve öğrenci yurtları silah depolarına çevrilmiştir (Kaya, 1981; Kaptan, 1986) çünkü üniversite özerkliği polisin üniversite içinde arama yapmasını önemli oranda engellemiştir (Gunter, 1989).

Son olarak 1980 darbesinden sonra öğrenci tutuklamaları birçok öğrencinin okullarını tamamlayamamasına yol açmıştır. 1982 yılındaki hükümet raporuna göre (Anarchy and Terrorism in Turkey, 1982), darbeden bir yıl sonra 1981 yılında 9.760 "terörist" öğrenciydi. Yakalanan toplam 43.140 "teröristin" yüzde 57'si 16 ile 25 yaş aralığında olup nunların büyük bölümü aynı zamanda erkekti.

Çalışmada Kullanılan Veri

Bu analizde, 2005 yılı Türkiye Hanehalkı İşgücü Anketi (HİA) kullanılmıştır. Bu anket Türkiye'yi ulusal bazda yansıtma özelliğine sahiptir. Türkiye İstatistik Kurumu (TÜİK) 2004 yılından itibaren Eurostat'ın isteklerini dikkate alacak şekilde mikro veriler üretmeye başlamıştır (TURKSTAT, 2007). Fakat 2004 yılı geçiş yılı olması sebebiyle analizde 2005 yılı verileri kullanılmıştır. Analizde kullanılan gözlemler 34 ile 51 yaş aralığında aktif işgücünde yer alan bireylerdir. Bu bireyler, hem etki hem de karşılaştırma gruplarından oluşmaktadır. Analizlerden elde edilen sonuçlar 2004 yılı verileri kullanıldığında anlamlı olarak değişmemektedir.

Ortalama maaşlar 34-51 arasındaki yaş gruplarında hafifçe artmaktadır (Grafik A.1'e bakın). Fakat 51 yaşından itibaren hızlı bir şekilde düşerek oynak olmaya başlamaktadır. Ayrıca, gözlem sayıları da 51 yaşından sonra hızlı bir şekilde

azalmaktadır (2004 yılı verileri içinde aynı durum geçerlidir). Bundan dolayı, 2005 yılı anket verileri bu çalışma için son güvenilir veri setidir.

Anket verisinde toplam 490.040 kişi bulunmaktadır. Ücretli çalışan sayısı ise 73.310'dur. Verilerde yaş, en yüksek eğitim düzeyi, işgücü durumu, esas işte hafta ortalama çalışılan saat sayısı, geçen ay esas işten elde edilen gelir, işyerindeki esas işin niteliği gibi bilgiler bulunmaktadır.

Veride doğrudan tecrübe yıl sayısı bulunmamaktadır. Bundan dolayı Mincer (1974) tarafından önerilen potansiyel tecrübe yılı analizlerde kullanılmıştır. Buna göre, tecrübe yılı kişinin yaşından tamamladığı okul yılı ve okula başlama yaşı çıkartılarak bulunmaktadır. Türkiye'de okula başlama yaşı 1980'den önce 7'dir.

Veride ayrıca kişinin tamamladığı okul yılı verisi bulunmamaktadır. Bunun yerine en son tamamladığı mezuniyet seviyesi bulunmaktadır. Bununla beraber, Türkiye Nüfus ve Sağlık Araştırması (TNSA) kişinin hem bitirdiği eğitim düzeyi hem de tamamladığı okul yıl sayısını vermektedir. 2008 yılı TNSA verileri ile kişinin bitirdiği eğitim düzeyi koşulu esas alınarak, bireyin tamamladığı ortalama eğitim süresi tahmin edilmiştir. Buna göre, okuma yazma bilmeyenlerin tamamladığı ortalama okul yılı 0,14; okuma yazma bilmesine rağmen herhangi bir mezuniyeti olmayanların ortalama yılı 1,68; ilkokul mezunların ortalama okul yılı 5,09; ortaokul mezunlarının ortalama okul yılı 8,34; lise mezunlarının ortalama okul yılı 11,09 ve yükseköğretim mezunlarının ortalama okul yılı 14,63 olarak bulunmuştur.

Bu bilgilere dayanarak, kişinin tamamladığı okul yılı; okuma yazma bilmeyenler için 0, okuma yazma bilip diploması olmayanlar için 2, ilkokul mezunları için 5, ortaokul mezunları için 8, lise mezunları için 11 ve üniversite mezunları için 15 olarak belirlenmiştir. Benzer bir strateji Aydemir and Kirdar (2017) tarafından da kullanılmıştır. TNSA çalışmasında, bu tahminler 37-54 yaş aralığında olan

bireyler için yapılmıştır. Çünkü 2005 yılı HİA verilerini kullandığım çalışmamda bireyler 34-51 arasındadır.

Veride aylık maaş bilgileri bulunmaktadır (2005 yılında ortalama maaş 588 TL). Card'a (1999) göre eğitimin yıllık getirisini tahmin eden katsayı, eğitimin saat başı ücret üzerindeki etkisi, haftada ortalama çalışılan saat üzerindeki etkisi ve yılda çalışılan hafta üzerindeki etkilerini içermektedir. Ayrıca, Amerika Birleşik Devletleri'ndeki (ABD) verilere göre, yüksek eğitimli kişiler daha çok çalışmaktadır. Diğer taraftan, Türkiye'de eğitim süresi ile ortalama çalışma süresi arasında negatif bir ilişki bulunmaktadır (Tablo 2.1'e bakın). Eğitim süresi artıkça haftada ortalama çalışma saati azalmaktadır. Eğitim süresi ile haftada ortalama çalışma saati arasındaki ilgileşim katsayısı ayrıca -0,3'tür. Bundan dolayı, bu çalışmada, saat başı ücret gelir verisi olarak kullanılmıştır. Esas işteki aylık maaş önce (52/12)'e sonra haftada ortalama çalışılan saat sayısına bölünerek saat başı ücret tahmin edilmiştir.

Bütün analizlerde, saat başı ücretler herkesin 26 yıl iş tecrübesi olacak şekilde yeniden tahmin edilmiştir. Bunun temel nedeni etki ve kontrol gruplarının farklı iş tecrübelerine sahip olmalarıdır. 26 yıl, 34-51 yaş aralığında yer alan bireylerin ortalama potansiyel tecrübe yılıdır. Yenilenen saat başı ücret tahmininde, logaritmik saat başı ücret her bir eğitim düzeyi için ayrı ayrı dördünsel bir potansiyel tecrübe yılı üzerinde doğrusal bağlaşım çözümlemesi yapılmıştır. Veride tanımlı olup kullanılan eğitim düzeyleri, herhangi bir diploması olmayanlar, ilkokul mezunları, ortaokul mezunları, lise mezunları ve yükseköğretim mezunlarıdır. Bu regresyonlardan, potansiyel tecrübe yılı 26 olacak şekilde oluşturulan saat başı ücrete regresyonlardan elde edilen hata yerimi eklenerek her bir kişi farklı saat başı ücretler tahmin edilmiştir. Benzer bir strateji, Altonji, Bharadwaj, and Lange (2012) tarafından kullanılmıştır.

Analizler için tercih edilen 34-51 yaş aralığında yer alan bireylerin yüzde 63'ü ilkokul ya da ortaokul mezunu, yüzde 14'ü lise mezunu, yüzde 8'i ise

yükseköğretim mezunudur. Ayrıca, bu nüfusun yüzde 54'ü çalışırken yüzde 58'i işgücündedir (Tablo 2.2' bakın).

Araç Değişken Tahmincisinin Geçerlilik Sınaması

Eğitim ve gelir arasındaki yatay kesit nedensellik ilişkisi standart bir doğrusal regresyon modeli ile tutarlı olarak tahmin edilemeyebilir. Bunun temel nedeni eğitimle ilişkili olan yetenek, motivasyon ve aile bilgileri gibi dışlanmış değişkenlerin varlığıdır. Diğer türlü, elde edilen tahmin sadece eğitimin gelir üzerindeki etkisinden oluşmamakta ayrıca gelirle ilişkili kişisel ve ailesel diğer değişkenlerin de etkisinden oluşmaktadır. Bu soruna yönelik kullanılabilecek metotlardan biri araç değişken yöntemidir. Bu metot geliri sadece eğitim üzerinden etkileyebilen ve gözlenebilen en az bir değişkene ihtiyaç duymaktadır.

Ancak, bölüm 2.3 ve 2.5.1'de görüldüğü üzere, 2005 yılında 40-45 yaş aralığındaki (1960-65 aralığında doğanlar ya da 1978 yılında 13-18 yaş aralığından olanlar) bireyler 46-51 yaş aralığından olan bireylere göre yükseköğretim mezun oranları anlamlı bir şekilde azalmıştır. Bunun temel nedeni, 1970'lerin sonlarındaki yoğun öğrenci olayları ve 1980 darbesinden sonraki toplu öğrenci tutuklamalarıdır. Normalde yükseköğretim mezun oranlarının zaman içinde artması beklenmektedir. Bundan dolayı, 40-45 yaş aralığından olan bireylerin "1" olarak 46-51 yaş aralığında olan bireylerin "0" olarak kodlandıkları bir kukla değişkeni eğitimin getirisini tahmin etmek için bir araç olarak tanımlanmıştır.

Çoktürel-sonuç çerçevesinde, araç değişken yöntemi, eğitimin getirisi, eğitim tercihi araç değişkeninden etkilenen bireyler için nedensellik bağlamında potansiyel olarak doğru tahmin edilebilmektedir. Bu tahmin yerel ortalama işlem etkisi (LATE) olarak tanımlanmaktadır (Imbens and Angrist, 1994; Angrist, Imbens, and Rubin, 1996; Card, 2001). Yukarıda belirtilen çerçeve için iki koşul bulunmaktadır.

Birinci koşul araç değişkenin varlığıdır. Doğum yılının rastsal olması nedeniyle kişinin yeteneği, motivasyonu ve aile bilgilerinden ilişkisiz olmasından dolayı 40-45 yaş aralığında olan bireylerin 46-51 olanlara göre daha düşük maaş (işgücü piyasasında tecrübeler arındırıldıktan sonra) almalarının nedeni yükseköğretimde yaşadıkları kayıpla ilgili olmasını iddia etmek anlamlı görünmektedir. Bundan dolayı, işgücü piyasasındaki potansiyel çıktılar araç değişkeninden bağımsız olup dışlama kısıtlaması varsayımı sağlanmış olmaktadır. Beklentinin ötesinde, 40-45 yaş aralığından olanlar için yükseköğretimde aşağı yönlü zaman trendi gözlemlenmektedir. Bu da geliştirilen aracın yükseköğretimdeki potansiyel eğitim çıktılarından bağımsız olduğunu göstermektedir. Dolayısıyla, araç değişkeni geçerlidir. Ayrıca, 2.5.1 bölümünde yükseköğretimin araç değişkeninin ihmal edilmeyen bir fonksiyonu olduğu gösterilmiştir. Bundan dolayı, araç değişkeni anlamlı olup birincil koşul sağlanmaktadır.

İkinci koşul devamlılıktır. Bu varsayım geliştirilen aracın yükseköğretimi tek yönlü olarak etkilemesidir. Diğer bir anlamda, hiç kimse yükseköğretime gitme tercihinin tam zıddını 1978-82 karışıkları yüzünden yapmamalıdır (Imbens and Angrist, 1994; Angrist, Imbens, and Rubin, 1996). Bölüm 2.5.1'de açıklandığı üzere, 1978-82 olayları farklı birçok toplum kesimini, erkeler, kadınlar, ücretli çalışanlar, ücretli çalışmayanlar negatif etkilemiştir. Ayrıca, bir kişinin normalde yükseköğretime katılmazken üniversitelerdeki şiddet nedeniyle yükseköğretime katılmak istemesi anlamlı değildir. Bundan dolayı devamlılık koşulu sağlanmaktadır.

Bu iki koşula binaen, araç değişken tahminleri yükseköğretime devam edecekken 1978-82 olayları yüzünden devam edemeyenlerin ortalama işlem etkisidir. Normalde, bu kişiler yükseköğretim diplomalarına sahip olacaklardı. Kullanılan araç değişkeni nedeniyle analizler erkek ücretli çalışan 40-51 yaş aralığından olan veriler üzerinden gerçekleştirilmiştir.

İLKÖĞRETİM OKUL BİNA YATIRIMININ LİSE MEZUNİYET DÜZEYİ VE İŞGÜCÜNE KATILIM ÜZERİNDEKİ ETKİSİ

Giriş ve Değerlendirme

Bugünlerde gelişmiş ülkelerde eğitim araştırmaları kalite odaklı iken (Hanushek 2002) Türkiye ve gelişmekte olan ülkelerin birçoğunda eğitim seviyesi araştırmalarda odak olmaya devam etmektedir. 2015 yılında 25-64 yas arası nüfusun yüzde 37'si lise ve sonrası eğitim düzeyine sahipken bu oran OECD ülkelerinde yüzde 78'dir. Son 20 yılda, Türkiye eğitime ayırdığı kaynakları ortalama eğitim düzeyini artırmak amacıyla önemli ölçüde artırmıştır. Bununla birlikte, bu büyük devlet yatırımlarının etkisini nedensellik bağlamında araştıran çok az çalışma bulunmaktadır.

Tezin ikinci bölümü, Türkiye'nin büyük ölçekli ilköğretim okul yatırımlarının lise mezuniyet ve işgücü üzerindeki taşan etkisini araştırmayı amaçlamaktadır. Bu program, hükümet tarafından 1997 yılı zorunlu eğitim yasasının bir parçası olarak uygulanmıştır. Dönemin politik ortamı nedeniyle ilgili yasa meclisten hızlı bir şekilde geçmiştir. O dönem ortak kanaat yasanın temel amacının üç-yıllık imam hatip ortaokulların kapatılması olduğu yönündeydi (Gunay 2001; Pak 2004).

Bu yasa geleneksel zorunlu eğitim yasalarından birçok açıdan farklıdır. Birincisi okuldan ayrılma yaşı 15 olarak korunmuştur. İkincisi zorunlu eğitim süresi değişmemiştir. Yasa temel olarak sekiz-yıllık eğitimin aynı binada yapılmasını kararlaştırmıştır. 1997 yasası öncesi, zorunlu eğitim temel iki aşamadan oluşmaktaydı: beş-yıllık ilk okul ve üç-yıllık ortaokul. Bu iki eğitim beraber olabildiği gibi ayrı okullarda da yapılabilmekteydi. Bununla beraber, üç-yıllık ortaokul eğitimi okul binalarının yetersizliği nedeniyle zorunlu eğitim düzeyi olarak uygulanamıyordu (MONE-Baskent University 2002; Dulger 2004).

1997 kanunun uygulanması okul yatırımlarının gereksinimini birçok açıdan artırmıştır. Birincil olarak 1,5 milyon ortaokul eğitimi dışında kalmış çocuğun okullaştırılması amaçlanmıştır. İkinci olarak kanunun uygulanış şekli nedeniyle

beş-yıllık küçük köy ilkokulları ve lise bünyesinde yer alan ortaokul binaları işlevlerini yitirmiştir. Örneğin, 2002-2003 eğitim yılı itibarıyla, küçük köylerde 15.000'in üzerinde beş-yıllık ilkokul kapatılmıştır (MONE 1996, 2003).

Eğitimdeki bina stok açığı hükümeti yeni sınıflar inşa etmeye odaklaştırmıştır. Özel sektörden alınan destekle hükümet 1998 ile 2002 arasında sınıf mevcudiyet sayısını 67.014 artırmıştır (ortalama 1.000 çocuk başına 6,2 derslik). Bu artış mevcut sınıf sayısının yüzde 31 artırılmasıdır (MONE 1999, 2000, 2001, 2002, 2003).

Tezin ikinci bölümünde Duflo'nun (2001) stratejisi takip edilerek farkların farkı metodu kullanılmıştır. Çalışmada iki değişim esas alınmaktadır. Birincisi iller arasındaki yatırım yoğunluk farkları olup ikincisi ise bireylerin doğum yılları arasındaki farklarından dolayı programdan etkilenen ve etkilenmeyen birey farklarıdır. Programın yatırım yoğunluğundan 1998 ile 2002 arasında 1.000 çocuk başına artan sınıf sayısı kastedilmektedir.

Bu bölümde yapılan analizlerde, 2011 yılı Nüfus ve Konut Araştırması ile Milli Eğitim İstatistik kitaplarından elde edilen il verilerinin birleştirilmesiyle elde edilen özgün bir veri seti kullanılmıştır. Bireyin doğum yılı ile doğum yeri ortak olarak yatırım programdan etkilenip etkilenmediğini ortaya koymaktadır. Yapılan regresyonda doğum yılı ile doğum yeri sabit etkileri kontrol edildikten sonra, doğum yılı kukla değişkenleri ile ilköğretimde net sınıf artışını gösteren değişkenin ortak etkileşim katsayıları dışsal olarak kabul edilmiştir. Çünkü yasanın ortaya çıkması ve ilgili politikaların uygulanması 1997 yılının politik atmosferiyle ilişkili olduğundan etkileşim değişkenleri potansiyel eğitim geri dönüşlerinden bağımsızdır.

Analizler, ilköğretim bina yatırımlarının erkek ve kadınlar için lise mezuniyet oranları üzerinde önemli etkilere neden olduğunu ortaya koymaktadır. 6-13 yaşlarındaki 1.000 çocuk başına artan bir ilköğretim sınıfı, erkekler için lise mezuniyet yüzdesini 0.34-0.38 puan arasında kadınlar için ise lise mezuniyet

yüzdesini 0.37-0.40 puan arasında artırmaktadır. 1998-2002 arasında yatırım programı süresince 1.000 çocuk başına artan derslik sayısı 6.2 olması nedeniyle programın toplam etkisi erkekler için lise mezuniyet yüzdesinde 2.1-2.4 puan arasında artış iken kadınlar için bu artış 2.3-2.5 puan arasındadır.

Ayrıca, yapılan analizlerden okul yatırımlarının sadece kadın işgücü katılım oranını etkilediği anlaşılmıştır. 1.000 çocuk başına artan her derslik kadın işgücü katılım yüzdesini 0.35-0.42 puan arasında artırmıştır. İlköğretim 1.000 çocuk başına toplam derslik artışı 6,2 olması nedeniyle yatırım programı kadın işgücü katılım yüzdesini toplam 2.2-2.6 puan arasında artırmıştır. İlköğretim okul yatırım programı erkek işgücü katılım oranını anlamlı olarak etkilememiştir.

Tezin ikinci bölümünde yapılan analizler ile elde edilen sonuçlar gelişmekte olan ülkelerde okul yatırımlarının eğitim düzeyi üzerindeki etkileri açısından literatüre önemli katkılar sağlamıştır. Bu çalışma eğitim yatırımlarının etkilerine odaklanması nedeniyle Türkiye'de bir ilk olma özelliğini taşımaktadır. Zira, bu çalışmada tercih edilen farkların farkı stratejisi ve aynı dönemde uygulanan pansiyon ve taşımalı eğitim programlarının etkisinin kontrol etmesiyle derslik yapımına odaklanan okul yatırım programının etkisi arındırılabilmiştir.

Gelişmekte olan ülkelerde büyük ölçekli okul yatırımlarının nedensellik etkilerine odaklanan çalışmalar sınırlıdır. Duflo (2001) ve Li ve Liu (2014) ilkokul yatırımlarının sırasıyla Endonezya ve Çin'deki etkilerini araştırmışlardır. İki çalışmada bu programların ortaokul eğitim düzeyi üzerinde taşma etkilerinin olduğu gösterilmiştir. Çalışmam dahil bu üç çalışmanın ortak noktası büyük okul yatırımlarının sadece hedefledikleri eğitim düzeyi değil bir sonraki eğitim düzeyi de etkilediğinin ortaya konulmasıdır.

Tezin bu bölümü ayrıca okul yatırımlarının işgücü piyasasında cinsiyet eşitliğini sağlamadaki rolünü araştıran literatüre de katkı sağlamıştır. Eğitim seviyesi

yükseldikçe kadın işgücüne katılım oranı Türkiye ve birçok gelişmekte olan ülkelerde artmaktadır. Bu çalışmada, Türkiye'de 1998-2002 arasında yapılan okul yatırımlarının sadece kadın işgücü katılım oranını etkilediği ortaya konulmuştur.

Önemli olan bir diğer nokta bu çalışma 2011 yılı Nüfus ve Konut Araştırmasını kullanan nadir çalışmalardan biridir. Sayım verinin zengin olması bu çalışmada hanehalkı işgücü anketleri kullanan 1997 zorunlu eğitim yasasını esas alan diğer çalışmalara kıyasen daha güvenilir tahminler elde edilmiştir. Hanehalkı işgücü anketlerinde bölge tahmin seviyesi 26 Düzey2 bölgesi iken bu düzey sayım verisinde 81 ildir. Dolayısıyla, standart hataların doğum yeri üzerine kümelendirilmesi durumunda sayım verisini kullanan regresyonlar daha güvenilir standart hata tahminlerini verecektir.

Bununla birlikte, çalışmanın bir kısıtı da bulunmaktadır. Çalışma yatırım programının işgücü katılım oranı üzerindeki etkisi tam olarak tahmin edememektedir. Bunun temel nedeni etki grubunda yer alan 1992 ve 1993 doğumluların lise eğitimlerini henüz tamamlamaları ya da hala yükseköğretimde bulunma olasılıklarıdır. Dolayısıyla, işgücü katılım oranına odaklanan analizlerin erken sonuçlar olarak kabul edilmesi anlamlı olacaktır.

Türkiye 2012 yılında, zorunlu eğitim süresini 12 yıla çıkartmıştır. Ayrıca, eğitim sistemini de sekiz-yıllık zorunlu ve seçmeli lise eğitiminden dörder yıllık dilimlerden oluşan ilkokul, ortaokul ve liseden oluşacak şekilde yeniden revize etmiştir. Çok büyük olasılıkla zorunlu eğitim süresinin artması ve yapılacak lise okul yatırımları Türkiye'nin ortalama eğitim süresini artıracaktır. Duflo (2001), Li ve Liu (2014) ve benim analizlerimden çıkan sonuçlar ışığında yeni uygulanacak programların aynı zamanda yükseköğretim üzerine taşma etkileri de olacaktır. Yükseköğretim ile kadın işgücü katılım oranı arasındaki yüksek korelasyon nedeniyle bu gelişmeler işgücü piyasasındaki cinsiyet eşitliğine daha fazla katkı sağlayacaktır. Zorunlu eğitim süresinin artırılması, yapılan lise yatımlarının ve dört-yıllık imam hatip ortaokullarının yeniden sisteme

eklenmesinin etkilerinin araştırılması gelecek çalışmalar olarak düşünülmektedir.

Türkiye'de Zorunlu Eğitim Yasaları

Türkiye Cumhuriyetinde başlangıçtan beri zorun eğitim süresi beş yıldır. 1973 yılında, zorunlu eğitim süresi Türkiye'de beş yıldan sekiz yıla çıkartılmıştır. Kanun, zorunlu eğitimin iki bölümden oluşmasını öngörmüştür: beş yıllık ilkokullar ve üç yıllık ortaokullar. Öğrenciler her bir bölümün sonunda ayrı diplomalar almışlardır. Ayrıca, kanun, koşullara göre okulların ayrı ayrı yapılabileceği gibi birlikte de yapılabileceğini belirtmiştir.

Bununla beraber, üç yıllık ortaokul zorunlu eğitimi fiziksel imkanların yetersizliği nedeniyle büyük ölçüde uygulanamamıştır (MONE-Baskent University, 2002; Dulger, 2004). Ancak, 1973 ile 1997 arasındaki 23 yıl zorunlu eğitime bir geçiş dönemi olarak düşünülmektedir. Bu dönemde, zorunlu eğitime yönelik birçok farklı program uygulanmıştır (MONE-Baskent University, 2002).

1996 yılında, Refah Partisi seçimi kazanarak birincil ortak olarak bir koalisyon kurmuştur. Bununla beraber, bu parti ordu ve diğer kritik devlet birimleri tarafından İslamcı bir parti olarak görülmüştür (Onis, 1999). Bir yıl sonra, dolaylı bir askeri müdahale ile bu koalisyon parçalanmıştır (Onis, 1999). Türkiye Büyük Millet Meclisi zorunlu eğitime yönelik bir kanunu (4306) hızlı bir şekilde kabul etmiştir. Bu kanun, aynı binada sekiz yıllık kesintisiz seküler bir eğitimin yapılmasını öngörmüştür. Bu kanun, ordu tarafından domine edilen Milli Güvenlik Kurulunun önemli kararlarından biridir. Bu kurul, 28 Şubat 1997 yılında, Türkiye'deki algılanan yükselen İslamcılığı durmayı hedefleyen 18 madde yayımlamıştır (Gunay, 2001).

1997 zorunlu kanunu diğer geleneksel kanunlardan farklıdır. Birincisi okulda kalma yaşı olan 15 değiştirmemiştir. İkincisi zorunlu eğitim süresi uzatılmamıştır. Bunun yerine, aynı binada kesintisiz sekiz-yıllık bir eğitim öngörülmüştür. Ayrıca, kanun beş-yıllık ilkokul ve üç-yıllık ortaokul

diplomalarını kaldırmış bunun yerine sekiz-yıllık ilköğretim diplomasını zorunlu hale getirmiştir.

Bu kanun, genel olarak üç-yıllık ortaokul imam hatiplerin kapatılmasını hedeflediği algısı kabul görmüş, bu okullar kanunla birlikte kapatılmaya başlanmıştır. Bazıları bu okulların devlet okulu olmalarına rağmen İslamcılığın aşılandığı merkezler ve seküler sistem için potansiyel tehdit olarak görmüşlerdir (Gunay 2001; Pak 2004). Bundan dolayı, uzmanların yeterli okul olmadığı uyarısına rağmen hükümet kesintisiz sekiz-yıllık eğitimi uygulamıştır. Hükümet politik riskler nedeniyle "büyük patlama" yaklaşımı çerçevesinde yasayı uygulamayı benimsemiş, yasanın adım uygulanması yerine hızlı ve yaygın bir uygulama yolu hükümet tarafından benimsenmiştir (Dulger, 2004). Bundan dolayı hükümet geçici vergi yöntemleriyle okul yatırım programını başlatmıştır.

Üç-yıllık ortaokul imam hatiplerin kaldırılması Türkiye'de büyük bir tartışmayı başlatmıştır. Hükümet imam hatiplerini hedeflemediğini göstermek amacıyla üç-yıllık mesleki ortaokulları da kapatmış ayrıca çıraklık yaşını 12'den 15'e yükseltmiştir.

Kanunun uygulanmasından 15 yıl sonra, Türkiye yeniden zorunlu eğitimi 12 yıla 2012 yılında yükseltmiştir. Aynı zamanda okul kurgusunu da sekiz-yıllık zorunlu eğitim ve seçmeli lise eğitiminden dörder yıllıktan oluşan üçlü bir sisteme geçirmiştir: ilkokul, ortaokul ve lise. Bu yeni yapıda, dört-yıllık imam hatipler sisteme yeniden tanımlanmıştır. Bu çalışma sonuçlarından hareketle gelecekte ne tür sonuçlarla karşılaşabileceğimizin tartışılması yararlı olacaktır.

Okul Yatırım Programı

Kesintisiz aynı binada sekiz-yıllık eğitimin yapılmak istenmesi büyük bir okul açığını ortaya koymuştur. Birincisi ortalama 1,5 milyon ortaokula gitmeyen bir çocuk grubu bulunmaktaydı. İkincisi kanunun uygulanış şekli beş-yıllık küçük köy ilkokullarının ve lise bünyesinde yer alan üç-yıllık ortaokul binalarını

işlevsiz hale getirmiştir. Örneğin, 2002-2003 ders yılında 15.000'in üzerinde köy ilkokulu kapatılmıştır (MONE, 1996, 2003). Bu gelişme hükümetin yeni bina yapmaya odaklanmasına sebep olmuştur.

Okul yatırım programı geçici vergilerden oluşan bir düzenleme ile finanse edilmiştir. Yeni vergiler ile 2 milyar dolar okul yatırım programı kapsamında toplanmıştır. Programın ilk dört yılında yıllık ortalama 3 milyar doların üzerinde para harcanmıştır (Dulger, 2004).

Hükümet ve özel sektör katkılarının ortak birleşimiyle hükümet ilköğretim sınıf mevcut sayısını 1998-1999 ile 2002-2003 ders yılları arasında 67.014 artırmıştır. Yaşları 6-13 arasında olan 1.000 çocuk başına ortalama 6.2 derslik anlamına gelen bu artış mevcut stok içerisinde bu dönemde yüzde 31'lik bir artışa denk gelmektedir. Bununla birlikte, artışın yüzde 70'i kentlerde olurken yüzde 30'u köy ilkokullarının kapatılması nedeniyle kırsal bölgelerde gerçekleşmiştir (MONE, 1999, 2000, 2001, 2002, 2003).

Okul yatırım programı dışında iki ayrı programda bu dönemde uygulanmıştır. Bu programların amacı kırsal bölgelerdeki erişimi artırmaktır. Bunlar taşımalı eğitim ve pansiyon yapımıdır. Taşımalı eğitimler, okulları kapatılan küçük köylerdeki çocukların nispeten daha büyük yerleşim birimlerinde kurulan ilköğretimlere taşınmalarıdır. Eğer taşıma mesafesi çok uzunsa çocuklar Yatılı Bölge İlköğretim Okulları (YIBO) ya da Pansiyonlu İlköğretim Binalarının (PIO) pansiyonlarına yerleştirilmişlerdir.

Taşımalı eğitimden yararlanan öğrenci sayısı 1997 yılından itibaren hızlıca artarak 1997'de 281.833'den 2002'de 654.093'e ulaşmıştır. Pansiyonlardan faydalanan öğrenci sayısı ise 1998 ile 2002 arasında 131.458'den 279.791'e yükselmiştir. 2002'den itibaren iki programdan yararlanan öğrenci sayıları ortalama olarak aynı seviyede kalmıştır (Grafik 3.1' bakın).

Okullaşma Oranları

Milli eğitim Bakanlığı 1994 yılından itibaren net okullaşma oranlarını verebilmektedir. Zorunlu eğitim kanunu ve uygulanan programlar sayesinde ilköğretimde net okullaşma oranı 1996'da ortalama yüzde 75'den 2002 yılında yüzde 91'e yükselmiştir. Bu artış ortalama olarak 1,3 milyon öğrencinin ilköğretimde artması anlamına gelmektedir. Ayrıca, net okullaşma oranı 2000 yılında yüzde 95'e yükselmesine rağmen sonraki yıllarda yüzde 90'lara doğru inmiştir. Bu oranın zaman içindeki trendi Milli Eğitim Bakanlığını yatırımlarının Toplam Kamu Yatırım içindeki oranı trendiyle örtüşmektedir (Grafik 3.2 ve Grafik 3.5'e bakın). Yatırımın artmasıyla birebir bir örtüşmenin gerçekleşmesi anlamlıdır. 1997 kanunundan önce ilkokul ve ortaokullarda net okullaşma oranları üç yıl boyunca değişmemiştir.

İlköğretim okul yatırım programının taşma etkisinin 1998-1999 yılından itibaren görülmeye başlanması beklenmektedir. Lise okullaşma oranlarında da benzer bir eğilim dikkat çekmektedir (Grafik 3.3'e bakın). 1997 yılında yüzde 38 olan lise net okullaşma oranı 2006 yılında yüzde 57'e yükselmiştir. Ayrıca, 1998'den önceki dört yıl boyunca net lise okullaşma oranlarında bir değişikliğin görülmemesi buradaki artışın kanun ve onunla birlikte uygulanan programlarla ilişkili olduğunu göstermektedir.

Çalışmada Kullanılan Veri

Bu çalışmada 2011 Nüfus ve Konut Araştırması verileri kullanılmıştır. Çalışmada, 1971 ile 1993 yıllarında doğanları kapsayan bir veri seti tercih edilmiştir. Bu tanım, örneklemde yer alan kişilerin en az liseyi bitirdiklerini ortaya koyması açısından önemlidir. Çalışmada kullanılan gözlem sayısı 2.872.593'tür. Sayımdan gelen mikro veriler kişilerin doğum yerleri üzerinden il bazlı yatırım ve diğer program verileriyle birleştirilerek analizler yapılmıştır. Sınıf sayısı ve diğer programların il bazlı verileri Milli Eğitim Bakanlığının yıllık yayımlanan istatistik kitaplarından elde edilmiştir.

APPENDIX C: CURRICULUM VITAE

AHMET OZTURK

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EDUCATION

Middle East Technical University **2013-2017**

Ph.D., Economics

• Thesis Title: Essays on Quasi-Experimental Studies in Labor Economics

University of Southern California **2011-2013**

M.A., Economics

Middle East Technical University **1996-2001**

B.S., Mathematics

FELLOWSHIP AND AWARDS

State Planning Organization (SPO) Graduate Scholarship 2011-2013

PROFESSIONAL EXPERIENCE

Ministry of Development **2004-Present**

Junior / Senior Specialist

- Supervising and assisting Istanbul, Cukurova, and Eastern Black See Development Agencies in annual work program and budget preparation, financial management, and development plan preparation

- Conducting/coordinating studies and researches on regional development with socio-economic, legal, and institutional dimensions
- Making policy recommendations, participating in legislation drafting studies and steering/monitoring activities of related public institutions
- Briefing and writing memos/reports for policy makers
- Organizing and rendering trainings, seminars and conferences to diverse audiences
- Involving in cooperation and technical studies with the international organizations

RESEARCH and PUBLICATIONS

- Homojen ve Fonksiyonel Bölgelerin Tespiti ve Türkiye İçin İstatistiki Bölge Birimleri Önerisi (Identifying Homogenous and Functional Regions and a Proposal for NUTS Classification in Turkey), SPO Senior Specialist Thesis, SPO, 2009, Ankara, Turkey, http://www.kalkinma.gov.tr/Lists/Uzmanlk%20Tezleri/Attachments/251/AhmetOzturk.pdf.
- İlerde Öne Çıkan Sanayi Sektörleri (Leading Industrial Sectors in Provinces), SPO, 2006, Ankara, Turkey.
- Türkiye'de Bölgesel Gelişme Politikaları: Sektör-Bölge Yığınlaşmaları (Regional Development Policies in Turkey and Sector-Region Concentration), TUSIAD, 2005, Ankara, Turkey.

CONFERENCES AND WORKSHOPS

- "The Impact of NUTS Classification on Regional Statistics and Regional Development Policies in Turkey" presented at 13th National Regional Science Congress, Yildiz Technical University, Istanbul, Turkey, March 11-12, 2010.
- "How to Collect and Analyze Data" presented at training of employees of Regional Development Agencies, Samsun (February 2010), Kocaeli (April 2010), Malatya (May 2010), Turkey.

COMPUTER SKILLS

Stata, SPSS, ClustanGraphics, Flowmap, MapInfo, CorelDRAW

APPENDIX D: TEZ FOTOKOPİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü ☐

Sosyal Bilimler Enstitüsü ■

Uygulamalı Matematik Enstitüsü ☐

Enformatik Enstitüsü ☐

Deniz Bilimleri Enstitüsü ☐

YAZARIN

Soyadı : Öztürk

Adı : Ahmet

Bölümü : İktisat

TEZİN ADI (İngilizce) : Essays on Quasi-Experimental Studies in Labor Economics

TEZİN TÜRÜ : Yüksek Lisans ☐ Doktora ■

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. ■
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. ☐
3. Tezimden bir (1) yıl süreyle fotokopi alınamaz. ☐

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: