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ESSAYS ON THE ECONOMICS OF EDUCATION AND GENDER

Dissertation in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Economics (XXI Cycle)

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Preface

This dissertation is part of requirements towards the successful completion of my PhD programme in Economics at Bocconi University in Milan, Italy. The dissertation's topic is the economics of education and gender and it consists of four chapters, of which the first is an introduction.

The second chapter concentrates on the influence of civil conflict on the demand for education.[1] First, we develop a theoretical model on how the presence of civil conflict could distort incentives, particularly in a relatively highly developed, but culturally distant, region. We show that, under relatively general circumstances, it can be argued that only individuals with a medium level of education are going to change their behaviour by increasing their desired level of education. Both highly- and lowly-educated individuals will be unaffected. We test this hypothesis empirically using the Basque Region in Spain as an example of a conflict in which there has been no supply-side effect in education and the demand-side effect is thus isolated. We use Census results to create a database with nearly four million individuals and employ a matching method to recreate a synthetic Basque Region with data from before the conflict. Then, when comparing the development of the true and synthetic regions after the civil conflict starts, we find evidence that supports our theoretical model.

In the third chapter, I aim to explain the main factors that affect the demand for education in Turkey for both boys and girls, to investigate the presence of differences between genders, and to evaluate the impact of the extension of compulsory education in Turkey which took place in 1997. The main conclusion derived in this chapter is that income growth and improvement in parents' education contribute positively to children's school attainment, and the positive effect is higher for girls than it is for boys. Furthermore, the results show that the extension of compulsory education increased the total working hours of the households. This, however, has not had any effect on the probability that mothers start working or fathers get additional jobs. In addition, it does

[1] This chapter is co-authored with Olaf J. de Groot of the German Institute for Economic Research (DIW Berlin).

show the negative effect on the occurrence of child labour by decreasing its probability among the households. Another result of this study is that due to high dropout rates, an increase in school enrolment does not necessarily mean an increase in school graduation rates.

The fourth chapter investigates the main determinants of the participation decision of females in the labour force in Turkey. Turkey is a particularly important case as, unlike in many other countries, female labour force participation has shown a decreasing trend in the last 50 years. This chapter aims to elaborate on the causes of this decrease. In addition to the main determinants found in previous literature, this chapter adds a new variable that influences female labour force participation in Turkey: Conservatism and the role of traditional and social norms. An original proxy for conservatism is created by using a unique data set about perceptions. Four indices that might influence conservatism are formed: Tradition, social norms, men's decision power, and conservatism. The results are in accordance with the previous literature stating that urbanization, child care institutions and education level play an important role in the participation decision of women. However, these factors are not enough to explain the decline in female labour force participation. This chapter presents a new concept by showing that social norms, tradition and men's higher bargaining power play a negative role in the probability of women working in urban areas, while they have the opposite influence in rural areas. Furthermore, this chapter shows a new possible explanation for the link between urbanization and female labour force participation: Higher urbanization causes higher conservatism, which leads to lower female labour force participation.

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like to express my deepest gratitude. This thesis would not have been possible without the kind support of my Dissertation Committee, Prof. Dr. Eliana La Ferrara, Asst. Prof. Martina Björkman and Prof. Dr. Zafiris Tzannatos. I have also benefited from the discussions I have had with Prof. Dr. Alberto Alesina, Asst. Prof. Elsa Artadi and Dr. Vincent Hogan. Of course I am grateful as well to the board of Bocconi University, for their financial support during my thesis work, without which I could not have afforded to engage in my graduate studies. I owe my deepest gratitude to Olaf J. de Groot, my friend and my co-author for chapter 2, without whom I would not be able to finish this thesis.

Furthermore, I am grateful to everyone who has read parts of the thesis and has given useful comments. Parts of the dissertation have been presented at conferences in Lucca, Italy (December 2007), Maastricht, the Netherlands (June 2008), Berlin, Germany (July 2008), Madrid, Spain (September 2008), Florance, Italy (November 2008), Cork, Ireland (April 2009), Aix en Provence, France (September 2009) and Valencia, Spain (December 2009), the participants of which have also helped me improve the different chapters. I remain indebted to Irfan Çöllüoğlu, Refet Şaban and Burcu Becermen for their help in providing the necessary data sets. Moreover, I would like to thank Aazir Khan and Fedor van Rijn for their technical and linguistic support.

Further I would like to extend my thanks to my friends for their constant help and support through the thesis. Special thanks go to Giovanna Labartino for her help with the Stata and to my office mate Annaig Morin for the nice working environment that we created in our office. I would also like to take this opportunity to thank Işıl Göksel and Lorenzo Benaglia for their patience and support.

Lastly, and most importantly, I would like to express special thanks to my parents, Ayper Göksel and Mustafa Göksel. They bore me, raised me, supported me, taught me, and loved me. Without their help and encouragement, this study would not have been completed. To them I

dedicate this thesis.

Contents

1 Introduction

My aim, with this dissertation, is to contribute to the literature on the economics of education and gender. The importance of education to economic development is well documented. Many studies concentrate on the contribution of education not only to economic growth but also to individual and social development. Likewise, all chapters in this dissertation also emphasise the importance to education on different subjects and show how diverse its impact can be; people respond to the existence of a conflict by increasing their investment in education. Agents with higher education tend to be less conservative and this, in turn, influences female labour force participation. Another emphasis of the dissertation is the gender bias against females, particularly in Turkey, which is also closely related to education.

All of the following chapters contain empirical work and each of them concentrate on one country. The second chapter analyses the case of Basque region in Spain, since the focus of the study is to examine the influence of civil conflict on demand for education. The Basque conflict is one of the rare conflicts that has not had a strong supply-side effects on education and therefore enables us to look at the isolated influence of conflict on demand for education[2]. In the next two chapters, I chose to focus on Turkey. The reason for this choice is the fact that unfortunately, it is not possible to say that Turkey's performance regarding education and gender equivalence is up to standard. As Wigley and Wigley (2005) state, the education of Turkey's adult population is outperformed by

[2] This chapter is co-authored with Olaf J. de Groot from the German Institute for Economic Research (DIW Berlin).

most countries with a lower GDP per capita and those countries with similar or higher level of per capita income (with the exception of Brazil) in terms of being literate.[3] In terms of youth illiteracy, only Jamaica, the Philippines and Brazil perform worse than Turkey. Wigley and Wigley (2005) also highlight Turkey's female illiteracy rate, which is higher than in many other countries. Moreover, Turkey shows a particularly different trend compared with many other countries regarding female labour force participation (FLFP). Over the last 50 years, Turkey's FLFP has been decreasing.[4] Furthermore, according to the Global Gender Gap Report 2009[5], Turkey has the 6th lowest global gender gap index and the 5th lowest rank in economic participation and opportunity for women.[6] The only countries among the 130 in the sample that perform worse than Turkey are Saudi Arabia, Benin, Pakistan, Chad and Yemen. A closer look at the gender gap sub-indices reveals that Turkey has the 10th lowest female labour force participation rate and the 12th lowest share of women in ministerial positions among 130 countries.[7] Lastly, being a link between the East and the West both geopolitically and culturally, Turkey plays an important role in the region's economy and politics. Especially during the integration process of Turkey with the European Union, it is essential to identify such problems and to propose possible solutions.

In the second chapter[8], unlike previous work (e.g. Lai and Thyne), we are not interested in the supply-side effects that may take place due to

[3] Countries included in this survey are Indonesia, Jamaica, Philippines, Paraguay, China, Peru, Turkey, Thailand, Brazil, Mexico, Malaysia, and Chile.

[4] Fernandez and Fogli (2005).

[5] World Economic Forum (Geneva, Switzerland 2009).

[6] When gender gap index equals to one it means equality between males and females. In 2009 Iceland has the highest ranking with an index of 0.8276.

[7] It is interesting to observe such a trend in Turkey, especially when we consider the fact that it was one of the first countries where women received their right to vote and to be voted (1930, 1934).

[8] This chapter is co-authored with Olaf J. de Groot from the German Institute for Economic Research (DIW Berlin) and this part of introduction leans heavily on the part in his dissertation.

lack of teachers, difficulty in the physical access to schools, the necessity for students to work, etc. Instead, we look at the demad-side effects, relating them to the literature on brain gains vs brain drains.

We start by exploring the suspected effects in a theoretical model. This naive model assumes innate ability for individuals, who then decide on their level of education. The level of education, then determines the wage level that one can expect. In addition, one can decide whether to work in the home region or in a migration region, subject to a cost of migration that depends negatively on the level of education. Finally, there is a bonus for living outside your home region, which can be either positive or negative. We then show that under relatively general conditions, the initiation of a small-scale civil conflict (not causing any supply-side effects in education) which increases the bonus of living outside the home region will increase the incentive for migration. However, it is particularly interesting to see that the difference in education demand takes place in one specific part of the ability distribution. It is the group with a medium level of ability who are more likely to migrate and increase their level of education. Neither the high-ability, nor the low-ability types show this same effect.

In order to study the veracity of our theoretical model, we look at the Basque Region in Spain, where a relatively low-scale civil conflict broke out in the late 1960s and which fits the other characteristics that our model requires. The method we employ is inspired by Abadie and Gardeazabal (2003), who use the other Spanish regions to construct a synthetic Basque Region that has the same features as the true Basque Region had before the conflict started. They then look at the development of the true and synthetic regions after the conflict started and conclude that the conflict is responsible for a GDP loss of approximately 10%. However, contrary to Abadie and Gardeazabal, we are not looking at average outcomes particularly because of our suspicion that different effects are at play at different locations within the distribution. Instead,

we plan to replicate the entire educational distribution. But before doing so, it is important to take out other obvious explanatory factors that may explain some of the educational variance among different parts of the country.

We employ a dataset that consists of an amalgamation of the Census results from 1990 and 2000 and includes a total of six million observations. Approximately two million of these observations are ineligible, but with the rest, we perform an ordered probit analysis, that aims to take out the most obvious explanatory variables for educational achievements. What is left is the so-called Residual Education, for which we continue to calculate the average decile values for all Spanish Regions.

In the second stage, these regional decile values for all regions except the Basque Region are used as inputs to replicate each of the Basque Region's deciles between birth years 1910 and 1955. Most deciles use a variety of inputs to create the artificial region's distribution of Residual Education. For a sense of clarity, we then add up the different components in three different groups: the three lowest, the four middle and the three highest deciles. Graphically, it is obvious that the lower and higher deciles are indeed unaffected by the start of the civil conflict and education in the true and artificial regions continue to move very similarly. For the middle deciles, on the other hand, the true Basque Region's level of education is significantly higher than that of the artificial Basque Region.

Finally, we provide additional evidence for the proposed channel of these differences: migration. When performing a naive difference-in-difference analysis on people born in the Basque Region and born elsewhere in Spain, it is clear that Basque-born have become relatively more likely to migrate. At the same time, in concordance with our theoretical model, the average Basque-born individual has relatively increased his level of education. Most significantly, while the average Basque-born out-migrant has a higher level of education, it has decreased relatively compared to

out-migrants from other regions, as forecasted by our theoretical model.

After observing the influence of conflict on investment in education, in the next chapter I concentrate on a different kind of conflict and its influence on human capital investment: Conflict between genders. In the first part of the third chapter, I again look at the demand side for education, this time for Turkey and explain the main factors that affect the demand for education for males and females separately. This gives me the opportunity to observe whether there are any differences between genders or not. Moreover, in the second part of the chapter I evaluate the impact of the extension of compulsory education, which took place in 1997, on the composition of household labour force participation.

Education of parents, household income, and number of children in the household seem to be the main determinants of school attainment for both boys and girls in both years, although the marginal effect is different for genders. These determinants affect girls' attainment more than boys' in both years. While girls are more negatively affected by the number of the boys in the household, boys are influenced negatively by having a self employed father. Living in urban region has lost its positive significance, which it had in 1994 and in 2002 for middle schooling. It is also shown that when mothers have the power to decide, they give more importance to their children's education. The chapter concludes that income growth, and increase in parents' education contribute positively to children's school attainment, and their positive effect will be higher for girls than boys.

Educational decisions in Turkey involve some very important gender issues: Girls are less educated than boys are, and there are major social changes underway with respect to the roles of women in marriage, divorce and the labour market, all of which influence schooling decisions. The impact of compulsory schooling and gender issues are different in rural and urban settings. In the third chapter, I concentrate on differ-

ences with respect to education, whereas the fourth chapter emphasises the urban-rural differences in terms of female labour force participation. More girls already attend school in urban areas compared to that in rural areas and face different employment opportunities and social possibilities. A careful analysis of the impact of expanding compulsory education on educational attainment and the structure of family labour supply is therefore useful and required keeping the differences in urbanity and gender under close consideration.

Contrary to the developed countries, Turkey extended its compulsory education just recently. It is important to investigate its effects and see whether this policy is efficient or not in increasing school enrolment and graduation rates in recent times. In order to see the impact of the extension of compulsory education, first the overall statistics have been assessed. Although it seems like the extension increased the overall enrolment rate, the further analysis show that because of the drop outs, this policy has not been as effective as one would expect. Only the girls living in the cities seem to be positively affected by the extension of compulsory education in terms of school attainment, and when the pooled data is concerned, it does not seem to have any significant effect. The extension of compulsory education may also affect the labour force combination of the households. In order to understand this, difference-in-differences methodology is used by taking the 16-17 years old children as treatment group and 18-19 years old children as control group. The results show that this policy increased the total working hours in the households, but it did not have any effect on the probability that the mother starts working or father gets an additional job. On the other hand it had a positive effect on child labour by decreasing the probability of child labour by 2%. This study shows that in Turkey when a household needs extra income the first way they choose is to increase the working hours of the head of the household rather than letting mothers work. This is in accordance with the following chapter.

The last chapter concentrates on the impact of conservatism on female labour force participation. The previous chapter not only shows that there is a gender bias against girls in terms of investment in education in Turkey but also demonstrates that mothers' working is not a preferable way to increase the household income. Furthermore, the female labour force and gender gap statistics of Turkey are as bad as the ones for education.

In addition to the main determinants found in the previous literature, this chapter adds a new variable that influences female labour force participation in Turkey: Conservatism and the role of tradition and social norms in Turkey. An original proxy for conservatism is created by using a unique data set about perceptions in Turkey. Three indices that might influence conservatism are formed: Tradition, social norms, and men's decision power. Then the first three are combined to see the general influence of being conservative in social terms. After all the indices have been transformed into a pooled data set which consists of three different data sets from different years, an instrumental variable approach is used to test the validity of the indices. Altitude is chosen as an instrument for conservatism. By using this instrument, endogeneity problems are prevented from still having significant results.

This chapter shows that social beliefs and behaviours also play an important role in women's decision to work. Women are not alone when they are making their decisions but the environments they live in affect their behaviour. Women that live in a conservative and traditional environment, where men have a higher decision power and stronger social norms, tend to stay at home as expected by society and become housewives. Moreover, the conservative environment that a woman lives in has a greater influence on her decision to work or not rather than how conservative her husband is. The difference in the impact of conservatism on female labour force participation between the most conservative urban area in Turkey and the least conservative one is 10 percentage points,

which is equivalent to the influence of almost three years of education. On the other hand, in rural areas this difference is 9 percentage points.

Education plays an important role in women's decision to work through two channels. First one is an already known fact; with higher education it is easier to find a job. The second one, shown in this chapter, is that a high education level weakens the influence of conservatism.

Urbanization is one of the most important reasons for the decline in female labour force participation, not only because of the lack of job opportunities for women in cities but also because conservative men's preferences differ between urban and rural areas. This is in accordance with the results of the previous chapter in which it is shown that living in a city is the variable that influences the probability of mother working most negatively when marginal effects of the variables used in the study are calculated. In their book, Çarkoğlu and Kalaycıoğlu (2009) claim that urbanization is one of the reasons of increasing trend in conservatism. This chapter shows a new possible explanation for the link between urbanization and female labour force participation. Higher urbanization causes higher conservatism, which leads to lower labour female force participation.

2 The Influence of Conflict on the Demand for Education in the Basque Region

Abstract

It has previously been shown that civil conflict influences many economic factors, including education, which play an important role in development and economic growth. Previous authors working on the influence of conflict on education have, however, always focused strongly on the supply-side effects, whereas this chapter examines the influence of conflict on the demand for education. It is theoretically shown that, under relatively general conditions, individuals living in a conflict area have an incentive to increase their level of education and that this effect depends on the individual's skill level. This hypothesis is then tested using the conflict in the Basque Region as a case study, which is an example of a conflict in which one would not expect strong supply-side effects. Using the other Spanish regions, an artificial region is created in which the population has a similar educational distribution as in the Basque Region. When comparing the true and artificial regions, it can clearly be seen that for individuals with a medium level of education, there is a strong incentive to increase their education level, which is in concordance with the theoretical model.[9]

Keyword: Education; Conflict; Matching; Spain

Jel codes: I21, D74, C15

Introduction

The adverse effects of civil conflict on many factors that influence social

[9] This chapter is co-authored by Olaf J. de Groot from the German Institute for Economic Research (DIW Berlin).

well-being can be considered to be a well-established fact. For example, conflict researchers have previously examined the impact of conflict on health (Ghobarah *et al.*, 2004), human capital (Hoeffler and Reynal-Querol, 2003), physical capital (Abadie and Gardeazabal, 2003), economic growth (Murdoch and Sandler, 2002), and education (Lai and Thyne, 2007 and Ichino and Winter-Ember, 2004). Furthermore, the causes of civil war (Djankov and Reynal-Querol, 2007), particularly the impact of ethnicity (Fearon and Laitin, 2003) on conflict and its spillover effects (Murdoch and Sandler, 2002 and De Groot, 2009) are also topics discussed extensively in this literature.

On the other hand, it is well known that education plays an important role in economic growth (Barro, 2001 and Wong and Yip, 1999), equality (Gradstein, 2003), and the role of females in society (Schultz, 1995b). Moreover, returns to education (Garcia Prieto *et al.*, 2005 and Psacharopoulos and Patrinos, 2004) is regarded as an important topic as well as the basic consideration when making human capital investment decisions. Furthermore, education has an additional downstream effect: higher educated parents tend to have higher incentives to invest more on their children's human capital (Göksel, 2010).

Extending from the aforementioned literature, this paper aims to analyse the impact of conflict on the demand for education. Observing this impact will help to clarify the implications of conflict on this particular element of social well-being. It is important to stress that, unlike previous papers (Lai and Thyne, 2007, particularly), we aim to analyse the demand-side of education, instead of the combination of demand and supply-side effects. We have chosen the Basque conflict as a case study because this conflict has not had strong supply-side effects on education, which gives us the opportunity to look at the isolated influence of conflict in the demand for education.

In the following section of the paper, we provide a brief literature review.

We introduce our theoretical model in the third section. In the fourth section, the empirical analysis and data are presented. The fifth section includes the results and the final section concludes.

Literature Review

To our knowledge, the only other paper that investigates the impact of conflict on education is by Lai and Thyne (2007), in which they use cross-sectional and time series methods to analyse the issue. The authors consider two mechanisms: the first channel entails the fact that civil wars are likely to destroy a state's system of education through the loss of infrastructure and personnel. The second channel is the reallocation of resources from education to military expenses. Lai and Thyne use UNESCO education data for all states from 1980 until 1997 and examine the percentage change in educational expenditures for all education levels. They find evidence for their first claim, as both expenditures and enrolment decline during periods of civil war, but they do not find any proof for the reallocation of education funds towards military spending during conflicts. Finally, the supposed decrease in education expenses is only valid for higher level conflicts.

In their paper, Hoeffler and Reynal-Querol (2003) investigate the costs of conflict. They separate the costs into two subgroups consisting of economic and human costs. They also consider the long-term effects of civil war, taking into account the mortality rates among children, HIV in the military and the psychological damage of conflict. Surprisingly enough, they do not consider the impact of civil wars on education while performing these analyses.

According to Arrazola and De Hevia (2006), who use the Spanish Civil War as an Instrumental Variable to research the rates of return to education for men and women, there are three main reasons why educational attainment decreases during war periods. This includes difficulties in the

physical access to schools, the decline in financial means for school attendance and need for children to leave school to earn money for their family. In this paper, we are interested in the impact of the Basque conflict, which is not an actively armed conflict and thus does not cause physical bans or damage to the schooling system. Our claim is that it still may influence the incentives to acquire education, due to changes in the returns to schooling. Basically, our main interest is the demand side of the schooling system instead of the supply side.

Brain Gain vs Brain Drain

Our hypothesis is related to the ongoing debate of brain gain versus brain drain in migration literature. It has been claimed that migration decreases economic growth and the average education level of the source country due to the departure of the more highly educated and more intelligent people (Bhagwati and Hamada, 1974 and Haque and Kim, 1995). Building on that, Wong and Yip (1999) claim that brain drain reduces the economic growth rate and has a detrimental effect on non-emigrants in the source country through income-distributional effects and the reduced human capital accumulation. Wong and Yip show that if the initial rate of human capital accumulation is relatively low, a representative non-emigrant's sum of discounted income and life time utility could deteriorate. But recently researchers have started to show that migration may in fact have positive effects for the source country.[10] Borjas (1994) in his paper investigates the economics of immigration in detail and evaluates both positive and negative consequences of migration. Using cross section evidence, Boucher *et al.* (2007) claim that the access of households to high-skill internal migration networks increases the likelihood that children will attend school beyond compulsory level. Furthermore, they provide evidence that if the returns to education are higher in the destination country, the incentive to invest in human capital will increase

[10] Mountford (1997) and Stark (2004)

in the source country with a positive probability of migration. Likewise, Stark *et al.* (1997) claim that optimising workers in the source country will invest more in education if they have an opportunity to migrate and hence have higher expected returns to investment in human capital. Moreover, they find that costs of acquiring human capital are lower for more able workers than for less able ones. Both of these papers stress that only a proportion of the educated residents finally migrates and that therefore, in the end, the average level of education for the remaining population also increases. On the other hand, Beine *et al.* (2001) consider both beneficial and detrimental effects of migration. Their supposed "brain effect" refers to the improved incentives for investment in education as a result of improved migration opportunities, similar to the previously mentioned authors. The second impact of migration, referred to as the "drain effect" is the departure of some, if not all, educated agents. Beine *et al.* go on to claim that the sign of the total impact of the migration depends on which effect dominates.

As mentioned before, the aim of this paper is to analyse the impact of conflict on the demand for education. Civil conflict can have two different effects on education. It may either increase the incentives for education in order to be able to migrate out of the conflict region or reduce the incentives on human capital accumulation due to the problems caused by conflict and demoralisation.

Methodological Literature

The methodology used in this paper is inspired by Abadie and Gardeazabal (2003), who construct a synthetic control region, which resembles the Basque region, in order to be able to compare the economic evolution of that artificial region to the Basque region during the conflict era. The artificial region is constructed as a weighted combination of other Spanish regions chosen to resemble the characteristics of the Basque country

before the conflict. The authors find a 10% average GDP gap and provide evidence that changes in the per capita GDP gap are associated with the intensity of the conflict.

In the same style, Guidolin and La Ferrara (2007) employ a similar methodology to conduct an event study regarding the sudden end of the conflict in Angola due to the death of the rebel movement leader in 2002. They aim to find how the value of diamond mining firms responds to conflict episodes and to estimate the relationship between abnormal return and political tension. In order to achieve this, two portfolios are constructed: a portfolio with firms that have significiant Angolan interests, and a control portfolio that consists of companies that do not have such interests. The control group is formed by assigning weights to companies in order to minimise the Euclidean distance between two vectors containing the mean of abnormal returns, the variance of abnormal returns and the OLS beta of a world market portfolio model that regresses daily control returns on the world market for the period of four years before the end of the conflict. Their results show that the end of the conflict decreases the abnormal returns of the Angolan portfolio rather than increase them. The authors interpret this as a signal that incumbent firms benefit from the existence of conflict due to the barriers to entry and reduction in a government's bargaining power caused by the instability created by the civil war. Their paper is an important contribution to the literature not only because of the methodology employed, but also because it proves that conflict may positively impact the interests of some agents.

Basque Conflict

Before continuing this paper, it is important to clarify the outline of the Basque conflict[11]. The main actor of the Basque conflict is ETA

[11] This subsection including the description of the Basque conflict leans heavily on

(Basque for "Basque Homeland and Freedom"), whose main aim is to promote establishment of an independent Basque country. Although it was founded in 1959, ETA did not claim its first victim until 1968 (Abadie and Gardeazabal, 2003). Since then, ETA has killed 823 people and committed dozens of kidnappings. Abadie and Gardeazabal show a table listing the number of killings and kidnappings by ETA between 1968 and 2000, which is reproduced here in table 1. From table 1, it can be seen that the number of killings and kidnappings were low before 1973, but started to increase during the mid 1970s, peaking during the years of 1978-1980 (235 victims). After 1980, the number of killings decreased gradually. During the 1980s, on average, ETA killed 39 people per year and this number is reduced to 19 per year during the 1990s. In September 1998, ETA declared a cease-fire, which lasted for 14 months and in 2000 ETA killed 23 people (Abadie and Gardeazabal, 2003). ETA's main financial sources are kidnapping, extortion and some robberies. For these activities, they have been targeting mainly the Basque entrepreneurs. Another interesting thing is the fact that although ETA conducts its activities in almost all Spanish regions, most of its activities are concentrated in the Basque Region. According to the calculations of Abadie and Gardeazabal, almost seventy percent of deaths cause by ETA in Spain during 1968-1997 took place in the Basque Region.

Theoretical Model

For the current paper, we develop a naive theoretical model, which is merely used to outline our hypothesised changes in education as a result of a civil conflict. As mentioned earlier, the model is not generally applicable to simply any conflict, because, different from Lai and Thyne (2007), it focuses on the supply side of education, instead of the demand side. It is assumed that in the conflict region, as well as in the

the description provided by Abadie and Gardeazabal (2003).

1.Number of deaths from ETA attacks

year	deaths	year	deaths	year	deaths
1968	2	*1979*	76	*1990*	25
1969	1	*1980*	92	*1991*	46
1970	0	*1981*	30	*1992*	26
1971	0	*1982*	37	*1993*	14
1972	1	*1983*	32	*1994*	13
1973	6	*1984*	32	*1995*	15
1974	19	*1985*	37	*1996*	5
1975	16	*1986*	41	*1997*	13
1976	17	*1987*	52	*1998*	6
1977	11	*1988*	19	*1999*	0
1978	67	*1989*	19	*2000*	23

Note: table is a replication from Abadie and Gardeazabal (2003).

non-conflict region, education is sufficiently available and the level of education is determined primarily by the demands of the individual, instead of supply constraints. This assumption may not necessarily hold when considering longer time periods, as freely accessible (tertiary) education is something that has only developed during recent decades, but the assumption can be adjusted to read that there is no difference in the supply of education between the conflict area and the non-conflict area.

The outline of the model is as follows: An economy is populated by individuals who all have a particular level of ability. Using their level of ability, they decide to obtain a certain level of education and subsequently they decide whether to work in the home region, or whether to migrate and work in the migrant region. Individuals are fully rational and therefore make all their decisions through rational optimisation.

Model Outline

As mentioned above, the population consists of a continuum of individ-

uals. These individuals differ in only two respects. First, they have an ability level $A_i \in [0;1]$ and second, they are either susceptible to migration or not. In total, a proportion γ is potentially interested in moving, while the rest $(1-\gamma)$ is not[12]. The first group is the group that we are interested in and whom our model concerns, whereas the latter is simply staying in the home region and not involved in any migration decision. The Ability level A_i is the main determinant in the cost of acquiring education, where it obviously has a negative sign. The relationships between the Cost of Education (CE_i) and both A_i and the chosen Education level $E_i \in [0;1]$ are convex, which yields the following type of cost function:

$$CE_i\left(E_i, A_i\right) = E_i^2 \cdot \left(2 - A_i\right)^2 \tag{2.1}$$

There are also other potential cost functions, but as long as it satisfies the initial conditions, the actual form does not significantly influence the results. During the first stage of the model, individuals use this cost function to determine their optimal level of education, taking into account the expected payoffs from education at a later stage. That second stage is when the individuals take up jobs and start working either in the domestic market or the migrants' market. The wages in these markets are the same in principle and depend on the level of education of an individual and a factor $\omega > 0$:

$$w_d\left(E_i\right) = w_m(E_i) = (1 + E_i) \cdot \omega \tag{2.2}$$

However, living as a migrant has one additional benefit. Individuals who live as migrants receive a bonus of $\lambda \in [-\infty;\infty]$, which represents the benefit of living out of your own region. This benefit can come from different sources, such as the expansion of job opportunities or an increased appreciation for highly developed skills. Another possibility,

[12] This assumption is merely in place to avoid an outcome in which the entire population decides to migrate, which is unrealistic and undesirable.

however, is that there is a peace bonus to living in another region, if indeed there is a civil conflict taking place in the home region. This is one of the channels through which we expect to see results. The second relevant channel is the costs incurred during migrating. These Costs of Migration (CM_i) consist of the fact that one is away from the home region, which may lead to problems of adjusting to a different culture and/or language. Particularly the language aspect is expected to be important and therefore, the Costs of Migration are decreasing in Education. One way this function could look is as follows:

$$CM_i(E_i) = (1 - E_i) \cdot \mu \tag{2.3}$$

where $\mu \geq 0$ is related to the difficulty of the adjustment process between the two different cultures.

The individuals have all this information available and decide whether to migrate or not. For this decision, they weigh the different levels of utility they would derive from migration and non-migration:

$$\begin{aligned} U_i &= (1 + E_d) \cdot \omega - E_d^2 \cdot (2 - A_i)^2 \text{ if } migr = 0 \\ U_i &= (1 + E_m) \cdot \omega - E_m^2 \cdot (2 - A_i)^2 + \lambda - (1 - E_m) \cdot \mu \text{ if } migr = 1 \end{aligned} \tag{2.4}$$

Solution

It is easy to see that this model is simply a game with three stages:

1. Decide on education level E_i, given A_i.
2. Decide whether to migrate or not.
3. Work and earn.

We therefore solve the game through backward induction. At the third stage, no real decisions are taken and this stage is therefore ignored. At

the second stage, however, there is an important decision to be made. The outcome of this decision depends on the Utility levels that can be derived from migration and from staying in the domestic region. To be more precise, defining $\widehat{E_d}$ and $\widehat{E_m}$ as the optimal levels of education under the assumption that the individuals are either working domestically or as migrants, an individual decides to migrate when the following is true

$$\left[\left(1+\widehat{E_m}\right)\cdot\omega-\widehat{E_m}^2\cdot(2-A_i)^2+\lambda-(1-\widehat{E_m})\cdot\mu\right]-\left[\left(1+\widehat{E_d}\right)\cdot\omega-\widehat{E_d}^2\cdot(2-A_i)^2\right]>0 \tag{2.5}$$

$$\lambda-\widehat{E_d}\cdot\omega+\widehat{E_m}\cdot(\mu+\omega)-\mu>\left(\widehat{E_m}^2-\widehat{E_d}^2\right)\cdot(2-A_i)^2 \tag{2.6}$$

$$\sqrt{\frac{\lambda-\widehat{E_d}\cdot\omega+\widehat{E_m}\cdot(\mu+\omega)-\mu}{\left(\widehat{E_m}^2-\widehat{E_d}^2\right)}}>(2-A_i) \tag{2.7}$$

$$\overline{A_i}=A_i>2-\sqrt{\frac{\lambda-\widehat{E_d}\cdot\omega+\widehat{E_m}\cdot(\mu+\omega)-\mu}{\left(\widehat{E_m}^2-\widehat{E_d}^2\right)}} \tag{2.8}$$

From equation 2.8, it can be seen that the decision to migrate depends on the equilibrium levels of Education, the individual Ability level and several parameters. An individual prefers to migrate when her threshold ability level ($\overline{A_i}$) is larger than the right-hand side of the equation. Taking this into account, we move back to the first stage of the game in which individuals decide on their education levels. We calculate separately what the equilibrium level of education is when migrating and when staying in the home region:

$$\max_{E_i} U_i=(1+E_d)\cdot\omega-E_d^2\cdot(2-A_i)^2 \text{ if } migr=0 \tag{2.9}$$

$$\max_{E_i} U_i = (1 + E_m) \cdot \omega - E_m^2 \cdot (2 - A_i)^2 + \lambda - (1 - E_m) \cdot \mu \text{ if } migr = 1 \qquad (2.10)$$

Simply taking the First Order Conditions for each of these two expressions yields the following:

$$\begin{aligned} \frac{\partial U_{i,d}}{\partial E_d} &= \omega - 2 \cdot E_i \cdot (2 - A_i)^2 = 0 \\ E_d &= \frac{\omega}{2 \cdot (2 - A_i)^2} \text{ if } migr = 0 \end{aligned} \qquad (2.11)$$

$$\begin{aligned} \frac{\partial U_{i,m}}{\partial E_m} &= \omega - 2 \cdot E_i \cdot (2 - A_i)^2 + \mu = 0 \\ E_m &= \frac{\omega + \mu}{2 \cdot (2 - A_i)^2} \text{ if } migr = 1 \end{aligned} \qquad (2.12)$$

These equilibrium levels of education depend on the parameters of the model, and the individual level of Ability, A_i. It is important to note here that for a given level of Ability, an individual who decides to migrate will acquire a higher level of education than an individual who decides to stay at home, as long as $\mu > 0$. At this stage, we can insert expressions 2.11 and 2.12 into equation 2.8, to find the equilibrium after which individuals will find it more attractive to migrate and find work in the migration region:

$$\overline{A_i} > A_i = 2 - \sqrt{\frac{\lambda - \widehat{E_d} \cdot \omega + \widehat{E_m} \cdot (\mu + \omega) - \mu}{\left(\widehat{E_m}^2 - \widehat{E_d}^2\right)}} = 2 - \sqrt{\frac{\lambda - \frac{\omega^2}{2 \cdot (2 - A_i)^2} + \frac{(\omega + \mu)^2}{2 \cdot (2 - A_i)^2} - \mu}{\left(\left(\frac{\omega + \mu}{2 \cdot (2 - A_i)^2}\right)^2 - \left(\frac{\omega}{2 \cdot (2 - A_i)^2}\right)^2\right)}}$$

$$\lambda - \frac{\omega^2}{2 \cdot (2 - A_i)^2} + \frac{(\omega + \mu)^2}{2 \cdot (2 - A_i)^2} - \mu > (2 - A_i)^2 \cdot \left(\left(\frac{\omega + \mu}{2 \cdot (2 - A_i)^2}\right)^2 - \left(\frac{\omega}{2 \cdot (2 - A_i)^2}\right)^2\right)$$

$$\lambda - \mu + \frac{1}{2} \cdot \frac{(\omega + \mu)^2 - \omega^2}{(2 - A_i)^2} > \frac{1}{4} \cdot \frac{(\omega + \mu)^2 - (\omega)^2}{(2 - A_i)^2}$$

$$\overline{A_i} > A_i = \left(2 - \frac{1}{2} \cdot \sqrt{\frac{(\omega)^2 - (\omega + \mu)^2}{\lambda - \mu}}\right) \tag{2.13}$$

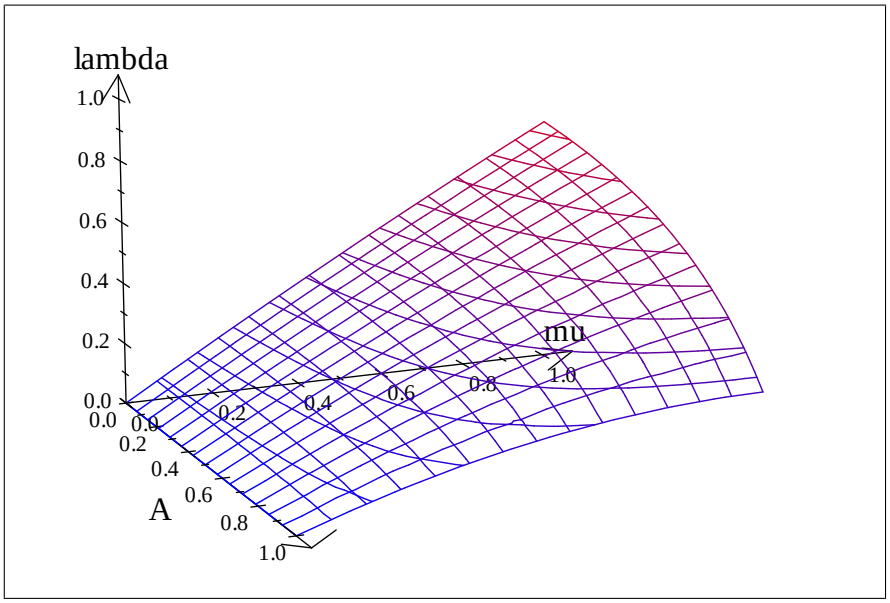
So, apart from a number of coefficients, the decision whether or not to migrate depends solely on the level of Ability.

Interpretation

Unfortunately, the interpretation of equation 2.13 is not very straightforward at first sight. There is, however, a way of graphically showing the implications from this equation. If we assume unity wage, so $\omega = 1$, equation 2.13 becomes:

$$\overline{A_i} > A_i = \left(2 - \frac{1}{2} \cdot \sqrt{\frac{1 - (1 + \mu)^2}{\lambda - \mu}}\right) \tag{2.14}$$

There are now only two coefficients left (λ and μ), in addition to the level of Ability A_i. The way this can be represented is by looking at the combinations λ and μ that will give a particular threshold level of Ability above which it is more attractive to migrate. In figure, the threshold for choosing to migrate is shown as a function of the relevant characteristics. As can be seen, given λ, an increased level of μ will require a higher Ability level in order to migrate. Conversely, keeping μ constant, a higher λ indicates that the cut-off level of Ability is lower.



The combinations of λ, μ and A_i where individuals decide to migrate or not.

It is important to stop for a moment and consider the interpretation of figure . Looking at an example, we know that with $\lambda = 0.4$ and $\mu = 0.4$, even individuals who have $A_i = 0$ are interested in migrating and working in the foreign region. On the other hand, when $\lambda = 0.2$ and $\mu = 0.5$, not even the top of the Ability distribution is going to be willing to migrate and work abroad. Of course, it would be expected that the real values of λ and μ are somewhere in the middle of these extreme examples.

The implications of figure should be obvious in the context of the current paper. An outbreak of a relatively small-scale civil conflict in the domestic region is going to increase λ, which leads to an increase in migration, as long as the ex ante equilibrium is somewhere in the medium region. However, an autonomous shift of λ will not merely change the size of migration, but also the composition. After all, when e.g. $\lambda \approx 0.36$ and $\mu = 0.5$, any individual who is potentially interested in migrating[13] needs

[13] Remember that we said that only a portion γ of the population is potentially interested. This is to make sure that there is no situation in which the entire

$A_i \geq 0.5$ in order for him to have an incentive to migrate. This implies that the level of education of migrants is distributed between 0.5 and 1. Now, if due to the occurrence of a civil conflict, λ increases and becomes $\lambda_{new} \approx 0.40$, the threshold level of Ability will go down to 0.3. This leads to an increase in migration, but also to a reduction of the Ability level, which will now be distributed between 0.3 and 1.

The implication for education can be seen as follows: Of those individuals born in the domestic region, the increase in potential migrants will in fact increase the over-all level of education. The average level of education for migrants, on the other hand, is going to fall, due to the increased presence of low-Ability individuals in the total pool of migrants.

The Basque Case

The case of the Basque civil conflict fits into the current model very well, particularly because Spain and the Basque region are politically unified. This reduces the Cost of Migration and increases the percentage of people who would potentially be interested in migrating. In this particular case, it is only the cultural and linguistic differences that make the move more difficult. Another major difference with the standard migration literature (e.g. Borjas, 1994), is the fact that there are no legal differences between the education systems of the Basque and Spanish regions, so the problem that highly educated migrants end up doing lower class jobs does not take place here.

During the conflict, there have been no significant effects on the supply of education and any changes in education achievement are due to demand changes. In the next section, we analyse empirically what the presence of the Basque conflict did to the education achievements of Basque-born individuals. For this, we could look at the average educational achievement, but according to the theoretical model described

population chooses to migrate.

here, the effects should be stronger in one particular part of the educational distribution. In fact, assuming that the combinations of λ and μ do not take on extreme values that would lead to no or full migration, it can be expected that the shift as a result of the conflict takes place in the middle part of the educational distribution. This leads to an increased overall level of education and to a lower level of education for the population of domestic migrants from the Basque Region.

Empirical Analysis

In the previous section, we described a hypothesis on how the presence of civil conflict may influence education outcomes, even when, contrary to Lai and Thyne (2007), a conflict does not influence the supply of education. To empirically test whether this hypothesis is true, we employ a method based on Abadie and Gardeazabal (2003) and in this section we explain how. In a nutshell, the idea is that we use a dataset on realised education for people born in different Spanish provinces and in different years, which is then used in an ordered probit analysis to take out the most obvious explanatory factors for education accomplishments. This first stage yields a dataset on "residual education" for individuals from all different Spanish regions. At the second stage, the dataset is split into one pre-conflict dataset and one dataset that takes place during the conflict. Using the pre-conflict dataset, we then apply a matching method to create an artificial region that exhibits the same characteristics as the Basque region, pre-conflict. After doing this, we compare the distributions of education in the true and artificial Basque Regions during the conflict, from which it is possible to conclude what the effect of the conflict on education is.

In the following subsections, the details of the analysis are explained more precisely.

First Stage Regression

Different from the Abadie and Gardeazabal (2003) analysis, we choose to filter out the alternative explanatory factors of education level before creating the artificial region during the second stage. The dataset we employ are the 1991 and 2001 Census results, which report, among many other things, the realised education level of all interviewed individuals. Of course, in order to make sure that individuals will have completed their entire education, only those individuals who have reached the age of 25 at the time of the Census are included.

The education levels are given in levels between 1 and 10, representing everything from $illiterate$ until $PhD - level$. As these are categorical non-continuous observations, the use of Ordinary Least Squares is ruled out. Instead, we perform an ordered probit analysis, with education level as the dependent variable. The independent variables are the most ex ante obvious variables to explain the level of education. In an ideal situation, this would include variables like the wealth status of the individual's family at the time of birth or the parental level of education, but unfortunately these data are impossible to obtain. The only totally exogenous explanatory variables that are available at the individual level are year of birth and gender. So while it is not possible to add further individual-specific control variables, there are several variables at the provincial level that add a significant amount of explanatory power. First of all, there is Provincial GDP level. As this may be endogenous to the level of education of the population, it is important to have an ex ante level of GDP. Unfortunately, due to the specifics of the Spanish situation, there is very little available in terms of old provincial data and we therefore use the oldest trustworthy source of data that can be found: GDP in 1967. Most importantly, this year is before the actual start of the conflict and can therefore be considered as a relevant explanatory variable.

The other provincial-level variables are related to the supply of education. After all, obtaining a higher level of education is largely dependent on the availability of educational institutions. As a proxy for the availability of lower level of education, we use population density. After all, primary and secondary education are nearly universally available as long as there is a minimal mass of people. The only possible impediment to accessing these levels of education is the potential travel time to and from schools, which, again, is directly related to the population density in a province. In order to make sure there are no endogeneity issues, we use the population density at the provincial level at the nearest decade (1930, 1940, etc) before birth. For tertiary education, we have used a more sophisticated method and set up a database on the Spanish Higher Education. In subsection 4.3, there is further explanation concerning the data collection, but it suffices to say that we use a dummy variable that says whether or not an institution of higher education is available in the province, 18 years after birth. Finally, in order to pick up any other province-specific effects, we add province-dummies for each of the 50 provinces in our dataset[14].

Empirically, the Ordered Probit regression we estimate during the first stage looks as follows:

$$\begin{aligned}\Pr(edu_{i,y,p} \quad = \quad lvl) = \begin{bmatrix} \beta_1 \\ \vdots \\ \beta_{50} \end{bmatrix} \begin{bmatrix} D_1 & \cdots & D_{50} \end{bmatrix} + \beta_{51} \cdot sex_i + \beta_{52} \cdot birth_i + \\ \beta_{53} \cdot \ln(gdp_{1967,p}) + \beta_{54} \cdot dens_{p,|y|} + \beta_{55} \cdot uni_{p,y+18} + \varepsilon_{i,y,p}\end{aligned} \tag{2.15}$$

where $edu_{i,y,p}$ is the level of education of individual i, born in year y in province p. lvl represents the possible level outcomes for education[15].

[14] As explained at a later stage, the provinces of Ceuta and Melilla are dropped due to their specific status.

[15] This is an ordinal variable, which is why we use the Ordered Probit methodology. The situation would be different if the education level were, for example, measured in

$D_1 \cdots D_{50}$ are the provincial dummies, sex_i is a dummy variable taking value 1 when an individual is male, $birth_i$ is the year of birth of the individual, $gdp_{1967,p}$ is the 1967 GDP level in the province of birth, $dens_{p,|y|}$ is the population density in the nearest full decade before birth and finally, $uni_{y+18,p}$ is a dummy variable that takes value 1 when a university is present in the birth province when the individual reaches age 18.

After running the regression in equation 2.15, we have probabilities for each educational outcome for every single individual. Using a simple measure, we then calculate the so-called residual education, res_i which is taken to the second stage of the analysis:

$$res_i = edu_i - \frac{\sum_{\eta=1}^{10} \Pr(\eta_i)}{10} \tag{2.16}$$

where η_i are the different levels of education that are obtainable. This measure of residual education includes two major groups of variables: inherent personal characteristics and conflict-related variables. As these personal characteristics can be expected to be distributed relatively equally throughout the population, there should be no difference between individuals born in the Basque Region and those born outside of it. At the same time, we argue that the conflict-related variables are not due to the supply of education, for the reasons argued above, but instead to the demand for education. However, the presence of conflict is still likely to affect the demand for education differently between people, which is something that can not be assumed to be randomly distributed. Instead, this influence is expected to be different for different levels of education.

total years of schooling. The total number of levels is ten.

Second Stage

The inspiration for the second stage comes from the paper by Abadie and Gardeazabel (2003), who analyse the influence of the Basque conflict on economic growth. However, there are a number of significant differences between their methodology and ours. Abadie and Gardeazabel construct an artificial region, with all the non-Basque regions as potential elements. While we do the same in principle, an important distinction is the fact that we attempt to replicate the entire distribution of educational achievement, and not simply the average. For that reason, we split up all our data in ten different deciles, and perform the matching analysis upon each separate one. The next important difference is that Abadie and Gardeazabel replicate the explanatory factors of economic growth (such as the physical and human capital stocks) and then look at the resulting levels of GDP. As we have taken out the (few) obvious explanatory variables in the first stage of the analysis, it is feasible for us to simply create a matching of the outcome (level of education).

First, with D_J as the total number of deciles from all J potentially contributing regions to the artificial region ($D_J = 10 \cdot J$), we define $\mathbf{W} = (w_1, \ldots, w_J)$ as a $(D_J \times 1)$ vector of weights for each decile of each contributing region j. $\mathcal{W} = \{(w_1, \ldots, w_J)'\}$ is the set of possible different combinations of w_j, under the conditions that $w_1 + \ldots + w_J = 1$ and $w_j \geq 0 \; \forall \; j = 1, \ldots, J$. $\mathbf{Z}_1$ is a $T \times 1$ vector containing the educational outcomes for the decile under analysis, where T is the number of pre-conflict time periods used. $\mathbf{Z}_0$ is a $T \times D_J$ matrix which contains the same outcomes for all J regions during all T time periods. We then use the following method to find the outcome of $\mathbf{W}$ that minimizes the difference between the real Basque region and the artificial one:

$$\mathbf{W}^* = \underset{W \in \mathcal{W}}{\arg\min} \left(\mathbf{Z}_1 - \mathbf{Z}_0\mathbf{W}\right)' \left(\mathbf{Z}_1 - \mathbf{Z}_0\mathbf{W}\right) \qquad (2.17)$$

This method is repeated ten times for each decile in order to get estimations for each one. As a basis, we utilise the data from people born between 1930 and 1955 as the source of data for the pre-conflict births. As the conflict breaks out around 1970, this means that all individuals who reach age 15 after the initiation of the conflict are assumed to be influenced by its presence. As this choice may seem rather arbitrary, we show in the robustness checks that the results do not change significantly for other reasonable pre- and post-war assumptions. The post-war generation, as discussed in the next section, finishes with the generation born in 1976, after which there is no data available on completed educations.

Data

In this section, we give a description of our data sources and a description of what is done to make them suitable for this analysis. The dependent variable is the accomplished education level, which runs, as said before, from 1 until 10. Like all the individual data, these data come from the National Censuses in 1991 and 2001 (Instituto Nacional de Estadistica, 1991, 2001). Unfortunately, the two Censuses use different definitions of the Education system, but using information from the Ministry of Education (retrieved from http://www.mec.es), we can transform the fifteen categories in the 1991 Census to conform to the ten categories in the 2001 Census[16]. The 1991 Census used a 10% sample of the population, yielding a total of 3,888,692 observations and the 2001 Census interviewed 2,039,274 individuals, giving us a total of 5,927,966 observations. However, we drop those individuals who are born abroad or in

[16] More particularly, the categories "Formacion Professional 2° grado, Maestria Industria" and "Otras titulaciones media" were combined to become "FP Grado Superio". "Arquitecto e Ingeniero Técnico y Diplomado (aprovado compieto 3er curso) de Escuelas Téchnicas Superiores", "Diplomado de Escuelas Universitarias y Diplomado (aprobado completo 3er curso) de Facultades y Colegios Universitarios", "Arquitecto o Ingeniero Superior" and "Titulaciones de Estudios Superiores no universitarios" form " Diplomatura" and finally, "Titulaciones de Estudios de Posgrado o Especializacion para Licenciados" is added to the category of "Doctorado".

either Ceuta or Melilla, the two small city-regions on the North-African coast and retain 5,714,097 individuals. The next step is dropping the individuals who may not yet have completed their entire education. Assuming that the maximum level of education is in principle reached at the age of 25, we drop all observations aged less than 25 at the time of their Census interview, thus retaining 3,842,997 observations. As can be seen in the results section, we experiment with the starting date for the analysis and drop more observations that way, but in principle we can use nearly 4 million observations.

From the Census, we also retrieve the gender, the birth year and the birth province upon which the provincial dummies are based. Next up is the provincial density, which proxies the availability of primary and secondary education. These data are also retrieved from the Instituto Nacional de Estadistica's Census results (2008). Goerlich Gisbert and Mas Ivars (2001) are the source for the 1967 GDP data.

The final variable in the first-stage ordered probit regression is the dummy for whether or not there is an institution of Higher Learning in the Province of birth. To create this variable, we obtained a list of current institutions of Higher Learning from the Ministry of Education. We then performed a web-based research on all the individual institutions and set up a database on their respective histories. This database includes the founding dates of each of the institutions, and whether they are follow-ups of other institutions. If they are, we then looked up the founding dates of the previous institutions. For most institutions, this method worked very well and for those few for which it did not, we contacted the institutions directly to obtain the required data. Overall, this yielded a database with an observation for each province-year and whether or not an institution of higher learning was present.

Results

As explained in the previous section, we start with a first-stage regression that aims to take out the most obvious effects that influence the level of education. The results of this regression, following equation 2.15, are shown in table 2. The different columns all use different sample periods, which is going to be useful at the next stage when it has to be determined which time period is most appropriate. It can already be seen that the differences in the coefficients between different periods is relatively small, so the sample selection is not expected to have a strong influence.

A disadvantage of using ordered probit analysis is the difficulty of interpreting the coefficients. Therefore, for ease of interpretation, an Ordinary Least Squares (OLS) regression is added in table 2, of which the coefficients do not necessarily convey much meaning, but the signs of the coefficients do. Unsurprisingly, sex has a positive effect (with men given the value 1 for this dummy variable) and the year of birth does as well. As expected, richer regions also have higher levels of education. The effect of population density, on the other hand, has an effect opposite to what might be expected. After all, it was hypothesised that an increase in density should be associated with easier access to schools and therefore an increase in education. It turns out that this effect is actually going in the opposite direction and an increase in population density is in fact associated with a lower level of education. One possible explanation for this result when the higher population density is the result of higher population growth, this may be correlated with high fertility rates or a quickly increasing tutor-pupil ratio when the education authorities' reaction time is relatively slow.

Following equation 2.16, we calculate the residuals of the level of education and end up with our variable referred to as "residual education", with which we continue to go on to the second stage of our analysis. At

2.Results from the first-stage Ordered Probit regression

	all_data	>1909	>1929	>1934	OLS, >1909
sex	0.163***	0.160***	0.127***	0.108***	0.208***
	0.001	0.001	0.001	0.001	0.002
birthyear	0.040***	0.041***	0.047***	0.047***	0.054***
	0.000	0.000	0.000	0.000	0.000
$\ln(gdp_{1967})$	1.500***	1.504***	1.536***	1.503***	2.022***
	0.011	0.011	0.011	0.012	0.018
$\ln(popdens)$	-0.284***	-0.317***	-0.484***	-0.483***	-0.101***
	0.004	0.005	0.006	0.006	0.008
unipres	0.051***	0.041***	0.020***	0.034***	0.128***
	0.002	0.002	0.002	0.003	0.004
prov_dummies	*yes*	*yes*	*yes*	*yes*	*yes*
N	3834854	3736709	2958818	2640918	3736709
$LR-\chi^2$	1620372.7	1519346.1	922046.3	684278.3	-
df	53	53	53	53	$\overline{R^2}=0.26$

*Note: The results of the first stage regression show the values of some of the most obvious explanatory variables that are able to explain long-run education achievements. The table shows coefficients and standard errors and *** implies a significance level of more than 99%.*

this second stage, we use equation 2.17 to determine the values for the artificial region. The different components that make up the artificial Basque Region are shown in table 3. Our artificial region is composed of very different elements than Abadie and Gardeazabal's, whose artificial region consists of only Catalunya and Madrid. For our results, on the other hand, all regions, except the Balearic Islands, contribute to the behaviour of the synthetic Basque region. For conciseness, we have summarised the data, and we show for the artificial low, medium and high levels of education what the contributing regions are. As for the contributing deciles, the table shows whether the contribut**ing** decile is equal to the contribut**ed** decile (*same)*, whether it is from one of the lower deciles (*lower*) or whether it is from a higher decile (*higher*). The final column shows the contribution of all contributing elements to all deciles. For example, when creating the lowest three deciles, 54.2% of the contributions come from same-level deciles in other regions and particularly Madrid and Navarra play a large role. At the same time, 33.2% of the contributions to the lowest deciles come from higher-ranked deciles (Cantabria and Navarra, in particular), while 12.6% come from lower-ranked deciles[17]. Of course, this is only a summary measure and the more detailed information could be interesting too. The contributors can be quite surprising in fact. For example, for the recreation of the fifth decile, the contributors are as follows: Navarra dec. 1 (13.7%), Cantabria dec.3 (1.9%), Galicia dec.3 (18.1%), Navarra dec.3 (10.2%), Canary Islands dec.4 (8.2%), Catalunya dec.5 (26.3%), Cantabria dec.6 (4.3%), Aragon dec.6 (9.6%), La Rioja dec.6 (5.9%) and Madrid dec.10 (1.9%). For all deciles together, the greatest contributors are Navarra with 28.9%, Madrid with 14.0% and Asturias with 9.4%

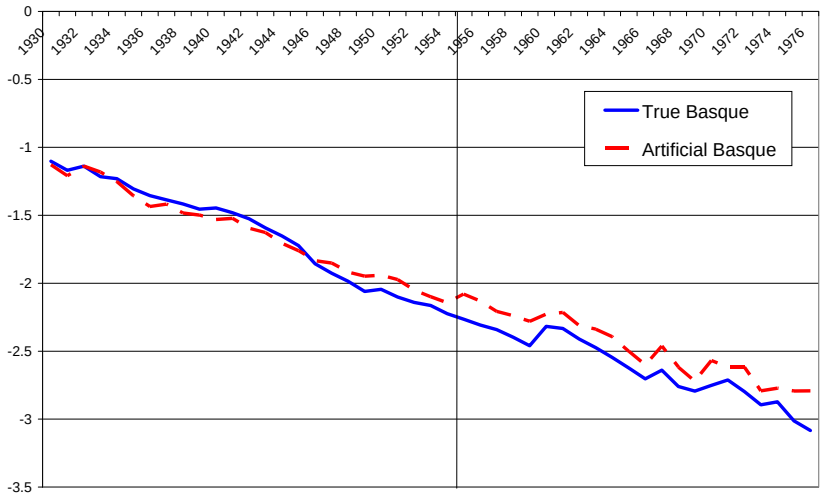
The question remains whether these results reflect reality well. This

[17] Of course, for the first decile, there are no lower-ranked deciles, so a specific value for the first deciles has to be 0. The contributions of Vastile & Leon, Madrid and Navarra take place in the estimation of the second and third deciles.

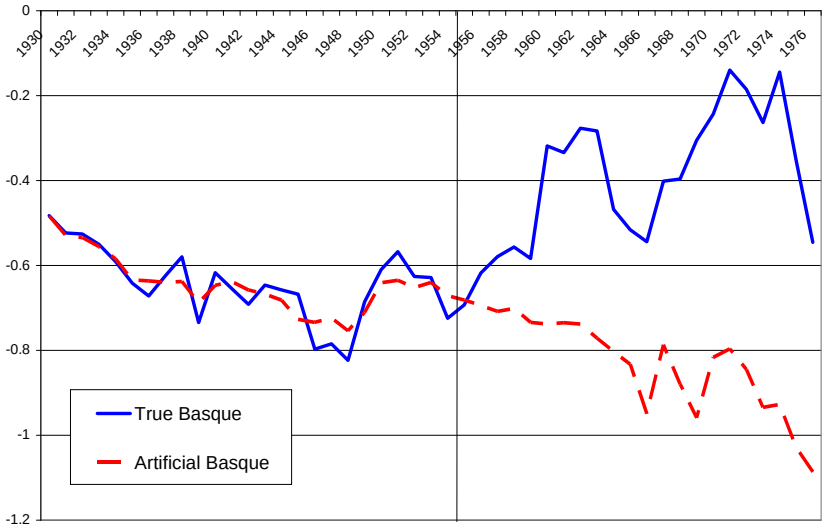
3.Weights distribution within artificial Basque Region

		Deciles			
		lowest 3	*middle 4*	*highest 3*	*All*
	Valencia	0	0.092	0	0.037
	Andalusia	0	0	0.071	0.021
	Asturias	0	0.099	0.058	0.057
L	*Vastile&Leon*	0.049	0	0	0.015
O	*Cantabria*	0	0.005	0.014	0.006
W	*Galicia*	0	0.126	0	0.051
E	*La Rioja*	0	0.007	0	0.003
R	*Madrid*	0.054	0.033	0	0.030
	Murcia	0	0.064	0.022	0.032
	Canary Islands	0	0.021	0	0.008
	Navarra	0.022	0.093	0	0.044
	TOTAL	**0.126**	**0.539**	**0.165**	**0.303**
	Catalunya	0.018	0.139	0.008	0.063
S	*Cantabria*	0.009	0	0.075	0.025
A	*La Rioja*	0	0	0.007	0.002
M	*Madrid*	0.237	0	0.125	0.108
E	*Navarra*	0.278	0	0.199	0.143
	TOTAL	**0.542**	**0.139**	**0.415**	**0.343**
	Catalunya	0	0	0.013	0.004
	Castille-La Mancha	0	0.029	0	0.012
	Asturias	0	0.009	0.112	0.037
H	*Vastile&Leon*	0	0	0.135	0.040
I	*Extremadura*	0	0	0.033	0.010
G	*Cantabria*	0.055	0.014	0.067	0.042
H	*Galicia*	0	0.016	0	0.007
E	*Aragon*	0	0.049	0.060	0.038
R	*La Rioja*	0	0.130	0	0.052
	Madrid	0	0.005	0	0.002
	Murcia	0	0.021	0	0.009
	Navarra	0.277	0.048	0	0.102
	TOTAL	**0.332**	**0.322**	**0.421**	**0.355**

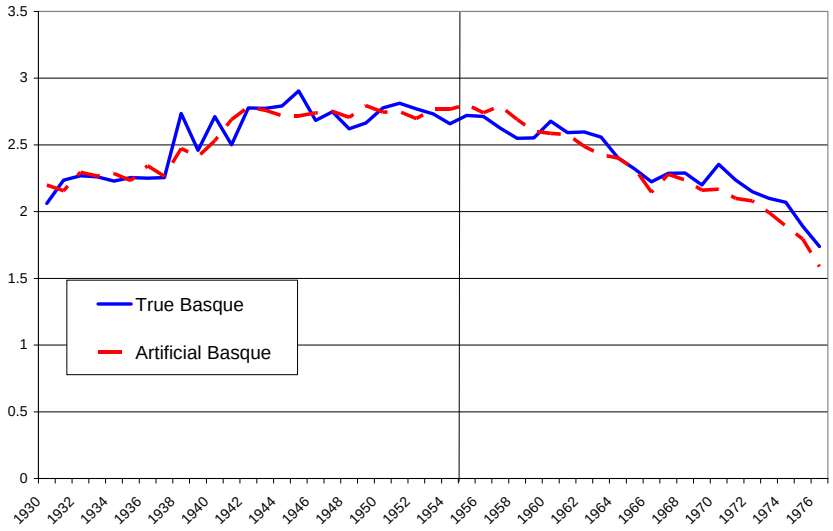
Note: The table contains the weights of "same", "lower-ranked" and "higher ranked" deciles for all relevant regions in the construction of the different artificial decile groups. The table is explained further in the accompanying text.



1. *This figure contains the values of residual education for the true Basque and the articial Basque regions for the three lowest deciles.*



2. This figure contains the values of residual education for the true Basque and the articial Basque regions for the four middle deciles.



3.This figure contains the values of residual education for the true Basque and the articial Basque regions for the three highest deciles.

can be shown graphically, by showing the graphs that compare the true Basque region with the artificial one. Figures 1, 2 and 3[18] show the residual education values for the low, middle and high deciles of the true and artificial Basque Regions. For the lowest deciles, it can clearly be seen from the graph that there is a disparity between the true Basque region and the artificial region, but it also shows that this divergence starts before the conflict-generation is born. In fact, for those born after 1955, the disparity is not any larger than for those born before 1955. For the highest deciles (figure 3), there is also no division at all between the pre-conflict generation and the post-conflict generation. However, when looking at the middle levels of education in figure 2, a clear divergence takes place. As we hypothesised in section 3, the level of education for this group of individuals actually increases compared to the artificial Basque Region. This is compatible with what we have stated

[18] For brevity's sake, we do not include graphs for each decile, but they are available from the authors.

earlier, if indeed a larger portion of these individuals decides to seek opportunities outside the Basque Region. A quantification is possible, with the total divergence between the true and artificial Basque Regions being approximately 0.5 points of residual education. In order to put this value in perspective, we have calculated the average difference between any two contiguous deciles, which turns out to be approximately 0.6. Therefore, the relative increase in education is nearly equal to an upward movement of one decile for the entire middle population, which is a surprisingly large result.

Additional evidence

Our results in the previous section indicate that in the Basque Region, the middle deciles increased their levels of education disproportionally compared to individuals who did not reside in the conflict region. In section 3, we hypothesised that this is due to the increased incentives to migrate. Of course there may be other channels through which the changes in educational achievements change, but since we have no alternative theories available, it makes sense to test the migration theory. We do this by looking at the actual migration behaviour of individuals. Here we use a relatively straightforward technique and simply consider the difference-in-differences for within-country migration from the Basque Region and from all non-Basque regions. As is shown in the top part of table 4, both before and after the conflict, Basque-born individuals are less likely to migrate to other Spanish regions than individuals born elsewhere. This may be due to the cultural difference between the Basque Region and the other Regions, but it may also be due to the superior economic position held by the Basque Region. The same table, however, also shows that there is quite a large decrease in the probability of migration for non-Basque individuals after the cutoff point. The Basque-born individuals, on the other hand, actually become slightly more likely to migrate. This implies that, according to our difference-in-difference

estimation, the Basque-born indeed increase their probability of within-country migration.

Another important implication from the theoretical model is a (relative) decrease in the level of education of migrants. After all, the education cutoff beyond which individuals decide to migrate moves to a lower part of the distribution and as a result, the average migrant's level of education should go down. Considering the difference-in-differences, the lowest section of table 4 shows that the level of education of migrants from the Basque Region indeed decreases, compared to migrants from other regions. However, in contrast, the middle section of the table shows that the overall education level of Basque-born individuals increases faster than that of non-Basque born, despite the fact that the Basque-born have a higher level of education to start with. Again, this is evidence that supports our theory that the occurrence of conflict increases the incentive to migrate and that the potentiality of migration requires a higher level of education.

Three things should, however, be considered in this case as well. The first is the geographical size of the regions. After all, their sizes differ immensely and it can be expected that fewer people from large regions migrate than people from geographically smaller ones. For two reasons, this cannot be driving the effect we find. First of all, the Basque Region is in fact among the smallest of the regions and one therefore should in principle expect a higher level of migration, which is not the case. Second, as the sizes of the regions do not change over time, this cannot be expected to influence the results from our difference-in-differences analysis.

The second thing that needs to be considered is foreign migration. As we use data from the Spanish Census, this merely includes data regarding those individuals who are still living in Spain. The percentage of Spaniards migrating internationally has been relatively small (com-

4.Naive diff-in-diff estimation of effects of civil conflict on migration and education levels

	Spain	*Basque*	Difference	
%Migrants				**N=3,995,162**
Pre-conflict	*30.5*	*15.1*	-15.4	
Post-conflict	*25.2*	*15.4*	-9.8	
Difference	-5.3	0.3	**5.6*** **	(0.227)
Educ_all				**N=3,986,468**
Pre-conflict	*3.09*	*3.85*	0.77	
Post-conflict	*4.79*	*5.69*	0.90	
Difference	1.70	1.83	**0.13*** **	(0.0096)
Educ_migr				**N=1,093,197**
Pre-conflict	*3.33*	*4.42*	1.09	
Post-conflict	*4.82*	*5.76*	0.94	
Difference	1.49	1.34	**-0.15*** **	(0.026)

Note: This table shows a naive difference-in-difference comparison between the Basque region and the rest of Spain, in which it can be seen that migration out of the Basque Region has increased, that the average education level has increased and that the average migrant's education level has decreased. Between brackets, the standard deviations of the diff-in-diff estimations are included.

pared to within-country migration) and would not be able to explain our results. However, even if there were a relatively large amount of international migration, this would have only two effects: First, it would increase the amount of migration, particularly from the Basque Region, as it is close to the international border with France. Second, with the increasing integration between Spain and the rest of Europe, including their joining of the European Union, one would particularly expect the later period to have increased total migration, because of the international component. This would imply that the result we find now is in fact an underestimation of migration effect rather than an overestimation.

Finally, the third thing that further strengthens our results is government policy. For political reasons, successive Spanish governments have been

trying to give incentives to individuals to move towards the Basque region. This would imply that overall, within-country migration has been stimulated more in the non-Basque regions than in the Basque Region itself, which again biases our results in the direction of an underestimation, rather than an overestimation.

Conclusion

In this paper, we analyse the potential effect that conflict has on the incentives to acquire education. According to our naive theoretical model, the demand-side effects of civil conflict particularly influence the middle level of education, although this depends on the parameters of the model. We test our theoretical model in an analysis of the Basque conflict region in Spain. After all, this is exactly the kind of conflict in which our theoretical model is applicable, because it is a conflict that is relatively low-key and influences only the demand for education and not the supply thereof. After all, at no time during the conflict, was there any significant interruption of the supply of education, which makes it an interesting case to analyse. When using a relatively advanced matching technique to set up an artificial region that has an educational distribution similar to that of the Basque Region, it turns out that the effects are indeed particularly visible among the median levels of education. These individuals, it turns out, acquire a significantly higher level of education after the initiation of the conflict than beforehand, which leads us to believe that there exists in fact a causal relationship. The probability of migration of this group also increases over time, which is in concordance with our results.

The results found in this paper contrast previous findings in which conflict has been shown to have a negative impact on human capital accumulation. We argue that this negative relationship is indeed true, but fully due to supply-side effects, whereas demand-side effects actually increase

human capital accumulation. As a result, the supply-side effect found in previous papers is probably an underestimation of the true effect.

While it is a little difficult to see usable policy recommendations on basis of our results, we do believe there is scope for some. One of the major differences between the conflict in the Basque Region and many other civil conflicts is its geopolitically limited scope. The conflict is limited to the Basque Region only, and the rest of the same political entity (i.e. Spain) is unaffected. Apart from potential cultural-linguistic barriers, there are no barriers to migration between the Basque Region and the rest of Spain, which makes sure that, even when individuals expect only a modest utility improvement from migrating, they still increase their demand for education. In many other conflicts, momentarily ignoring the supply-side effects, civil conflict in one country may in fact increase the difficulty of migration to other places, when a conflict engulfs an entire nation. And this is where we can suggest one potential policy recommendation, because it is clear that when individuals have the option of migration in the future, like in the rest of the brain gain literature, this improves their incentives for education. It is therefore not wise to lock refugees/migrants into positions where there is little scope for improvement, because in the long run, this strongly reduces their incentives for education, which exacerbates the long-run negative impact of conflict.

3 The Demand for Education in Turkey and the Impact of the Extension of Primary Education

Abstract

The chapter aims to explain the main factors that affect the demand for education in Turkey for both boys and girls, to investigate the presence of differences between genders, and to evaluate the impact of the extension of compulsory education in Turkey which took place in 1997. The main conclusion derived in this chapter is that income growth and improvement in parents' education contribute positively to children's school attainment, and the positive effect is higher for girls than it is for boys. Furthermore, the results show that the extension of compulsory education increased the total working hours of the households. This, however, has not had any effect on the probability that mothers start working or fathers get additional jobs. In addition, it does show the negative effect on the occurrence of child labour by decreasing its probability among the households. Another result of this study is that due to high dropout rates, an increase in school enrolment does not necessarily mean an increase in school graduation rates.

Keywords: Education; Gender; Demand for schooling; Turkey

Jel codes: I21, J16

Introduction

The importance of education to economic development is well documented. Many studies concentrate on the contribution of education not only to economic growth but also to individual and social development.

Accordingly, they show that the improvement in education plays an important role, especially in the development of the developing countries like Turkey in particular. However, it is unfortunately not possible to say that Turkey's performance regarding education is up to standard. As Wigley and Wigley (2008) state, the education level of Turkey's adult population is out-performed by most of the countries with a lower GDP per capita and by those countries with a similar or higher levels of per capita income (with the exception of Brazil) in terms of being literate. In terms of youth illiteracy, only Jamaica, the Philippines and Brazil perform worse than Turkey.[19] Wigley and Wigley (2005) also highlight Turkey's female illiteracy rate, which is higher than in many other countries.

Educational decisions in Turkey involve some very important gender issues: Girls are less educated than boys are, and there are major social changes underway with respect to the roles of women in marriage, divorce and the labour market, all of which influence schooling decisions. The impact of compulsory schooling and gender issues are different in rural and urban settings. More girls already attend school in urban areas compared to that in rural areas and face different employment opportunities and social possibilities. A careful analysis of the impact of expanding compulsory education, on educational attainment and the structure of family labour supply is therefore useful and required keeping the differences in urbanity and gender under close consideration.

Contrary to developed countries, Turkey has extended its compulsory education just recently. It is important to investigate its effects and see whether this policy has been efficient or not in increasing school enrolment and graduation rates in recent times. In the last 15 years, Turkey has showed substantial improvement in literacy rates for both genders. The literacy rate of men, which was 89.8% in 1990, became 96% in 2006, while the literacy rate of women increased from 67.4% to

[19] Countries included in this survey are Indonesia, Jamaica, Philippines, Paraguay, China, Peru, Turkey, Thailand, Brazil, Mexico, Malaysia, and Chile.

80.3%.[20] On the other hand, there has not been a huge change in the net enrolment rate of primary education between these years (for boys 95.06% and 92.29%, for girls 88.7% and 87.16%, for the years 1990 and 2006 respectively). In high school attainment, the net enrolment rate of men increased from 31.82% to 61.13% in 2006, and of women from 20.59% to 51.95%.

Turkey extended the length of compulsory education from five to eight years in 1997. Before 1997, five years of compulsory primary education, was followed by three years of secondary school and three years of high school. Students subsequently were able to attend universities depending on their preferences and more importantly their successes in the university entrance examination. In 1997, primary education and secondary education were combined to become compulsory by a new law. Although the extension of compulsory education obviously increased children's enrolment rates into the previously optional three years of the secondary school that followed primary school, an increase in enrolment does not necessarily mean an increase in the graduation rates. When the basic education net enrolment rate of 7-15 year-old children in 1994 is compared to the graduation rates from compulsory education of 15-23 year-old children in 2002, the dropout rate is 17.1% for girls, whereas it is 7.6% for boys. I can conclude that, for girls in particular, an increasing enrolment rate does not necessarily mean a successful improvement of education. As a result, factors that have an impact on children's school attainment need to be investigated and improved.

This chapter aims to explain the main factors that influence the demand for education in Turkey for both boys and girls, and to investigate whether there are any differences between genders or not. Furthermore, I try to evaluate the impact of the extension of compulsory education in Turkey on enrolment and school attainment of children and on labour

[20] Turkish Statistical Institute Population and Growth Indicators http://nkg.tuik.gov.tr/. Literacy rates are increased generally by private courses given to adults by state.

force combination of households.

The outline of this chapter is as follows: In the next section, there is a brief literature review followed by description of the data in section 3. The model and the methodology are explained in section 4, and section 5 presents the estimation results. Section 6 is devoted to analysing the impact of alone mothers on school attainment, and section 7 to the robustness check of the analysis. After these, section 8 analyses the effects of the extension of compulsory education, and the final section 9 concludes.

Literature Review

There are many papers that evaluate the effects of the extension of compulsory education on various aspects of society. Considering it has been implemented very recently in Turkey, there has been insufficient research into the effects of this law. Using the data of 1994 and 1999, Dayıoğlu (2005) makes a simulation to see the effects of this extension on child labour in Turkey. In another paper, Dülger (2004) describes the rationale and the objectives of the program. Tansel (2002), which is closely related to this paper, explains the main determinants of school attainment in Turkey for boys and girls separately by using the 1994 data. From her paper it can be concluded that even when the compulsory education was five years, there was not a 100% enrolment of children in primary school. Here another question arises: What are the determinants of school attainment in Turkey?

There is a vast wealth of literature available on the determinants of school attainment specifically written about developing countries. The main determinants that are taken into account are usually gender, parents' education, household income, number and gender of siblings, rural/urban residence, employment of parents, etc. Connelly and Zheng (2003) define

school enrolment as a function of demand, supply and government policy. The individual decisions about the enrolment made by students or their parents through the comparison of the costs and benefits of continuing at school are considered as demand, while availability and quality of education forms the supply. In this paper the demand side of school enrolment and the impact of the specific change in government policy (extension of compulsory education) will be analysed.

In the previous studies, most of the above-mentioned factors were found to be significant determinants of school attainment, while their degree of impact is different for each country. In their analysis of 1995 CHIP data, Knight and Song (2000) find that the enrolment is higher for boys and children, whose mothers are more educated than their fathers, in China. In a more recent study again concerning China, Connelly and Zheng (2002) find that location of residence and gender are highly correlated with enrolment and graduation; therefore, rural girls are especially disadvantaged in terms of both enrolment and graduation rates. Other determinants that are found to be significant in their study are parental education, the presence of siblings, country level income and village level school rates. Ilon and Moock (1991) classify the predictors of educational participation into six categories in their study about Peru: individual child characteristics, opportunity costs, socioeconomic factors, school quality, school access and direct school costs. They find that the monetary costs of schools influence parents' decisions regarding school attendance and continuation, and that the education level of mothers is an important influence on children's education, especially in low-income households.

Holmes (1999) analyses the demand for schooling in Pakistan and focuses on two potential sources of bias in the estimation of demand for schooling. She defines the first source of bias as the lack of distinction between currently enrolled children and those who completed their schooling, which she calls censoring bias. According to her, the second

source of bias is sample selection, which she defines as the exclusion of children who have left the household from the potential sample. After all, the decisions to leave home and to attend school may be related. In this study, the sample is carefully chosen in order to minimise these biases. Holmes (1999) explains the two limitations to the data in the previous studies about determinants of school attainment. The first is the fact that surveys measure schooling by the years of education attained, meaning that the education level is observed in discrete year intervals, although the desired level of schooling is continuous. Her second reasoning is that the existence of a large mass point at zero year of schooling and similar probability spikes at primary and secondary completion levels, where continuation to the next level is delayed because of fees or entrance examinations, are limitations. She does not find Ordinary Least Square (OLS) estimation appropriate due to non-negativity constraints, and the discreteness and the probability spikes of the schooling variable, and advises to use a censored ordered probit model proposed by King and Lillard (1983; 1987). Likewise, Harmon and Walker (1995) argue that using instrumental variable approach would be better than using OLS when estimating the rate of return to schooling in UK. Furthermore, they compare the results of OLS and instrumental variable approach in their more recent paper (1999) and conclude that simple OLS estimates are subject to a bias. Callan and Harmon (1999) discuss the same argument in their paper that estimates the rate of return to schooling in Ireland, and interestingly they do not find statistically significant differences. In this paper, ordered probit model is used as a robustness check and the results show that OLS regression does not have significantly different results than the ordered probit one for this study.

There might be many factors that have an impact on school attainment within a country; it is important to determine them in order to be able to apply efficient policies to increase the demand for schooling. Furthermore, discovering the effects of an already applied policy will be a good

5.Average Years of Schooling for Boys, Girls and Their Parents

	Boys		Girls		Fathers		Mothers	
Age	**1994**	**2002**	**1994**	**2002**	**1994**	**2002**	**1994**	**2002**
16	6.84	7.13	6.03	6.68	5.21	6.08	3.37	3.71
17	7.37	7.77	6.38	6.98	5.44	5.85	3.56	3-97
18	7.55	8.31	6.68	7.49	5.14	5.91	3.42	3.73
19	7.76	8.74	7.21	7.97	5.04	5.90	3.42	3.61
20	7.96	9.03	6.80	7.81	4.80	5.60	3.32	3.53
Total	7.44	8.07	6.53	7.32	5.16	5.89	3.43	3.73

Source: Author's own calculations from 1994 and 2002 Household Income and Consumption data sets of State Institute of Statistics Note: All values are average means.The sample consists of 16-20 old children and their parents.

guide to form future policies.

Data

In this survey, two data sets are combined: the Household Income and Consumption Survey of State Institute of Statistics of Turkey data sets from 1994 and 2002. The 1994 survey was administered to 26 256 households in Turkey, while the 2002 survey was applied to 9 555 households from all over the country. In the 1994 data, there are 11 659 children between the ages of 16-20, while the 2002 data has 3 659 children within the same age range.

The average years of schooling for children and their parents are given in table 5 for the years 1994 and 2002. In general, it seems that the gender gap between boys and girls increases according to age. By the age of 20, the gender gap between boys' and girls' years of schooling is more than a year. There is approximately a two-year difference between mothers' and fathers' average years of schooling. When the average years of schooling in 1994 are compared to those in 2002, an improvement is observed for all individuals. On average, the increase in girls' years of schooling is

higher than that of boys, which means that approximately 16% of the gender gap in 1994 had been closed by 2002.

Another difference between the two data sets is the fact that the 2002 data set does not have regional variables, so it is not possible to investigate the regional differences in this paper.

Model and Methodology

As Tansel (2002) states, in human capital theory, education is seen as not only a consumption activity, but also as an investment to maximize lifetime wealth (Schultz, 1963, 1974; Becker, 1975). Each individual faces the problem of comparing the benefits and costs of additional schooling. While additional schooling brings higher future earnings as a benefit, it postpones the entry time of individuals into the labour force. Individuals will continue to invest in education as long as the marginal rate of return of additional schooling stays above the corresponding cost of borrowing. As a result, there is a positive relationship between optimal level of schooling and returns to human capital, while there is a negative relationship between optimal level of schooling and the cost of schooling.

Tansel (2002) explains that the demand for children's schooling could be written as a function of the wages of household members, market prices of inputs, unearned household income and a set of child and household characteristics. Furthermore, if parents have different preferences for their sons' and daughters' levels of schooling, this causes gender specific demand functions for schooling. Tansel (2005) finds that women in Turkey may be facing discrimination in the private sector and the returns to schooling are higher in private sector than in public sector. Therefore, it could be suggested that the returns to schooling for women might be lower in Turkey, as they face discrimination in the private sector, in which returns to education are higher. This fact may influence

the parents' decisions about levels of investment in their daughters' and sons' educations, as investing in the education of sons seems to be more efficient. Besides, parents may predict that the expected benefit of educating their sons is higher than that it is for their daughters, as daughters join their husbands' households by marriage, while sons are more likely to provide help for parents in older ages. Furthermore, education has some non-market benefits for economic development, which are difficult to quantify such as increase in nutrition and health, higher education of children, lower child mortality and fertility.[21] In the literature it has been shown that in developing countries females gain more than males in terms of non-market benefits (King and Hill, 1993; Schultz, 1995b).

Recent literature documents the important role of parents' education in children's schooling attainment.[22] Level of parents' education is a good signal for parents' preferences for schooling and the genetic factors. As Tansel (2002) states, if schooling is a normal good, higher income and wealth will lead to higher schooling attainment, ceteris paribus. On the other hand, if schooling is a luxury good, then the income effect would be very large especially for low income households.

In 1997, primary and secondary education in Turkey was combined by extending compulsory education from five to eight years. In order to be able to compare the years 1994 and 2002 only compulsory and high school attainments are taken into account. For the year 1994, middle school attainment meant five years of compulsory education and three years of secondary school, while in 2002 compulsory education is eight years. The demand for the desired level of schooling, S* is defined as:

$$S^* = \beta X + \varepsilon \tag{3.1}$$

where X is a vector of individual and household explanatory variables;

[21] Black, S.E, Devereux, P.J, and K. G. Salvanes (2004).
[22] Tansel (2002), Conelly, R., Zheng, Z. (2002), Mcintosh, S. (2001)

and ε is the normally, independently distributed disturbance term. β is the vector of coefficients of the factors that affect school attainment. In practice, desired schooling is not observed, while different levels of education for boys and girls, which is S, is the observed counter part of S*. In this case, some economists could claim that it is better not to use Ordinary Least Squares (OLS), as S is discrete and OLS assumes that the dependent variable is continuous.[23] However, this paper aims to give some policy implications and the usage of ordered probit, which would be the best option in this case, complicates the interpretation of the results. In order to have a better interpretation but still make sure that using OLS does not alter the results a robustness check is done using ordered probit regression. The procedure is explained in the robustness section.

In Turkey, children start primary education at the age of seven. Therefore, at the earliest, they can finish their compulsory education when they are 15 years old and to finish high school they should be at least 18. Additionally, there are high schools, in which the language of education is English and there is a one-year preparation class to learn the language. In this survey, the children are separated into two groups according to their ages: 16-19 year-old children and 18-20 year-old children. The dependent variable (education level) might take four different values in the first group: 0, 2, 5 and 8 years of education, while for the second group also 11 years of education is possible. These groups are formed in this way as the final school attainment of the children, who are enrolled in the school at the time of the survey, is unknown. This can potentially bias the estimates of the school attainment. As Holmes (1999) suggests, defining samples to include only those above the approximate age of school completion is a way to deal with censored bias, although it has the caveat of throwing away many younger observations. That is the motivation to calculate the earliest ages of graduation from the

[23] Tansel (2002), Holmes (1999), Harmon and Walker (1995).

schools and to form the groups accordingly. Furthermore, in this survey only children in relation to the household are taken into account. Finally, following Tansel (2002) the upper bound of age is restricted at 20, as children usually leave the household of their parents after this age, and if the ones above this age were taken into account, it would be an unrepresentative sample.[24]

The children are grouped as boys and girls and the following variables are used as determinants of schooling: Children's age, squared term of children's age, education of parents, two dummies showing whether mother and father are self-employed, two dummies whether only mother or only father is present at the household, logarithm of total household expenditure, a dummy variable that shows whether the household is located in the urban area or not, number of children and percentage of boys or girls in the household.

The children's age and squared term in age show the age effects and whether there is non-linear effect of age on schooling or not. Parents' education is grouped as mother and father's education; and the years of schooling they achieved are taken into account. Parents' education accounts for both genetic ability of children and the complementary home learning. Furthermore, parents' education may also serve as a proxy for parents' earnings that could be invested in schooling. Moreover, mothers that are more educated may have higher bargaining power in the household and may decide to invest more on their children's human capital. Dummies for self-employment of parents are used to investigate whether self-employed parents force their children to work at their own

[24] In order to find this out Tansel (2002) computes the proportion of their own children in the household by age and she finds that this ratio drops substantially after age 19 for 1994 data. Unfortunately in 2002 survey the question of total number of children is omitted, so it is not possible to investigate the children, who left the house. As a result, in this paper the same procedure can not be repeated for 2002, but three years of extension of compulsory schooling would not cause children to leave house even earlier than before. If it has had any effect, it would increase the age of leaving the house, so it is assumed that the trend in age of leaving the house would not change drastically in eight years.

place or not. In order to understand whether living only with mother or father affects the school attainment or not, the dummies only mother and only father are used. Total household expenditure is used to proxy for household permanent income, as there may be transitory fluctuations in income, while savings allow the smoothing of expenditures over time. The dummy urban is used to observe whether being in a rural area decreases the school attainment or not due to the fact that in rural areas there exist fewer schools, less qualified teachers, higher opportunity cost for children because of farm employment opportunities or child labour needs at home. Another caveat of rural areas is the fact that historically they have lagged behind urban areas in access to schooling, so the parents of children in rural areas are likely to have less education than parents in urban areas (Ilon and Moock; 1991). Number of children is used to capture the relationship between fertility and the investment on education. Finally, for the girls' school attainment determinant, percent of boys in the family is used to see if there is any gender difference in parents' mind or not, when they are deciding how much to invest on their children's human capital. Likewise, percent of girls is used during the estimation of the boys' school demand function.

Estimation Results for School Attainment

Tables 6 and 7 present the OLS estimation results for middle and high school attainment, respectively. As discussed before, for middle schooling, boys and girls between the ages 16-19 and for high schooling children between 18-20 years are considered. The following OLS estimations are used:

$$EduBoy_i = \alpha_0 + \alpha_1 X_i + \alpha_i \tag{3.2}$$

$$EduGirl_i = \beta_0 + \beta_1 X_i + u_i \tag{3.3}$$

where $EduBoy_i$and $EduGirl_i$are the education levels of boys and girls, respectively, and X_i is the vector of individual and household characteristics.

Having more boys in the household has a significant negative effect on girls' middle schooling attainment, and even worse, this negative effect increases in 2002. On the other hand, in high school attainment the coefficient estimate of percentage of boys loses its significance in 2002. These observations hint that recently, once girls are able to finish middle schooling, having more boys in the family does not have any significant effect on their attainment to high school, although it used to have a negative effect in 1994. Meanwhile, number of girls in the family does not have any significant effect on boys' school attainment at any level as expected.

The coefficient estimate of the number of children is negative and highly significant in all levels of school attainment for both boys and girls. Furthermore, we observe that its negative effect is higher for girls and for the year 2002. It would be more convenient to comment on this effect together with the income effect. The coefficient of log expenditure, which is used as a proxy for income, is positive and highly significant for all levels of education and both genders. Besides, it takes higher value for girls and for the year 2002. Combining the effects of number of children and income, it might be concluded that following the economic crisis that Turkey faced after 1994, families became more income constrained. Under this constraint, they prefer to send their sons to school instead of their daughters, as additional level of education of a boy is more beneficial for the future especially in a country like Turkey.

All previous research on school attainment present a strong effect of parents' education on the school attainment of children, and Turkey is not an exception. The impact of the mothers and fathers' years of schooling is positive and highly significant at both levels of schooling and for

6.OLS Regression Results of Middle Schooling (Ages 16-19)

	Boys		**Girls**	
	1994	**2002**	**1994**	**2002**
Age	0.5721	0.0386	-2.3951	-4.3112
	(0.8021)	(1.4108)	(0.9181)***	(1.7002)**
Age^2	-0.0174	-0.0014	0.0691	0.1203
	(0.0229)	(0.0402)	(0.0263)***	(0.0486)**
Percent Boys			-0.1912	-0.3972
			(0.1153)*	(0.2011)**
Percent Girls	-0.0175	0.1955		
	(0.1037)	(0.1136)		
No. of Children	-0.1174	-0.1580	-0.2744	-0.3869
	(0.0163)***	(0.0328)***	(0.0171)***	(0.0414)***
Log Expenditure	0.0895	0.2301	0.2516	0.3045
	(0.0304)***	(0.0866)***	(0.0363)***	(0.0943)***
Mother's Education	0.0467	0.0509	0.1003	0.0900
	(0.0076)***	(0.0117)***	(0.0086)***	(0.0169)***
Father's Education	0.1049	0.0609	0.1383	0.0728
	(0.0072)***	(0.0123)***	(0.0083)***	(0.0163)***
Only Mother	0.3876	-0.0049	0.3879	0.5771
	(0.1360)***	(0.2405)	(0.1440)***	(0.2331)**
Only Father	-0.2363	-1.5126	-0.5610	0.3866
	(0.3032)	(0.9339)	(0.4320)	(0.7758)
Mother Self-employed	-0.1961	-0.0755	-0.2664	-0.1466
	(0.0510)***	(0.1192)	(0.0536)***	(0.1400)
Father Self-employed	-0.2326	-0.1405	-0.3086	-0.1791
	(0.0733)***	(0.8587)	(0.0846)***	(0.1124)
Urban	0.2116	-0.0210	0.6493	0.1784
	(0.0523)***	(0.1293)	(0.0598)***	(0.1623)
Constant	0.6659	2.2533	22.8725	39.4181
	(7.0077)	(12.4955)	(7.9842)***	(14.9039)***
R^2	0.1419	0.1285	0.3148	0.2680
N	4966	1612	4707	1488

Note:, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors. Dependent variable is education (years)*

7.OLS Regression Results of High Schooling (Ages 18-20)

	Boys		**Girls**	
	1994	**2002**	**1994**	**2002**
Age	-1.6730	0.9129	11.9099	11.9587
	(3.9100)	(6.4121)	(4.2886)***	(7.2705)*
Age^2	0.0500	-0.0150	-0.3098	-0.3111
	(0.1031)	(0.1691)	(0.1130)***	(0.1917)
Percent Boys			-0.4096	-0.5029
			(0.2216)*	(0.3755)
Percent Girls	0.1480	0.2181		
	(0.2147)	(0.3428)		
No. of Children	-0.1675	-0.2017	-0.3782	-0.5561
	(0.0298)***	(0.0548)***	(0.0281)***	(0.0669)***
Log Expenditure	0.2946	0.3860	0.3130	0.7063
	(0.0616)***	(0.1641)**	(0.0707)***	(0.1705)***
Mother's Education	0.1109	0.1194	0.1732	0.1957
	(0.0151)***	(0.0247)***	(0.0174)***	(0.0308)***
Father's Education	0.1867	0.1282	0.2460	0.1418
	(0.0147)***	(0.0233)***	(0.0161)***	(0.0328)***
Only Mother	0.6923	0.0687	0.7688	1.2103
	(0.2593)***	(0.3958)	(0.2547)***	(0.4110)***
Only Father	-1.2666	-0.2994	-1.0432	1.5027
	(0.7031)*	(0.9118)	(0.5076)**	(1.4943)
Mother Self-employed	-0.4540	0.0485	-0.4109	-0.4527
	(0.0755)***	(0.2074)	(0.0981)***	(0.2679)*
Father Self-employed	-0.2832	-0.3634	-0.4595	-0.0764
	(0.1103)***	(0.1713)**	(0.1190)***	(0.2112)
Urban	0.4073	0.4629	1.2991	0.5202
	(0.1039)***	(0.2428)*	(0.1074)***	(0.3003)*
Constant	16.6661	-11.8968	-112.4811	-121.1583
	(37.0426)	(60.9474)	(40.6081)***	(69.1254)*
R^2	0.1852	0.1874	0.3622	0.3376
N	3162	988	2866	968

Note:, **, *** indicate statistical significance at the 10, 5 and 1%, respectively.Figures in parentheses are robust standard errors. Dependent variable is education (years)*

both genders. As it was found in many other studies before, mothers' education has a higher effect on girls' school attainment than that of boys. On the other hand, although in all levels and for both genders, except for the girls at high school level, the coefficient estimate of fathers' education is higher than the one of mothers' education, it shows a decreasing trend. It might be predicted that in the following years the importance of mothers' education may surpass fathers' education. This might be explained by the fact that recently, the education of females has been increasing.

When the mother or father is self-employed, the opportunity cost of children's school attainment is higher, as they might work with their parents and contribute to the household income. The coefficient estimates of the dummies for mothers and fathers being self-employed take negative and significant values for both genders in 1994 for both middle and high school attainment. These results hint that some factors during this period including the extension of compulsory education eliminated the negative effect of mothers and fathers being self-employed. On the other hand, the negative effect of fathers being self-employed for high school boys and negative influence of self-employed mothers on high school girls still persists.

The coefficient estimate of the dummy variable urban, which represents residence in a city that has more than 20,000 inhabitants, takes positive values for the year 1994 for both genders and education levels. However, for children in the middle school age group, it loses its significance in 2002. This might be due to the extension of compulsory education. When the extension occurred, all primary schools, which had been providing five years of education beforehand, became compulsory schools and started providing eight years of education, so even the children in villages that had not had a secondary school before got the opportunity to continue their education for another three years. On the other hand, the same thing cannot be said for high school attainment. The coeffi-

8.Table

Statistics of mothers (fathers) living without husband (wife) and with their children				
	1994		**2002**	
	Number	**% of Mothers**	**Number**	**% of Mothers**
Mother	2196	7.9%	929	10.0%
Father	351	1.5%	114	1.4%
Distribution of Mothers that are living without their husband and with their children according to their marital status				
	1994		**2002**	
	Number	**% of Alone Mothers**	**Number**	**% of Alone Mothers**
Divorced	91	4.1%	841	90.5%
Living Separate	58	2.6%	78	8.4%
Widow	976	93.2%	10	1.1%

Source: Author's own calculation from the 1994 and 2002 Household Income and Consumption data sets of State Institute of Statistics, Turkey.

cient estimate of this dummy is still positive and significant in 2002 for high school attainment of both genders.

Impact of the Only Mother on School Attainment

The dummy of only mother represents the families, in which only the mother and children live together, so either the parents are divorced or the father is working in another city or abroad or he passed away. In the same manner, the dummy of only father represents the households with only father without mother. The coefficient estimate of only mother dummy takes a positive and significant value for both levels of schooling and both genders except for boys in 2002. It is important to understand the reasons for this in more detail, so this concept is analysed in a separate section.

Table 8 presents the distribution of the mothers that live only with their

children according to their marital status. From the table, it seems that in 2002 the percentage of the alone mothers increases, while the percentage of alone fathers stay almost the same. In the first part of the table, the important thing to compare is the difference between mothers and fathers. It can be observed that percentage of alone fathers is much less than the percentage of alone mothers in both years. One of the reasons for this is the fact that the expected age of women is higher than men. It also hints that fathers do not prefer to raise their children alone, even if they are divorced with the mother of their children or the mother passed away, they marry another person that accepts to take care of the children.

As the sample of alone fathers is very small and having only father's effect is generally insignificant on children's school attainment, in the second part of the table only mothers' distribution is analysed. The interesting thing about the second part of the table is the change in the reasons of being an alone mother between the years 1994 and 2002. In 1994 alone, mothers are generally widows, while in 2002 most of the alone mothers are divorced women. In 1994, 93.2% of alone mothers were widows. Being divorced and living separate do not constitute a high proportion of the alone mothers.

In the 2002 data, it can be observed that 90.5% of the alone mothers living only with their children are divorced and 8.4% are living separate. There might be two reasons of living separate: Either the parents preferred to live separate rather than to divorce or that the father is working in another city or abroad. Considering the fact that most of this sample contains divorced mothers, we can conclude that mothers give more importance to the education of their children, which is higher to their daughters, when they have power to decide. Moreover, 8.4% of the sample contains the families, the father of which might be working abroad or in another city. For these, we can conclude that the father earns higher in the place that he works (otherwise he would have preferred to stay

9.Table

Impact of Alone Mother on Girls' School Attainment				
	Middle School		**High School**	
	1994	**2002**	**1994**	**2002**
Divorced Mother	0.3067	-0.1122	0.4888	1.1331
	(0.3329)	(0.2229)	(0.3254)	(0.6718)*
Widow Mother	0.4144	0.6734	0.2886	0.6315
	(0.1031)***	(0.2035)***	(0.0894)***	(0.1897)
Separated Mother	0.4211	1.1841	-0.0015	-0.1401
	(0.3349)	(0.5271)**	(0.2058)	(0.5071)
R^2	0.3162	0.2864	0.3632	0.3383
N	4707	1488	2866	968
N. of variables used	14	14	14	14

Note:, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors. Although all the other variables (except for only mother) that were used in the analyses shown in Table 6 and Table 7 are also used in this analysis, the variables, coefficients of which do not change significantly, are not presented in this table for simplicity.*

with his family) and this decreases the income constraint on the family. On the other hand, in 2002, the estimate of the coefficient of dummy only mother loses its significance for boys in both education levels. This can be due to the higher responsibility given to the oldest boy, as now he is the head of the family or the fact that boys need more control of their fathers to be in discipline.

Furthermore, it is observed that the coefficient values for dummy only mother are higher for 2002 than 1994. As discussed above, in 1994 women were generally alone, as their husbands were dead; however, in 2002 it is usually their own choice, if they are alone.

After looking at the overall picture, a deeper analysis is made to see whether being divorced, separated or widow has a higher impact on children's school attainment or not. In order to attain this, the only mother, dummy is changed with three other dummies: Divorced, widow

10.Table

Impact of Alone Mother on Boys' School Attainment				
	Middle School		**High School**	
	1994	**2002**	**1994**	**2002**
Divorced Mother	-0.2507	0.0698	-0.1153	0.6494
	(0.4823)	(0.2302)	(0.8644)	(0.2601)**
Widow Mother	0.2372	Dropped	0.4918	-1.5666
	(0.1020)**		(0.1944)**	(0.3184)***
Separated Mother	1.0834	0.3823	1.2057	-0.1245
	(0.3041)***	(0.6845)	(0.7562)	(1.1983)
R^2	0.1428	0.1855	0.1856	0.1925
N	4966	1612	3162	988
N. of variables used	14	14	14	14

Note:, **, *** indicate statistical significance at the 10, 5 and 1%, respctively. Figures in parentheses are robust standard errors. Although all the other variables (except for only mother) that were used in the analyses shown in Table 6 and Table 7 are also used in this analysis, the variables, coefficients of which do not change significantly, are not presented in this table for simplicity.*

and separated. The same OLS regression is run and the results are presented in table 9 and table 10 for girls' and boys' school attainment respectively. As it is the repetition of the previous regression except for the dummies, not all variables are shown in the table.

From tables 9 and 10, it can be observed that except for middle school education of boys in 2002 having a widow mother has significant effect on school attainment. While this effect is always positive for girls, having a widow mother has a negative effect for boy's high school attainment in 2002. Considering the fact that widow mothers only forms 1.1% of the total alone mothers in 2002, the results for widow mothers in 2002 might be ignored. On the other hand, we observe a positive effect of having a divorced mother on high school attainment of both genders in 2002. This might be due to the fact that divorced mothers can still get monetary help from their ex-husbands, while widow mothers have to earn their own and in some cases the son should take the role of the

bread winner to help his mother. Here, another interesting fact is that for girls' middle school attainment, having a separated mother does not have any significant impact in 1994; however, it starts to have a positive and significant effect in 2002. On the other hand, the opposite holds for boys' middle school attainment. It might be the case that in 2002 separated mothers decided to care more about their daughters' education, while in 1994 they were caring more about their sons' education.

Robustness

As discussed before, in order to be able to interpret the results more efficiently in this paper OLS is chosen despite its caveats. In this section for robustness, ordered probit regression is used and as can be seen from the tables in appendix the results do not change significantly. The coefficients of ordered probit do not necessarily convey much meaning, but the signs of the coefficients do. It can be observed that the same independent variables are significant in both OLS and ordered probit regressions.

In order to run the ordered probit regression depending on the years of schooling, K categories are formed and each child is assigned to one of these categories. Illiterate children have zero years of schooling, while two years of schooling indicates that the child is literate but not a graduate of any school. Primary school graduates have five years of schooling and this was the compulsory amount in 1994. Middle school graduates have eight years of schooling and this is the new compulsory length of education in Turkey. Finally, high school graduates have eleven and university graduates have fifteen years of schooling. Following Tansel (2002), the ordinal variable S is defined to take a value of k, if S^* falls in the k^{th} category:

$$S = k \quad \text{if} \quad \alpha_{k-1} < S^* < \alpha_k \qquad k = 1, 2, \ldots, K \tag{3.4}$$

where "α"s are unknown threshold parameters. The probability that $S = k$ is:

$$Prob(S = k) = F(\alpha_k - X) - F(\alpha_{k-1} - X) \tag{3.5}$$

where F is a cumulative standard normal distribution function. The independent variable's effect on the probability of the k^{th} level of schooling is given by:

$$\partial Prob(S = k)/\partial X = \beta[f(\alpha_{k-1} - X) - f(\alpha_k - X)] \tag{3.6}$$

where f is the standard normal density function.

We again have two groups of children according to their ages: 16-19 year-old children and 18-20 year-old children. The first group, who have finished the middle school, are fit within four categories of schooling as 0, 1, 2, and 3 corresponding to 0, 2, 5 and 8 or more years of education. The children in the second group are fit within five categories of schooling as 0, 1, 2, 3, and 4 corresponding to 0, 2, 5, 8, and 11 or more years of schooling. As independent variables, same children and household characteristics are used. The tables show that using OLS or ordered probit do not matter a lot in this case, because same variables are significant in both regressions having almost the same significance level.

The additional benefit of using ordered probit is the ability to calculate the probabilities. The last rows of table 16 and table 17 present the probability of finishing middle school and high school respectively. For both genders, they show an increase in 2002 with respect to 1994. The probability of finishing middle school increases by approximately 16% for boys, while the percentage is approximately 18% for girls. Meanwhile, the increase in the probability of finishing high school is approximately 12% for both genders.

Impact of the Extension of Compulsory Education

As mentioned before, compulsory education in Turkey was extended from five years to eight years in September 1997. Some of its effects might be predicted from the previous analysis; however, to be more confident about the impact, some additional analysis is made in this section.

Summary Statistics

In order to have an overall idea of the middle school enrolment in Turkey, school enrolment data of State Statistics Institute in Turkey is gathered for the years 1990-2005. Figures 4 and 5 present the enrolment of both boys and girls in middle school between the years 1990-2005 in urban and rural areas, respectively. After 1997, a sharp increase can be observed in the enrolment of both boys and girls in urban areas. Furthermore, in rural areas before 1997, there was a decreasing trend of middle school enrolment of the children, and with the extension it started to increase again, finally coming to its original level of 1990 in 2005. We can conclude that the extension was beneficial for the children in rural areas, not because it significantly increased the enrolment in comparison with the rates in early-90s, but it stopped the decreasing trend of middle school enrolment. The number of schools for this period is presented in figure A.1 in appendix. Most probably due to the process of adaptation to the new system, after 1999, a decrease in the number of middle schools is observed. The data before 1997 contains the sum of primary and secondary schools, while after 1997 all schools were obliged to provide eight years of education. It might be the fact that as primary and secondary schools are combined, now one school that was primary school before and another that was secondary school would be counted as only one school. After 1997, all schools that provide eight years of education are named as primary schools, even if there are two separate schools, and counting them separately might cause double counting. As a result, it

might be concluded that the increase in middle school attainment is not due to an increase in the number of schools.

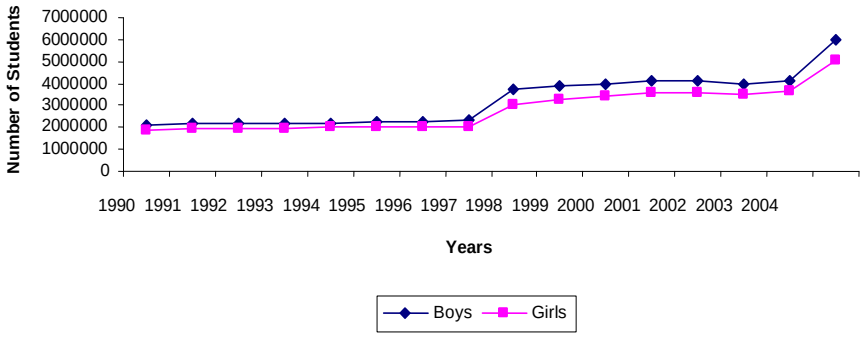


Figure 4: Urban middle school enrolment

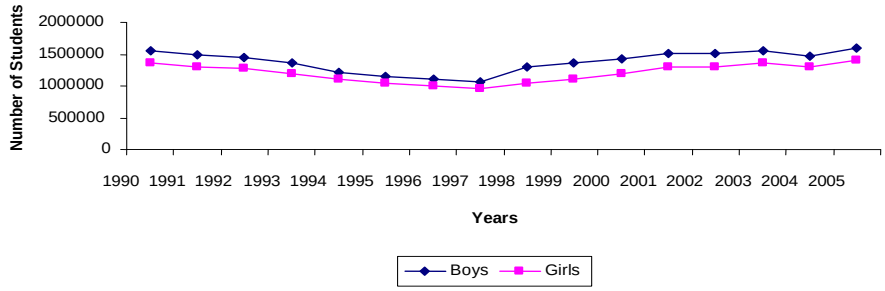


Figure 5: Rural middle school enrolment

Another question would be whether this combination of schools has caused any change in classroom size or students per teacher ratio. Figures A.2 and A.3 in the appendix show the classroom size for urban and rural areas, respectively. While a stable pattern is observed in urban areas, a sudden increase seen in the class size of rural areas in 1997 deserves attention. It might be due to the lack of schools and increase in the demand for schools in rural areas. Figure A.4 in the appendix presents that there has not been a substantial change in average number of students per teacher during the period 1990-2005. On the other hand, it is interesting to observe that in 2005 number of students per

teacher in urban areas fell below the ones in rural areas.

Difference in Differences Approach

Concluding that all the increase in school enrolment would also cause the same increase in graduate rates would be misleading. In order to isolate the impact of the extension of compulsory education, difference in differences method is used.

The oldest children that would be affected by the extension would be 17 years old in 2002, and the ones who are 18 years old in 2002 are the youngest ones that are not exposed to this change in compulsory education. Not to end up with very small sample size, it is decided to compare children between 16-17 years old with the ones who are 18-19 years old. Children between 16-17 years old are taken as the treatment group and the ones that are 18-19 years old are used as the control group. All the other observations are dropped from the sample. While 16-17 year-old children in 1994 sample were not exposed to the policy change, 16-17 year-old children in 2002 were affected by the extension in compulsory education. As the maximum amount of schooling years that could be finished by a 16-year old child is eight years in 2002, the maximum amount of education is set for eight years for all age groups. In this analysis, it is important to see whether the extension of compulsory education increased the mean education level of children towards eight years or not. Table 11 presents the results of analysis for boys and girls separately both for urban and rural areas.

Contrary to the expectations, the results for urban boys and rural girls are negative, but the difference-in-differences estimate for the girls living in rural areas is not significant. Nevertheless, the results hint that the extension of compulsory education has not had an impact on all children in the same manner. In this analysis, the exact number of years of education cannot be known, as the options in the survey are 0, 2, 5 and 8

11.Simple Diff-in-diff Results

Boys' Education (Urban)			
	Treat.G:16-17 years old	Cont.G:18-19 years old	Diff.
After:	7.1299	7.1974	-0.0675
2002	(0.2379)***	(0.2684)***	(0.0900)
Before:	6.9086	6.7834	0.1252
1994	(0.1275)***	(0.1561)***	(0.0580)**
Diff.	0.2213	0.4140	-0.1927
	(0.0745)***	(0.0790)***	(0.1093)*
Boys' Education (Rural)			
	Treat.G:16-17 years old	Cont.G:18-19 years old	Diff.
After:	7.1129	6.8241	0.2888
2002	(0.5778)***	(0.6243)***	(0.2222)
Before:	6.4522	6.2881	0.1641
1994	(0.1728)***	(0.2005)***	(0.0907)
Diff.	0.6607	0.5360	0.1247
	(0.1715)***	(0.1828)***	(0.2508)
Girls' Education (Urban)			
	Treat. G:16-17 years old	Cont.G:18-19 years old	Diff.
After:	6.6609	6.4618	0.1991
2002	(0.2337)***	(0.5577)***	(0.1205)*
Before:	6.2454	6.3565	-0.1111
1994	(0.1252)***	(0.1518)***	(0.0734)
Diff.	0.4155	0.1053	0.3102
	(0.0938)***	(0.1023)	(0.1392)**
Girls' Education (Rural)			
	Treat. G:16-17 years old	Cont.G:18-19 years old	Diff.
After:	5.9661	6.0526	-0.0865
2002	(0.4969)***	(0.5577)***	(0.3185)
Before:	5.1406	5.0156	0.1250
1994	(0.1433)***	(0.1863)***	(0.1073)
Diff.	0.8255	1.0370	-0.2115
	(0.2072)***	(0.2283)***	(0.3091)

Note:, **, *** indicate statistical significance at the 10, 5 and 1%, respectively.*

years, but it is the same for both years and both groups, so this should not bias the results. The results show that this program had a negative effect on education level of the boys in urban areas, while it affected the girls in the cities positively. This is rather a surprising result after observing the increase in enrolment rates in the previous section. It might be concluded that the extension of compulsory education has not had any significant effect on graduation rates in rural areas, mostly due to high dropout rates. In the first box in table 11, it can be observed that the simple difference between the years 2002 and 1994 is positive for both treatment and control groups for the boys in urban areas. Therefore, there is an improvement in 2002 relative to 1994. However, this improvement is more for the control group than it is for the treatment group, so there might be other changes that occurred in this period that have impact on school attainment. Both this and the fact that difference in difference estimate, which is significant at only 10% level, make it dubious whether this effect is only because of the application of this policy or not.

In order to isolate the impact of the extension of compulsory education, the following OLS regression is run:

$$Edu_{ij} = \beta_{j0} + \beta_{j1} X_{ij} + \beta_{j2} After_{ij} + \beta_{j3} Treat_{ij} + \beta_{j4} Aftertreat_{ij} + \varepsilon_{ij} \qquad (3.7)$$

where i stands for the individual and j for the gender. X is the vector of individual and family characteristics, which is the same as used in OLS estimates. $After$ is the dummy that takes value one for the 2002 observations, while $Treat$ is the dummy for 16-17 year-old children. $AfterTreat$ is the interaction of these two dummies, meaning that coefficient estimate for β_4 shows the difference-in-differences estimate. This regression is run three times: For boys, for girls, and for pooled sample of both boys and girls. The results are shown in table 12.

The results present that after controlling for individual and family char-

12.Table

OLS Regression Results of Diff-in-Diff Approach			
	Boys	**Girls**	**Pooled**
Age	0.4421	-2.7508	-1.2082
	(0.6975)	(0.8103)***	(0.5487)**
Age^2	-0.0125	0.0790	0.0352
	(0.0200)	(0.0233)***	(0.0157)**
Percent Boys		-0.2529	
		(0.1005)**	
Percent Girls	0.0672		-0.4575
	(0.0889)		(0.0495)***
No. of Children	-0.1271	-0.2975	-0.2138
	(0.0146)***	(0.0160)***	(0.0109)***
Log Expenditure	0.1107	0.2549	0.1835
	(0.0288)***	(0.0340)***	(0.0232)***
Mother's Education	0.0474	0.0980	0.0705
	(0.0064)***	(0.0076)***	(0.0050)***
Father's Education	0.0937	0.1219	0.1076
	(0.0062)***	(0.0073)***	(0.0049)***
Only Mother	0.3115	0.5218	0.3956
	(0.1174)***	(0.1211)***	(0.0864)***
Only Father	-0.5404	-0.3919	-0.4880
	(0.3321)	(0.3830)	(0.2578)*
Mother Self-employed	-0.1980	-0.2602	-0.2395
	(0.0431)***	(0.0470)***	(0.0326)***
Father Self-employed	-0.1862	-0.2149	-0.2084
	(0.0540)***	(0.0646)***	(0.0430)***
Urban	0.1706	0.5903	0.3901
	(0.0481)***	(0.0559)***	(0.0383)***
Treat	0.1006	0.0015	0.0565
	(0.0891)	(0.1032)	(0.0704)
After	-0.5106	-1.4066	-1.0039
	(0.1470)***	(0.1717)***	(0.1179)***
After*Treat	-0.0609	0.1958	0.1105
	(0.0925)	(0.1105)*	(0.0738)
Constant	1.1138	26.1404	14.1735
	(6.1081)	(7.0736)***	(4.7973)***
N	6578	6195	12773
R^2	0.1449	0.3057	0.2167

Note:, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors. Dependent variable is education (years)*

acteristics, the extension of compulsory education has not had any significant effect on boys' education level, while it has had a positive impact on girls' education. However, from the pooled data results it can be concluded that this policy has not had any significant impact on education level in general. Although it increased the enrolment rates, this increase is not followed by an increase in graduation rates.

Impact on Household Labour Force

The extension of compulsory education may also affect the labour force combination of the household. In this section, first the fact that mothers have started working after this policy change is analysed by using difference in differences approach in a probit estimate. Households that have at least one child between 16-17 years old are taken as the treatment group and the ones that have at least one child between 18-19 years old are taken as the control group. The families that have children both at the age of 16-17 and 18-19 are excluded from the sample. The following probit regression is used:

$$P_i = \alpha_0 + \alpha_1 X_i + \alpha_2 Treat_i + \alpha_3 After_i + \alpha_4 AfterTreat_i + \varepsilon_i \quad (3.8)$$

where P_i is the dummy variable, which takes the value one, when mother is working, X is the vector of household characteristics such as the mother's and father's education; the ages of mother and father; the squared terms of mother's and father's age; two dummies that take the value one, if the mother and/or the father is self-employed; the dummy that shows if the father is working in the public sector or not; the dummy that represents whether the father has any second job or not; the dummy that takes the value one, if the household is engaged in agricultural activities; the dummy that takes the value one, if at least one child in the household is working; variables that represent the number of

children between the age zero and six, seven and fifteen. The dummy variable $Treat$ takes the value one for the treatment group, in the same manner dummy variable $After$ takes the value one for the year 2002 and $AfterTreat$ is the interaction term of both. The results are shown in table 13.

As expected, the results show that the higher educated mothers have higher probability to work. On the other hand, the higher the education of the husband becomes, the more the probability for the wife to work decreases. This might be due to the fact that with a higher education level, the husband earns well enough that his wife does not need to work. Another important result is the fact that wives of men that have additional jobs have a higher probability to work. This means that men try to do their best to supply all household needs by themselves by even working in two jobs. This also shows that in general women work because of economic reasons. In the families that are engaged in agricultural sector the working probability of the mother is higher. Furthermore, the number of children between zero-six years old decreases the working probability of the mother, most probably because they need to be taken care of by the mother. Sometimes the cost of finding someone to take care of the child might be higher than the possible amount that would be earned by the mother, if she works. When marginal effects of the variables are calculated, the ones that most negatively influence the probability of mother working are living in a city and income.[25] On the other hand, the father having an additional job and being engaged in agricultural sector are the ones that influence the probability most positively.

The most important result of this analysis is the fact that the extension of compulsory education has not had any significant effect on mothers' working, as the coefficient estimate for α_4 is not significant. The same

[25] The influence of urbanization on female labour force participation is discussed in more detail in the next chapter.

13.Table

Estimation Results of the Probit Model for Mothers' Working		
	Coefficient	**Standard Error**
Mother's Education	0.0699	(0.0063)***
Father's Education	-0.0265	(0.0061)***
Mother's Age	-0.0044	(0.0035)
Mother's Age^2	0.0001	(0.0000)
Father's Age	-0.0097	(0.0044)**
Father's Age^2	-0.0001	(0.0001)*
Father Self-employed	0.0472	(0.0654)
Father in Public Sector	-0.0000	(0.0014)
Father Having a Second Job	0.7982	(0.0562)***
Parents Engaged in Agriculture Sector	1.0117	(0.0399)***
Log Expenditure	-0.0472	(0.0254)*
Urban	-1.0466	(0.0398)***
Number of Children Aged Between 0-6	-0.0148	(0.0060)**
Number of Children Aged Between 7-15	0.0004	(0.0030)
After	0.1044	(0.1378)
Treat	0.0685	(0.0399)
After*Treat	0.0011	(0.0136)
Constant	0.6140	(0.3940)
-Log Likelihood	3265.035	
N	7498	

Note:, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors.Dependent variable is dummy that takes value one if mother is working. The coefficients are calculated marginal effects.*

analysis is repeated also for the father about getting an additional work and again no significant result is found; and therefore, the results are not presented here. Finally, it is checked whether this policy affected the working hours in the family by using the following OLS regression:

$$Workinghour_i = \gamma_0 + \gamma_1 X_i + \gamma_2 Treat_i + \gamma_3 After_i + \gamma_4 AfterTreat_i + \varepsilon_i \quad (3.9)$$

where $Workinghour$ represents the total hours of adult work in the household, and the definition of the other variables are the same as in the previous analysis that is done for mothers. The results are shown in table 14.

The results present that the working hours of parents increase in the parents' age perhaps, due to the fact that the position at work and the amount of responsibilities change with respect to age differences. This idea can also be supported by the fact that having a self-employed father increases the working hours. When someone owns the job, he feels higher responsibility and also by increasing his working hours, he can increase his income. Households that work on their farms or do some kind of agricultural work tend to spend more time on working. There is also a positive relationship between income and the total number of hours worked. Higher income families tend to work more hours, and probably this is the reason why they earn more. In cities, households tend to work less. The number of children below fifteen years old decreases the total hour of work, both because they need to be taken care of and also because they do not work. The most important result of this analysis is the coefficient estimate of γ_4, which shows the difference in differences estimate. It is positive and significant, meaning that the extension of compulsory education forced the income constraint families to work for more hours.

Combining this work with the previous analysis, it can be concluded that

14.Table

Estimation Results of the OLS Regression for Working Hours		
	Coefficient	**Standard Error**
Mother's Education	-0.0886	(0.2325)
Father's Education	-2.6559	(0.2177)***
Mother's Age	1.0960	(0.2151)***
Mother's Age^2	-0.0129	(0.0028)***
Father's Age	1.3966	(0.1966)***
Father's Age^2	-0.0152	(0.0024)***
Father Self-employed	15.9587	(3.5299)***
Father in Public Sector	-0.0238	(0.0416)
Parents Engaged in Agriculture Sector	25.6335	(1.9376)***
Log Expenditure	5.6179	(0.9701)***
Urban	-27.1008	(1.9508)***
Number of Children Aged Between 0-6	-0.5625	(0.2412)***
Number of Children Aged Between 7-15	-0.7843	(0.1229)***
After	-28.5571	(5.5294)***
Treat	-9.0227	(1.6346)***
After*Treat	2.2793	(0.5442)***
Constant	-35.0486	(15.2554)***
-Log Likelihood	0.3898	
N	7498	

Note:, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors. Dependent variable is working hours.*

income constraint families in Turkey prefer to increase their working hours instead of having working mothers.

Impact on Child Labour

One of the aims of the extension of compulsory education was to keep the children at school for three more years, so it is important to evaluate if this policy decreased the child labour or not. The dummy child labour takes the value one if the child worked at least for one month during the survey year. As in the previous section, a probit estimate is formed and difference-in-differences methodology is used. The following probit regression is used:

$$ChildLabor_i = \beta_0 + \beta_1 X_i + \beta_2 Treat_i + \beta_3 After_i + \beta_4 AfterTreat_i + \varepsilon_i \quad (3.10)$$

where the definition of the variables is the same as in the previous section. The results are presented in table 15.

The results show that the reason why the children work is mostly income oriented. This is emphasised by the fact that the probability of working child decreases with the changes in income level. As expected, the education level of parents influence the occurrence of child labour negatively. Having a self-employed father decreases the probability to work. Most probably, even if the children work at their father's place, they are not reported as working. Usually if the child is working with the parents, it is not counted as a job by them, so children working in the farm or working at the place of their parents are not reported as a child labour in the survey. Another factor that decreases the probability of child labour is having a father that works in public sector, both because it is a relatively safe job and also fathers receive transfer for their children. Having a working mother has a very significant negative effect on the probability of child labour. Furthermore, child labour is less probable in the fami-

15.Table

Estimation Results of the Probit Model for Child Labour		
	Coefficient	**Standard Error**
Mother's Education	-0.0208	(0.0099)**
Father's Education	-0.0321	(0.0102)***
Mother's Age	-0.0310	(0.0081)***
Mother's Age^2	0.0004	(0.0001)***
Father's Age	0.0161	(0.0102)
Father's Age^2	-0.0002	(0.0001)*
Father Self-employed	-0.2371	(0.0986)**
Father in Public Sector	-0.0054	(0.0027)**
Father Having a Second Job	0.2341	0.0696)***
Parents Engaged in Agriculture Sector	0.2334	(0.0638)***
Log Expenditure	-0.1455	(0.0337)***
Urban	-0.2019	(0.0589)***
Number of Children Aged Between 0-6	-0.0188	(0.0094)**
Number of Children Aged Between 7-15	0.0487	(0.0040)**
After	0.2307	(0.2090)
Treat	0.4042	(0.2034)**
After*Treat	-0.0348	(0.0200)*
Constant	0.3962	(0.5360)
-Log Likelihood	1470.9425	
N	7498	

Note:, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors. Dependent variable is child labour. The coefficients are calculated marginal effects.*

lies in which the number of children aged between zero and six is higher. Most probably older children look after their younger siblings instead of working out. This is also a type of child labour, but obviously, parents do not report it as child labour as the child do not earn any money from it. As expected, number of children between seven and fifteen increases the probability of child labour, as in general they are the ones who are working.

When marginal effects of the changes in the variables are calculated, the ones that have the most positive influence on the probability of child labour are father having an additional job and working mother, while the variables that have the most negative influence are living in a city and income. Urban families with higher income have fewer tendencies to send their children to work. On the other hand, sending a child to work is the last option if the family still cannot survive even when mother is working and father has a second job. β_4 shows the difference-in-differences estimate for the effect of the extension of compulsory education on child labour. It is both negative and significant at 10% level. The marginal effect of the difference in difference estimator is calculated as 2%. It might be concluded that the extension of compulsory education decreased the child labour, although the amount of reduction is not a great success. These results are consistent with the simulation results of Dayıoğlu (2005). Different from her more recent data and a different methodology is used; still the results are very similar.

Conclusion

There are two main outcomes of this paper: The identification of the determinants of school attainment in Turkey and the effect of the extension of compulsory education on the school attainment.

The main determinants revolve around the family and household structure for both the 1994 and the 2002 data figures; although the marginal

effect is different for the genders. It can be concluded that income growth and increase in parents' education contribute positively to children's school attainment, and their positive effect are higher for girls than boys. When mothers have the power to decide, they give more importance to their children's education as well. Turkey's gini coefficient was 0.38 in 2005, which is higher than all European Union countries.[26] The results of this study present that the income is an important factor in the demand for schooling, so income inequality would negatively affect the school attainment. This issue must be taken care of to reach universal school attainment within Turkey. The paper also concludes that while the number of the boys in the household negatively affects girls, boys themselves are influenced negatively by having a self-employed father. Finally, living in urban region lost its positive significance, which it had in 1994 and in 2002 for middle schooling.

The results are also consistent with a view that enhanced family planning is likely to encourage schooling, but the data does not permit a stronger conclusion to be drawn. In Turkey, abortion is legal and in the statistics it is observed that women are aware of pregnancy controls; however, it is not possible to know whether they are applied in practice or not.[27] A high number of children in the household decreases the probability of school attainment, and education is an important factor in controlling the fertility. Therefore, there is a dual causality here, and parents (young and new) have to made aware of the fact that more children equates to less education, and the lower education more children.

In order to see the impact of the extension of compulsory education, first, the overall statistics have been assessed. Although it seems like the extension increased the overall enrolment rate, the further analysis

[26] In 1994 the gini coefficient was 0.49 and became 0.44 in 2002. For the years 2005 and 2006 it stayed stable at 0.38 Turkish Statistical Institute Population and Growth Indicators http://nkg.tuik.gov.tr/

[27] The percentage of women who knows the ways to control pregnancy is 99.1 in 1993 and 99.8 in 2003. Turkish Statistical Institute Population and Growth Indicators http://nkg.tuik.gov.tr/

show that because of the dropouts this policy has not been as effective as one would expect. Only the girls living in the cities seem to be positively affected by the extension of compulsory education in terms of school attainment, and when the pooled data is concerned, it does not seem to have any significant effect. The extension of compulsory education may also affect the labour force combination of the households. In order to understand this, difference-in-differences methodology is used by taking the 16-17 year-old children as the treatment group and 18-19 year-old children as the control group. The results show that this policy increased the total working hours in the households; however, it has not had any effect on the probability for the mother to start working or for the father to get an additional job. On the other hand, it had a positive effect on child labour by decreasing the probability of child labour by 2% in the households. This study shows that in Turkey, when a household needs extra income, the first way they choose is to increase the working hours of the head of the household rather than letting mothers work. Furthermore, policies that would keep children more in school would decrease the child labour amount in Turkey.

Having a stable economy seems to be one of the most important factors to be sustained in order to have universal school attainment. Furthermore, this study shows that having high enrolment rate does not necessary bring high graduation rate. After sustaining the high enrolment rate, precautions should be taken to prevent dropouts, especially in rural areas. This might be achieved by taking into account all the factors that influence the school attainment in Turkey, which are analysed in the first part of this paper. Furthermore, these results might be important while shaping the future policies, as the new government of Turkey is planning to extend the compulsory education to 12 years in 2012.

A Appendix

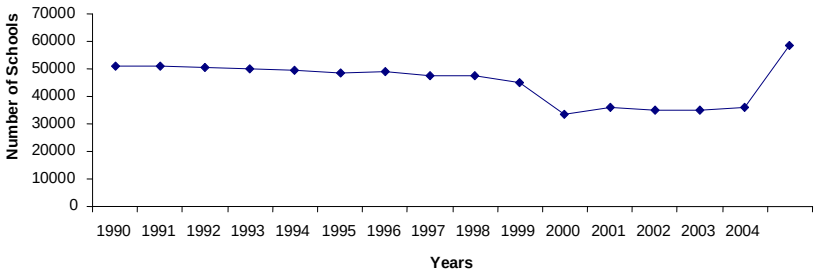


Figure A.1: Number of schools

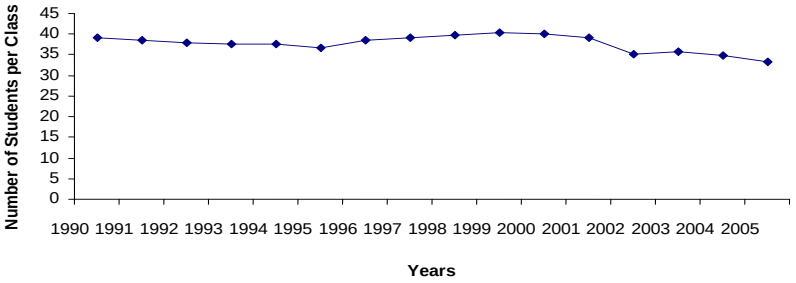


Figure A.2: Average class size in urban areas

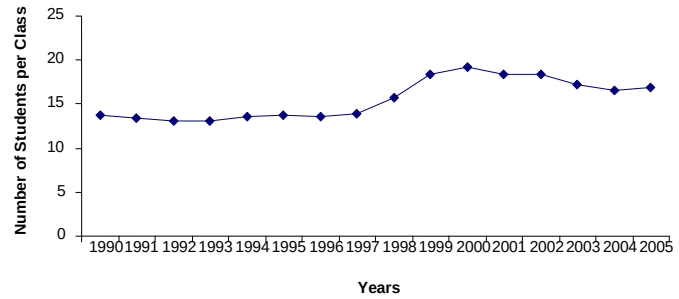


Figure A.3: Average class size in rural areas

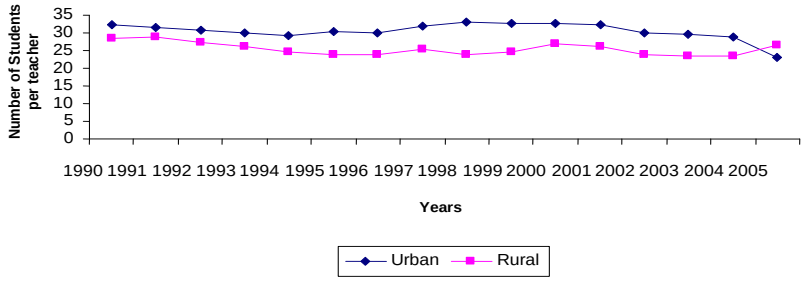


Figure A.4: Average number of students per teacher

16.Results of Ordered Probit Estimation for Middle Schooling (Ages 16-19)

	Boys		**Girls**	
	1994	**2002**	**1994**	**2002**
Age	0.5345	-0.4200	-1.3523	-3.6792
	(0.6331)	(1.2367)	(0.6485)**	(1.1647)***
Age^2	-0.0162	0.0107	0.0391	0.1029
	(0.0181)	(0.0352)	(0.0186)**	(0.0333)***
Percent Boys			-0.1689	-0.4262
			(0.0841)**	(0.1437)***
Percent Girls	-0.0196	0.0869		
	(0.0840)	(0.1584)		
No. of Children	-0.0788	-0.0865	-0.1699	-0.1971
	(0.0109)***	(0.0216)***	(0.0104)***	(0.0228)***
Log Expenditure	0.0721	0.2171	0.1923	0.2628
	(0.0238)***	(0.0743)***	(0.0246)***	(0.0643)***
Mother's Education	0.0465	0.0720	0.0884	0.0923
	(0.0068)***	(0.0137)***	(0.0070)***	(0.0171)***
Father's Education	0.1013	0.0797	0.1191	0.0551
	(0.0073)***	(0.0174)***	(0.0072)***	(0.0129)***
Only Mother	0.3237	0.1422	0.3283	0.4032
	(0.1032)***	(0.1750)	(0.0969)***	(0.1580)**
Only Father	-0.1855	-0.7050	-0.3420	0.3939
	(0.2314)	(0.4405)	(0.2534)	(0.5120)
Mother Self-employed	0.1344	-0.1153	-0.1973	-0.1110
	(0.0323)***	(0.0929)	(0.0350)***	(0.0889)
Father Self-employed	-0.2179	-0.1715	-0.2389	-0.1653
	(0.0502)***	(0.0791)**	(0.0551)***	(0.0741)**
Urban	0.1702	-0.0060	0.4713	0.1172
	(0.0383)***	(0.1089)	(0.0386)***	(0.0999)
-Log Pseudo Likelihood	3502.3363	977.5538	3554.5449	1137.883
N	4966	1612	4707	1488
Pr(edu.=middle school)	0.6067	0.7680	0.4240	0.6095

*Note:For empirical specification see robustness section. *, **, *** indicate statistical significance at the 10, 5 and 1%, respectively.Figures in parentheses are robust standard errors.*

17.Results of Ordered Probit Estimation for High Schooling (Ages 18-20)

	Boys		**Girls**	
	1994	**2002**	**1994**	**2002**
Age	-0.7556	0.2276	5.1511	5.6038
	(1.7191)	(3.1064)	(1.9457)***	(3.1657)*
Age^2	0.0226	-0.0009	-0.1341	-0.1458
	(0.0453)	(0.0821)	(0.0513)***	(0.0835)*
Percent Boys			-0.1999	-0.2695
			(0.1013)**	(0.1647)
Percent Girls	0.0620	0.1044		
	(0.0943)	(0.1625)		
No. of Children	-0.0700	-0.0817	-0.1715	-0.2156
	(0.0127)***	(0.0230)***	(0.0129)***	(0.0275)***
Log Expenditure	0.1230	0.1869	0.1488	0.3117
	(0.0267)***	(0.0786)**	(0.0321)***	(0.0721)***
Mother's Education	0.0518	0.0682	0.0855	0.1005
	(0.0071)***	(0.0142)***	(0.0090)***	(0.0159)***
Father's Education	0.0874	0.0668	0.1175	0.0627
	(0.0075)***	(0.0132)***	(0.0086)***	(0.0156)***
Only Mother	0.3126	0.0914	0.3454	0.5378
	(0.1107)***	(0.1744)	(0.1137)***	(0.1742)***
Only Father	-0.5282	-0.0129	-0.3816	0.5837
	(0.2993)*	(0.4222)	(0.2342)	(0.5999)
Mother Self-employed	-0.1969	0.0422	-0.1894	-0.1731
	(0.0323)***	(0.0974)	(0.0463)***	(0.1080)
Father Self-employed	-0.1317	-0.1724	-0.2126	-0.0172
	(0.0479)***	(0.0805)**	(0.0562)***	(0.0892)
Urban	0.1721	0.2201	0.5500	0.2291
	(0.0441)***	(0.1096)**	(0.0484)***	(0.1232)*
-Log Pseudo Likelihood	3416.1655	1017.7223	2799.0096	1007.4001
N	3162	988	2866	968
Pr(edu.=middle school)	0.3707	0.4960	0.3193	0.6032

*Note:For empirical specification see robustness section. *, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors.*

4 Conservatism and Female Labour Force Participation in Turkey

Abstract

The aim of this chapter is to investigate the main determinants of the participation decision of females in the labour force in Turkey. Turkey is a particularly important case as, unlike in many other countries, female labour force participation has shown a decreasing trend in the last 50 years. This chapter aims to elaborate on the causes of this decrease. In addition to the main determinants found in previous literature, this chapter adds a new variable that influences female labour force participation in Turkey: Conservatism and the role of traditional and social norms. An original proxy for conservatism is created by using a unique data set about perceptions. Four indices that might influence conservatism are formed: Tradition, social norms, men's decision power, and conservatism. The results are in accordance with the previous literature stating that urbanization, child care institutions and education level play an important role in the participation decision of women. However, these factors are not enough to explain the decline in female labour force participation. This chapter presents a new concept by showing that social norms, tradition and men's higher bargaining power play a negative role in the probability of women working in urban areas, while they have the opposite influence in rural areas. Furthermore, this chapter shows a new possible explanation for the link between urbanization and female labour force participation. Higher urbanization causes higher conservatism, which leads to lower female labour force participation.

Keywords: Female labour force participation; Gender; Conservatism; Turkey

Jel codes: J16, J21

Introduction

This chapter aims to determine the influence of conservatism on female labour force participation in Turkey. Turkey is chosen as it shows a

particularly different trend than many other countries regarding female labour force participation (FLFP). Over the last 50 years, Turkey's FLFP has been decreasing.[28] Moreover, according to the Global Gender Gap Report 2009[29] Turkey has the 6^{th} lowest global gender gap index and the 5^{th} lowest rank in economic participation and opportunity for women.[30] The only countries among the 130 in the sample that perform worse than Turkey are Saudi Arabia, Benin, Pakistan, Chad and Yemen. A closer look at the gender gap sub-indices shows that Turkey has the 10^{th} lowest female labour force participation rate and the 12^{th} lowest share of women in ministerial positions among 130 countries.[31] Worst of all, Turkey has the lowest gender gap index ranking in the upper middle income group that it belongs to. It is important to elaborate on the reasons behind this fact in order to form future policies both for Turkey and for other developing countries that might end up having the same problem as Turkey. Furthermore, being a link between the East and the West both geopolitically and culturally, Turkey plays an important role in the region's economy and politics. Especially during the integration process of Turkey with European Union, it is essential to identify such problems and to propose possible solutions.

Figures 6 to 8 present the evolution of fertility, female education and female labour force participation rates, respectively. While the level of education increases, the fertility and female labour force participation rates decrease over time. Accordingly, neither women's education level nor fertility rate can be a factor in the decreasing trend in female labour force participation. In the appendix of this chapter, some additional figures on percentage of working mothers by cohort and female labour

[28] Fernandez and Fogli (2005)

[29] World Economic Forum (Geneva, Switzerland 2009)

[30] When gender gap index equals to one it means equality between males and females. In 2009 Iceland has the highest ranking with an index of 0.8276. The index value for Turkey is 0.5828.

[31] It is interesting to observe such a trend in Turkey, especially when we consider the fact that it was one of the first countries where women received their right to vote and to be voted (1930, 1934).

force participation rates by year and education level can be seen.

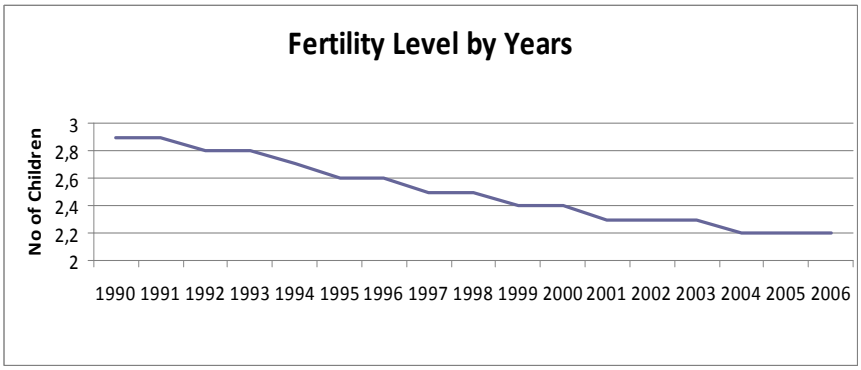


Figure 6

There is a huge literature on the subject of female labour force participation in an international framework. Tzannatos (1999) examines the level of and changes in female and male participation rates, employment segregation and female wages relative to those of male wages across the world economy. He finds sufficient evidence to support the view that labour markets in developing countries are transformed relatively quickly in the sense that gender differentials in employment and pay are narrowing much faster than they did in industrialised countries.

Blau and Kahn (2007) investigate married women's labour supply from 1980 to 2000. They find a large rightward shift in their labour supply function for annual hours in the 1980s, with a little shift in the 1990s. There are also studies done on the female labour force participation rate in Turkey and some of them try to explain the decline observed in recent decades. [32]

In addition to the main determinants found in the previous literature, this chapter adds a new variable that influences female labour force participation in Turkey: Conservatism and the role of tradition and social norms in Turkey. An original proxy for conservatism is created by using

[32] More information about these studies can be found in the next section.

a unique data set about perceptions in Turkey. Three indices that might influence conservatism are formed: Tradition, social norms, and men's decision power. Then, these indices are combined to see the general influence of being conservative in social terms.

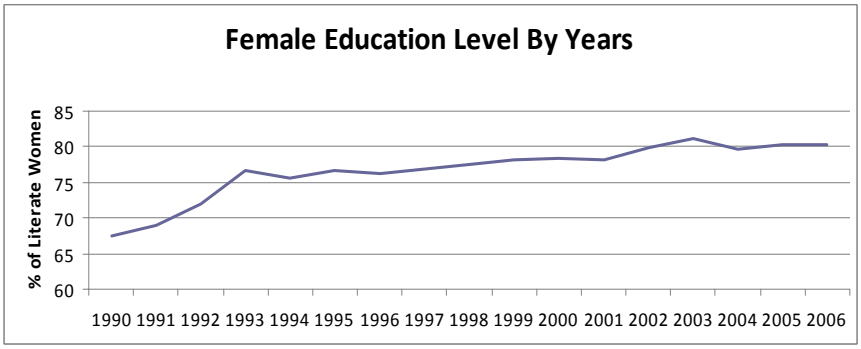


Figure 7

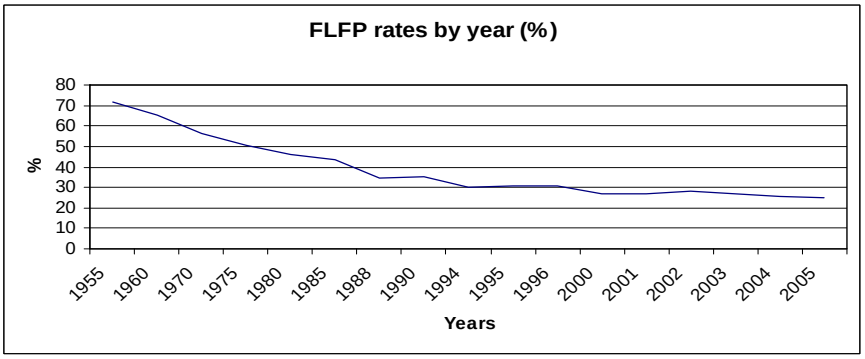


Figure 8

The idea of explaining economic outcomes by social norms, religion and tradition is not new in the literature. In the paper by Fernandez and Fogli (2009), they emphasise that Turkey is the only OECD country in which FLFP decreases over time, but this issue is not their main concern. They make use of a 1970 census and their sample consists of women born in the US but whose parents were born elsewhere. They use past FLFP and ancestral fertility rates as cultural proxies and find a positive and significant power of this proxy for decisions of members of the current generation about work and fertility. They claim that neither unobserved

human capital nor networks are likely to be responsible for this causality.

Recently, there has been an increasing trend in the number of papers that combine sociology and economic outcomes. The economic literature is enriched by papers that investigate the relationship between religion and economic performance (Iannaccone, 1998; Noland, 2005; McCleary and Barro, 2006; Becker and Woessmann, 2009), intergenerational transmission of ethnic and religious traits (Bisin and Verdier, 2000), the relationship between social norms and female labour force participation (Hazan and Maoz, 2002; Vendrik, 2003; Fernandez and Fogli, 2004; Burda et al., 2007), the connection between culture and economic outcomes (Guiso et al., 2006; Giavazzi, 2009), and the correlation between culture and institutions (Greif, 1994; Tabellini, 2005). This chapter combines such literature with the one on female labour force participation. To my knowledge, it is a first attempt in the forming of indices to explain conservatism in Turkey. Furthermore, the roots of conservatism are disentangled and it is possible to see whether being traditional or having stronger social norms has a higher influence on women's participation decision.

The outline of this chapter is as follows: The next section is devoted to the literature review and discussion on female labour force participation in Turkey. In section 3, I give a brief explanation about conservatism in Turkey and in section 4, I describe the model. The data are explained in section 5 while section 6 presents the methodology and section 7 the estimation results. The final section 8 concludes.

Literature Review and Discussion on Female Labour Force Participation in Turkey

The recent literature on FLFP in Turkey categorises the main reasons of the decrease in FLFP into six groups. One of the main reasons that has been frequently emphasised is urbanisation (Ilkkaracan, 1998; Başlevent and Onaran, 2002). In Turkey, there has been a continuing migration from rural to urban areas since 1950s. There are many reasons for this phenomenon which are outside the scope of this paper, but it is mainly due to the lack of importance and support given to the agricultural sector in Turkey. A few decades ago, Turkey was an agricultural country, but with the increase of industrialisation the resources shifted from this sector to the industrial sector. The second reason discussed in the literature is availability and affordability of childcare institutions (Acar, 2008). Though I agree that it is an important aspect, I do not concur that it might explain the decreasing trend in FLFP. Childcare institutions have been improving in Turkey and one year of pre-school education was made compulsory a few years ago. Moreover, the fertility rate in Turkey has been decreasing.

Another factor that is claimed to be the reason for decreasing FLFP is the U-shaped characteristic of labour force participation (Çagatay and Özler, 1995; Tansel, 2002). Tansel (2002) explains this pattern as follows: "the participation of women in the labour force is higher when agriculture is the dominant form of the economic activity. With development, economic activity shifts from home based production to market based activities. Markets' expansion and new innovations causes income to increase, hence decreases FLFP. Women may not be able to compete with men in the new sectors due to lack of education and due to tradition, culture and household responsibilities. Moreover, when the education level and real wages of women start to increase we pass to the upward sloping part of the U-shaped curve." Turkey might be on the

downward-sloping part of the curve, but as also emphasised by Tansel (2002), tradition and culture play an important role in this process and their importance is discussed in this paper. Furthermore, Ecevit (1998) claims that globalisation and liberalisation caused a decrease in FLFP by dismantling labour markets and by breaking all regulations in order to find cheap and unorganised labour.

Dayıoğlu (2000) and Ince and Demir (2006) indicate that the main reasons for the decline in female labour force participation are economic crises and the low education level of the female population. Figure 7 however presents the increasing level in female education in Turkey. It is true that the average female education level is still lower than the male one, but there is an increasing trend and it can therefore not be the sole reason for the decrease in FLFP. Economic crises are shocks to the economy and cause many people to become unemployed. Furthermore, during such shocks it is more difficult to find a job, especially for women. As Adamopoulos and Akyol (2009) emphasise, assuming leisure to have the same value for both men and women and taking into account the fact that women have a comparative advantage in home production, it can be concluded that the elasticity of labour supply for women will be higher than for men, so women will react by changing their labour supply more readily than men in the event of economic shocks. Though I accept that they are important factors, this mechanism can explain only part of the decline in female labour force participation.[33]

Lastly, unequal division of labour at home is emphasised as a factor that discourages women from working (Moghadam, 1998; Ilkkaracan, 1998). They claim childbearing, early marriage and women being seen as only housewives are the main reasons for low FLFP in Turkey. This is in accordance with what this chapter shows, that social norms are an important factor in the participation decision of women.

[33] See results section

Conservatism in Turkey

It is generally agreed that conservatism in Turkey is on rise, but as it is a qualitative concept it is really difficult to prove it with numbers. In this section I will try to give some examples that show that there is an upward trend in Turkey in terms of conservatism.

In their book, Çarkoğlu and Kalaycıoğlu (2009) explain the rising tide of conservatism in Turkey and claim that religiosity plays a major role. Indeed, when the web page of The Presidency of Religious Affairs in Turkey is checked for the number of Qur'an courses and the number of students that follow these courses, one can observe the increasing trend. Figures 9 and 10 show the Qur'an courses and number of students in recent years, respectively.

Çarkoğlu and Kalaycıoğlu (2009) claim that the increasing trend in conservatism is caused by long-term socio-political modernisation, industrialisation, increased pace of social mobilisation, and contemporary regional turbulences due to the changes that have been taking place in the international system since the end of the Cold War. In the post-1980 era, Turkish society became increasingly more urban and relatively more affluent. At the same time Turkish people started to be highly sensitive to the uncertainties of socioeconomic and socio-political changes occurring in and around the country. In the empirical section of their book they show that almost 40% of the population of Turkey desires to go back to the "good old days" and turn back to the traditional social norms. In a survey they conducted in 2006, 51% of the respondents are clearly closer to being very conservative, and only about 22% remain closer to being not conservative at all. They also show that there is a shift from leftwing to rightwing in terms of politics.

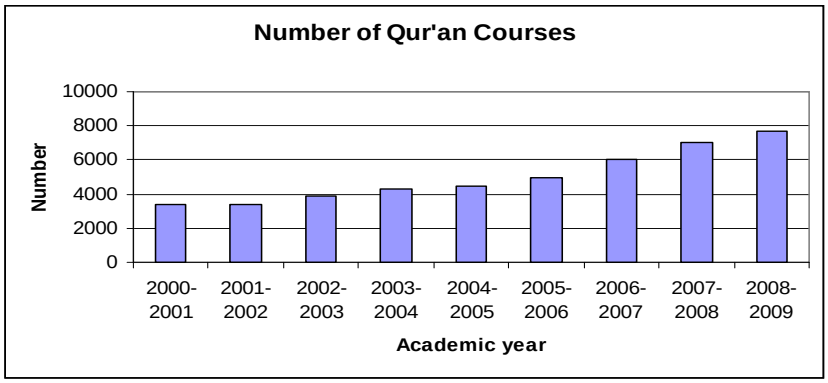


Figure 9

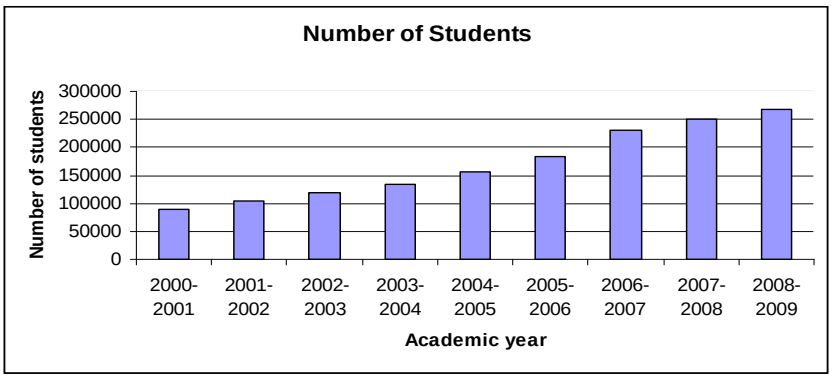


Figure 10

The aim of this chapter is neither to prove the increasing trend in conservatism nor to determine the reasons behind this trend. It aims to investigate whether conservatism has any influence on the decreasing trend in FLFP or not. For this reason, I have only tried to give some brief explanation about the trend in conservatism in Turkey in this section and have suggested reasons for this fact.

Model

Except for some recent papers in the literature, labour market participation of women is assumed to depend on their evaluation of the market

wage against their reservation wages. In this chapter, on the other hand, it is assumed that women are not alone when they are making their decisions. The environment and the social norms in that environment also play a role in the decision-making process.

There are three links through which social norms and conservatism influence the participation decision of women. The first one is the education link. Up to a certain age, parents make the decisions about their children's educational attainment. For example, only the first 8 years of education are compulsory in Turkey at present. If parents decide not to invest in the education of their children after this compulsory education period is over and do not send them to high school, then there is no way for these children to go to university even if they prefer to. The previous chapter shows that there is a gender bias against girls in Turkey in educational investment. If the social norms in a society are against females working and people believe that women should rather stay at home and take care of the house, then the girls living in such a society are less likely to have a high level of education and less likely to find a job in the future even if they want to.

The second link is through marriage. In conservative societies, women have less freedom to choose their partners. This also causes having less bargaining power in the household. In a sense, instead of their fathers, they have to obey their husbands after marriage. Fernandez *et al.*(2004) prove that the number of men being brought up in a family in which the mother worked as well has been a significant factor in the increase of female labour force participation. In a conservative society, a woman is unlikely to find such a husband, so her husband will most likely also have the same norms as her father. Having low bargaining power means women do not have any influence on the decision about fertility (Rasul, 2008) and having more children than they prefer also affects their participation decision.

The third link concerns the labour market. In a conservative society, having social norms against women working means employers set lower wage for females. Tansel (2005) states that this is indeed the case in the private sector in Turkey. As a result, returns to education for females are lower than they are for males and this strengthens the first link.

In this chapter, married women are taken into consideration. The reason for this choice is to be able to observe all the above-mentioned links. Throughout this chapter, conservatism is associated with the power of men to decide how women should act.

Data and Descriptive Statistics

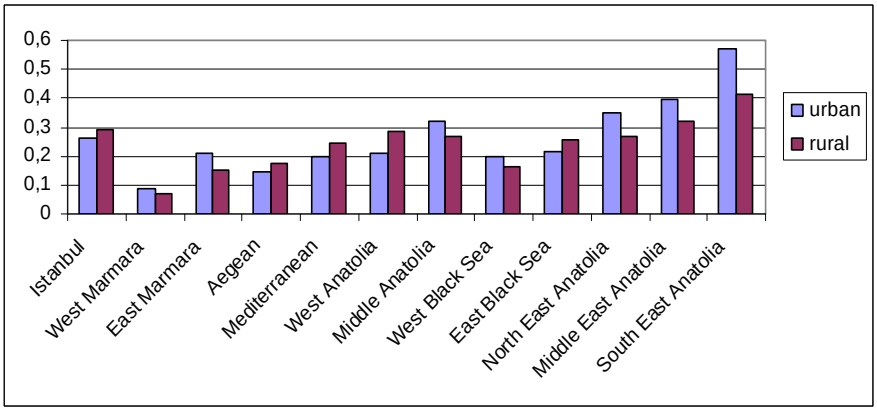
In this chapter, I mainly use four datasets, all of which conducted by the State Institute of Statistics (SIS) of Turkey: the 1994 Household Budget Survey, the 2003 Household Budget Survey, the 2006 Household Labour Force Survey and the 2006 Household Structure Survey. The main reason for the use of the 2006 Household Labour Force Survey rather than the 2006 Household Budget Survey (HBS) is that the latter lacks information about regions. The 1994 HBS covers 118,540 individuals from 26,256 households. Likewise, there are 25,920 households consisting of 107,614 individuals in the 2003 HBS. The 2006 Household Labour Force Survey, on the other hand, covers 497,137 individuals from 129,527 households. In all these datasets, it is possible to find the necessary individual and household characteristics.

Unlike the previous literature mentioned in this chapter, the 2006 Household Structure Survey, a unique data set about perceptions, is used. This survey is a product of joint research by the State Institute of Statistics of Turkey and the General Directorate of Family and Social Studies on the household structure of Turkish families. This survey consists of more than a hundred questions about the household structure, perceptions

and habits of Turkish families and, to my knowledge, this study is one of the first academic papers to use this survey. The details of the questions of this survey are explained further on in this chapter.

Table 18 reports the descriptive statistics. In the table, education presents the number of years spent on education while girls and boys are the number of girls and boys in the household, respectively. Grandmother is a dummy variable that takes the value one for the presence of a grandmother in the household. Loghusbandincome is the logarithm of the husband's income while logwifeincome is the logarithm of the wife's income. Husbands' conservatism denotes the average response rate for the conservatism index given by males at the same cohort of the husband and live in the same region. On the other hand, husband's conservatism exists only for the 2006 HSS and it is individualistic. Urban is a dummy variable that takes the value one if the population of the location is higher than 20,000. Working woman is a dummy that takes the value one if the woman is working. Whether a woman works or not does not depend only on an individual willingness to work but also on whether there are jobs available for her. For this reason, I formed another dummy variable that takes the value one if the woman is either working or in search for a job and zero otherwise. Distance to Istanbul shows the average distance between the biggest cities of a region and Istanbul.

In the 2006 HSS, the individuals are asked directly whether they think it is appropriate that women work or not. This variable is not used in the analysis as it is totally endogenous, but figure 11 presents the fraction of men who do not approve of women working. In most of the regions the percentage of men who are against women working is higher in urban areas than in rural areas. Moreover, the difference is higher for more conservative regions in east Anatolia. When the men that are against women working were asked for their reason for it, 63% of them replied that "The woman's main duty is to take care of the children and do the domestic work".



11.Percentage of men that answered negatively to the question "whether it is appropriate that women work or not" in 2006 HSS.

In addition to these datasets, the results of Turkey's 1995, 2002 and 2007 general elections combined with the 2003 Voter Tendency Survey are used in order to form an index about the level of radicalism, which is used in the robustness section. The 2003 Voter Survey consists of 41 questions about the political beliefs and attitudes of individuals. The individuals that participated in this survey answered questions about the party they voted for in the last elections, their ideas about Turkey's being a member of the European Union, their political position and so on. The reason why this survey is not used in the regression directly is the lack of individual and household characteristics.

Methodology

In this chapter, different data sets are used in order to determine the main factors that influence whether women work or not. Each data set has some pros and cons and they are used in such a way as to complete each other. In this section I explain how I used each data set to form my final data set for the analysis.

18.Descriptive Statistics

	2006 HSS	2006 LFS	Pooled Data
Age	43.5674	42.5938	42.0884
	(0.1343)	(0.0399)	(13.0961)
Education	4.8081	4.9383	4.7979
	(0.0384)	(0.0118)	(3.8606)
Sons	1.0140	0.9647	1.0141
	(0.0107)	(0.0031)	(1.0528)
Daughters	0.8395	0.8421	0.8893
	(0.0104)	(0.0031)	(1.0644)
Grandmother	0.0525	0.0644	0.0677
	(0.0022)	(0.0007)	(0.2501)
LogHusbandIncome	6.3225	6.4560	6.7804
	(0.6629)	(0.0028)	(0.9258)
Husbands' Conservatism	0.0051	-0.0586	-0.0521
	(0.0056)	(0.0016)	(0.5198)
Urban	0.5779	0.6814	0.6870
	(0.0049)	(0.0014)	(0.4637)
LogWifeIncome	6.2672	6.2828	6.3015
	(0.0158)	(0.0091)	(0.1955)
Working Woman		0.1897	0.2118
		(0.0012)	(0.4086)
Working+Unemployed Woman		0.2023	0.2219
		(0.4017)	(0.4155)
Husband's Conservatism	-0.0773		
	(1.4909)		
Distance to Istanbul		677.80	699.76
		(440.73)	(441.31)
N	10073	110266	157138

Source:Author's own calculations using 1994 HBS, 2003 HBS, 2006 LFS and 2006 HSS.

2006 Household Structure Survey

Though the 2006 Household Structure Survey (HSS) is a unique data set about the perceptions of Turkish people, it unfortunately lacks one of the basic pieces of information needed in this chapter: Whether the woman works or not. Luckily it contains information about the incomes of individuals. I am aware of the fact that having an income does not necessarily mean that the woman actually works. She might have inherited land or real estate and might be receiving rent. Still, I believe the proportion of women having such properties is not so high in Turkey. Furthermore, using only this data set would not provide information about the time variance because it is the product of the first survey done about family structure which is planned to be done every 5 years. In order to be able to observe the time trend, the information in this data set should be transferred to the other data sets that we have for previous years. The methodology for this is discussed later in this section but the analysis performed on the 2006 Household Structure Survey data is explained first.

In order to make use of the questions in the 2006 HSS, polychronic principal component analysis is used to form 3 different indices. The first index is called the tradition index and makes use of seven questions in the survey. The first question that is used for this index is about marriage age. The individuals are asked their age when they got married for the first time. I formed a dummy that takes the value one if the individual was under 19 years of age and zero otherwise. The other variables used for this index are whether they had the following traditional concepts or not: Arranged marriage, religious marriage, henna (kına) night[34], religious ceremony, bride money[35] and close-relative marriage. The more

[34] Traditionally (in Turkey, at least), henna night, or kına gecesi is a women's party that usually takes place the night before the wedding. The bride's closest friends and female family members gather to eat, dance, and sing. They put henna on their hands.

[35] According to traditions, the parents of the groom have to pay bride money to the

traditional the family, the higher the value the index takes.

The second index is about the decision power in the household. In the literature, it is usually assumed that it is proportional to the income the individual brings home and estimated accordingly. In the 2006 HSS, there is a question asking the participants who in the household makes the final decision regarding the following: choice of the house, choice of the house style, children, shopping, relations with relatives, relations with neighbours, holiday and fun. Higher values of this index mean that men have higher decision power in the household concerned.

The last index formed from the 2006 HSS is about social norms. While the previous two indices are at household level, this one is at an individual level. There are many questions about social norms in the 2006 survey, but a few of them are selected to form the index both according to their individual performance in the regression and also to the correlation matrix.[36] Dummies are formed using the answers to the following questions: "Do you approve of close-relative marriage?", "Is the wife not doing housework properly a sole reason for divorce?", "Do you agree with the statement: The continuation of a generation is guaranteed only by a son?", and "Do you agree with the statement: The best marriage age for a woman is between 15-19". Each dummy takes the value one if the answer to the relevant question is positive and takes the value zero if it is negative. Using principle component analysis with these dummies a social norm index is formed, which has higher values for the individuals that have stronger social norms.

Lastly, an index of conservatism is formed using all the variables mentioned above to see the total influence of being conservative. This index provides us with a general idea of the effect of conservatism on FLFP, while we can disentangle which issues play more important roles in this

parents of the bride. It might be cash as well as some animals or land. In return the bride brings a dowry to her new house.

[36] Choosing other combinations of the variables do not change the results significantly.

process by looking at the previous ones.

As explained before in the HSS, we do not have any information about the working situation of women. Rather, we only have information regarding their income. For this reason, I use the logarithm of the woman's income as the dependent variable for the analysis of this data set. Accordingly, the following OLS regression is run.

$$LogFemaleIncome_{ijk} = \alpha_0 + \alpha_1 X_i + \alpha_2 R_j + \alpha_3 I_{ik} + \varepsilon_{ijk} \qquad (4.1)$$

where X is a vector of individual and household characteristics, R is the region dummies and I represents the indices.

As this data set does not contain very reliable information about income and because I want to analyse not only the impact of the husband but also the impact of the environment on the woman's decision to work, I use the following equation:

$$I_{ijkl} = \sum \alpha_{ijkl} / N_{ijkl} \qquad (4.2)$$

where i, j, k and l represent sex, cohort, region, and urban respectively. Using this equation, I find the means of the indices and transfer the indices to the other datasets, e.g. all female people in cohort 25-30 years-old in region A in an urban area will have the same value for the index, which is the mean calculated using equation 4.2. Furthermore, using these mean indices will provide me with information about the environment that a woman is living in. I run the following OLS regression, this time with the mean of the indices that is calculated as described above.

$$LogFemaleIncome_{ijk} = \beta_0 + \beta_1 X_i + \beta_2 R_j + \beta_3 I_k + e_{ijk} \qquad (4.3)$$

where X is a vector of individual and household characteristics,R is the region dummies[37] and I represents the indices.

During the time period between 1994 and 2006 there were not any institutional or tax system changes in Turkey. I use the advantage of concentrating on only one country and unlike other papers in the literature that use panel data sets, I do not need to control for institutions and tax rates.[38]

In table 19, the first column presents the results for the first regression without any region-fixed effects. In the second column I add the fixed effects, while the third column shows the results for the second regression with the mean indices. In the data set, the age is given between intervals so the median of the interval is taken when determining age. Sons and daughters are the number of the sons and daughters of the mother, respectively. Grandmother is a dummy that takes the value one in the case of a grandmother living within the household. In this dataset, it is also possible to make a distinction between whether this refers to the husband's or the wife's mother. In the dataset, income is also given in intervals. For all intervals except the last one, the median is taken; but the last interval is given as higher than 2501YTL. In order to find an appropriate representative for this interval, a quantile method is used as suggested in Ligon (1989) and the upper bound is found to be 2,953YTL. Urban is the dummy that takes the value one if the individual is living in the city. Logwifeincome and loghusbandincome are the logarithms of the woman's and her husband's income, respectively. For brevity's sake only the results for the conservatism index is shown in this table and the

[37] Although the indices vary even within region there might be still some collinearity if the regions are used in the same way given in the data set. SIS uses 12 regional dummies, even though, in reality, Turkey has 7 geographic regions. SIS increased the number of regions by dividing some of them into parts to obtain a more detailed analysis. I recombine the split regions and use 7 regional dummies in order to be able to consider the region-fixed effects.

[38] Giavazzi et al (2009).

results are discussed in the next section.[39]

2006 Labour Force Survey

In the previous section, the results of the regressions are not interpreted as the 2006 HSS is unclear as to whether the mother is working or not, so the results might be misleading. Unlike the 2006 HSS, we find information about both wage and whether an individual is working or not in the 2006 LFS. Furthermore, it is also possible to see if the individual is unemployed and looking for a job. Using this information, a better variable for female labour force participation is formed, though the results do not differ much when the women who are unemployed are also counted.

The 2006 LFS is used to run three different OLS regressions separately for urban and rural areas[40].

$$LogFemaleIncome_{ijkl} = \alpha_0 + \alpha_1 X_i + \alpha_2 R_j + \alpha_3 I_k + \alpha_4 D_l + \varepsilon_{ijkl} \quad (4.4)$$

$$FemaleWork_{ijkl} = \beta_0 + \beta_1 X_i + \beta_2 R_j + \beta_3 I_k + \beta_4 D_l + e_{ijkl} \quad (4.5)$$

$$FemaleWorkorSearch_{ijkl} = \gamma_0 + \gamma_1 X_i + \gamma_2 R_j + \gamma_3 I_k + \gamma_4 D_l + \mu_{ijkl} \quad (4.6)$$

where the definitions of X, R and I are same as before. The first one is the same regression as in the previous section in which I used the

[39] The results of for the other variables are available from the author.

[40] OLS is used to be able to interpret the results more easily. A robustness check is done by using probit estimation and tables 31 and 32 in appendix show that when the marginal influence in the probit estimation is considered, there is not a significant difference between OLS and probit results.

means of the indices. $FemaleWork$ is a dummy variable that takes the value one if the wife is working and zero otherwise. On the other hand, $FemaleWorkorSearch$ is another dummy that takes the value one if the wife is either working or looking for a job. The last regression takes into account the cases in which the wife is not working as a result of lack of job availability in the region. D shows the average distance between the biggest cities in the region and Istanbul.

The previous literature claims that urbanisation plays an important role in the decrease of female labour force participation, which is also one of the conclusions of this chapter. In order to observe the differences between the urban and rural parts of Turkey, the regressions are run separately. I expect different results for urban and rural areas due to the difference in their way of living. In rural areas women traditionally work while this is not the case in cities.

Pooled Data

The 1994 and 2003 Household Budget Surveys and the 2006 Labour Force Survey are combined to form the final data set that is used in the rest of the chapter. I am aware of the fact that by this method, the values of the indices are assumed not to change over time, meaning that a 60-year-old woman in an urban part of region A in 2006 has the same perceptions as a 60-year-old woman in an urban part of region A in 1994. Moreover, there might be some endogeneity issues concerning this analysis. The indices might be endogenous to other variables and more importantly to the dependent variable itself. To deal with this problem, an instrumental variable (IV) approach is used. The altitude of the regions is used as an instrumental variable. The higher the place, the more difficult it is to reach it and the more closed it is to outside shocks and influence. So it can be assumed that the places that have a higher altitude are able to save their traditions more than others. Fur-

thermore, from figure 11, one can observe that the percentage of men who are against women working is higher in the Eastern part of Turkey, which is also at a high altitude. It is also true that in high altitude places there might be fewer job opportunities but this is controlled for by the region-fixed effects and by the choice of the dependent variable as $FemaleWorkorSearch$. Furthermore, distance to Istanbul is also used as a geographic control factor. Besides, altitude is constant over time, so it is in accordance with the assumption mentioned above.[41]

Results

In this section, the results of the regressions are presented separately for the 2006 HSS, the 2006 LFS and the pooled data.

2006 Household Structure Survey

The aim of conducting a separate analysis within the 2006 HSS is to analyse whether there is any difference between using the individual indices and the mean of the indices according to sex, cohort and region or not. In case there is, it is beneficial to see in what way they differ. The first two columns in the table 19 present the results for the regression with an individual conservatism index for the husband, while the regression with the mean conservatism index is shown in the last two columns. Even columns include region dummies.

The table 19 shows that the new index that I created by taking the mean of the conservatism index according to sex, cohort and region, which from now on will be called 'husbands' conservatism', has a higher and more significant influence than the individual one[42]. Another important

[41] Figure B.3 in Appendix presents the altitude of the regions in Turkey.

[42] It is done for all indicies, but for brevity's sake, I only show the results for conservatism index here. The results for other indices are available upon request.

19.OLS Regression Results for the 2006 HSS

LogFemaleIncome	I	II	III	IV
Age	0.0302	0.0297	0.0312	0.0292
	(0.0023)***	(0.0023)***	(0.0024)***	(0.0026)***
Education	0.2079	0.2107	0.2087	0.2129
	(0.0107)***	(0.0107)***	(0.0106)***	(0.0106)***
Sons	0.0717	0.0837	0.0767	0.0817
	(0.0272)***	(0.0274)***	(0.0274)***	(0.0274)***
Daughters	0.0217	0.0326	0.0262	0.0309
	(0.0274)	(0.0278)	(0.0279)	(0.0279)
LogHusbandIncome	-0.0628	-0.0798	-0.0697	-0.0783
	(0.0475)	(0.0479)*	(0.0479)	(0.0479)
Mother of Wife	1.0856	0.9825	1.0883	0.9879
	(0.6687)	(0.6551)	(0.6746)	(0.6582)
Mother of Husband	0.2621	0.2081	0.2466	0.2014
	(0.1539)*	(0.1500)	(0.1537)	(0.1499)
Urban	-0.4498	-0.3845	-0.5070	-0.3594
	(0.0592)***	(0.0593)***	(0.0690)***	(0.0879)***
Husband's	-0.0325	-0.0269		
Conservatism	(0.0192)*	(0.0166)*		
Husbands'			-0.1353	-0.1317
Conservatism			(0.0653)**	(0.0621)**
Constant	-0.6468	-0.6087	-0.6214	-0.6108
	(0.2990)**	(0.3201)*	(0.3011)**	(0.3208)*
Region Dummies	No	Yes	No	Yes
N	7043	7043	7043	7043
R^2	0.0867	0.1065	0.0869	0.1063

*Note: For empirical specification see the previous section. *, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors.*

result that can be concluded from the table is that urbanization plays a very high and negative role on female labour force participation. For this reason and for the other reasons that are discussed in the previous section, urban and rural areas will be analysed separately over the rest of the chapter. In this section, the coefficients of the other variables are not interpreted as the 2006 HSS is unclear as to whether the female is working or not, so the results might be misleading.

2006 Labour Force Survey

As before, urban and rural areas are analysed separately and tables 20 and 21 present the results, respectively. In both tables, the first columns have the results for the regressions in which the logarithm of female income is used as the dependent variable. The dependent variable in the next columns is a dummy that takes the value one if the female is working and zero otherwise, while in the last columns the dependent variable is $FemaleWorkorSearch$.

For both rural and urban areas, the regression with the dependent variable $FemaleWorkorSearch$ seems to have the higher explanatory power than the one with $FemaleWork$. On the other hand, the regression with $LogFemaleIncome$ seems to be overestimating the result and more importantly these results might be driven by the wage differences between males and females or by the fact that females have some other kind of income rather than the wage. Both for these reasons and for the reason that it takes into account the lack of job opportunities, $FemaleWorkorSearch$ will be used as the dependent variable over the rest of the chapter. I did this analysis using only the 2006 LFS in order to choose the best dependent variable to use. Hence, the values of the coefficients are not interpreted here but the interpretation will be done in the next subsection with the final data set.

20.OLS Regression Results for the 2006 LFS (Urban)

URBAN	LogFemaleIncome	FemaleWork	FemaleWorkorSearch
Age	0.0156	0.0025	0.0019
	(0.0013)***	(0.0002)***	(0.0002)***
Education	0.2689	0.0357	0.0386
	(0.0043)***	(0.0007)***	(0.0007)***
Sons	0.0170	0.0030	0.0000
	(0.0112)	(0.0020)	(0.0021)
Daughters	-0.0128	-0.0024	-0.0056
	(0.0107)	(0.0019)	(0.0020)***
LogHusband-	-0.1056	-0.0317	-0.0418
Income	(0.0226)***	(0.0039)***	(0.0040)***
Grandmother	0.1316	0.0284	0.0259
	(0.0485)***	(0.0087)***	(0.0090)***
Husbands'	-0.0101	-0.0816	-0.0526
Conservatism	(0.0058)*	(0.0148)***	(0.0154)***
Distance to	0.0004	0.0001	0.0002
Istanbul	(0.0001)***	(0.0000)***	(0.0000)***
Constant	-1.1626	-0.1578	-0.1035
	(0.2381)**	(0.0414)***	(0.0432)***
Region Dummies	Yes	Yes	Yes
N	32377	32377	32377
R^2	0.2115	0.2418	0.2514

*Note: For empirical specification see the previous section. *, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors.*

21.OLS Results Results for the 2006 LFS (Rural)

RURAL	LogFemaleIncome	FemaleWork	FemaleWorkorSearch
Age	0.0214	0.0061	0.0056
	(0.0021)***	(0.0005)***	(0.0005)***
Education	0.2322	0.0214	0.0236
	(0.0095)***	(0.0017)***	(0.0017)***
Sons	-0.0116	0.0112	0.0084
	(0.0165)	(0.0043)***	(0.0044)*
Daughters	0.0129	0.0135	0.0112
	(0.0147)	(0.0042)***	(0.0042)**
LogHusband-	-0.1574	-0.0599	-0.0601
Income	(0.0329)***	(0.0086)***	(0.0087)***
Grandmother	0.1410	0.1580	0.1542
	(0.0665)**	(0.0169)***	(0.0170)***
Husbands'	0.4009	0.0126	0.0122
Conservatism	(0.0984)***	(0.0023)***	(0.0036)***
Distance to	-0.0003	0.0004	0.0004
Istanbul	(0.0002)*	(0.0000)***	(0.0000)***
Constant	0.8916	-0.3494	-0.3393
	(0.3615)**	(0.0879)***	(0.0893)***
Region Dummies	Yes	Yes	Yes
N	8392	8392	8392
R^2	0.1680	0.2023	0.2028

*Note: For empirical specification see the previous section. *, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors.*

Pooled Data

This section presents the results of the analysis done with the final data set.

OLS Regression Results

The OLS regression results for urban and rural regions are presented in Table 22 and Table 23, respectively. In the tables, the first columns show the results without region-fixed effects. In the second columns and onwards, the region-fixed effects are introduced. In the first two columns, the results are for the regressions without any interactions and the rest of the columns demonstrate the results for regressions in which the indices are interacted with the level of education, age and income, respectively.

As expected, age, education and having a grandmother at home have a significant and positive influence on females' decisions to work in both urban and rural areas. The number of boys and girls has a negative and significant effect in urban areas while this effect becomes positive in rural areas, which is most probably due to the high cost of childcare institutions in urban areas. On the other hand, in rural areas in general, the elder siblings look after the younger ones. While the husband's income plays a negative role in whether women work in rural areas, it does have a positive influence in urban areas. In urban areas, having a high income also usually means a high education level and more highly educated people are presumably less reserved about women working. In rural areas, on the other hand, high income does not necessarily mean high education, wherefore the income effect prevails.

The most striking difference between urban and rural areas is the opposite influence of the indices. Conservatism influences the mothers' decision to work negatively in urban areas, while it has a positive effect in rural

22.Pooled Data OLS Regression Results (Urban)

URBAN	I	II	III	IV	V
Age	0.0013	0.0011	0.0011	0.0012	0.0011
	(0.0001)***	(0.0002)***	(0.0002)***	(0.0002)***	(0.0002)***
Education	0.0336	0.0334	0.0338	0.0334	0.0334
	(0.0005)***	(0.0005)***	(0.0005)***	(0.0005)***	(0.0005)***
Sons	-0.0041	-0.0032	-0.0032	-0.0031	-0.0032
	(0.0015)***	(0.0015)**	(0.0015)**	(0.0015)**	(0.0015)**
Daughters	-0.0041	-0.0033	-0.0033	-0.0033	-0.0033
	(0.0015)***	(0.0015)**	(0.0015)**	(0.0015)**	(0.0015)**
LogHusband-	0.0164	0.0192	0.0201	0.0192	0.0142
Income	(0.0029)***	(0.0029)***	(0.0029)***	(0.0029)***	(0.0030)***
Grandmother	0.0369	0.0381	0.0379	0.0381	0.0382
	(0.0070)***	(0.0069)***	(0.0069)***	(0.0069)***	(0.0069)***
Year 1994	0.0147	0.0181	0.0186	0.0180	0.0181
	(0.0047)***	(0.0047)***	(0.0047)***	(0.0047)***	(0.0047)***
Year 2003	-0.0592	-0.0645	-0.0664	-0.0646	-0.0650
	(0.0072)***	(0.0073)***	(0.0073)***	(0.0073)***	(0.0073)***
Husbands'	-0.0772	-0.0514	-0.0702	-0.0667	-0.0651
Conservatism	(0.0056)***	(0.0092)***	(0.0114)***	(0.0186)***	(0.0311)**
Education*			0.0025		
Conservatism			(0.0010)**		
Age*				0.0003	
Conservatism				(0.0003)	
Income*					-0.0174
Conservatism					(0.0045)***
Distance to	0.0000	0.0001	0.0001	0.0001	0.0001
Istanbul	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Constant	-0.2060	-0.3227	-0.3337	-0.3237	-0.2872
	(0.0186)***	(0.0262)***	(0.0265)***	(0.0261)***	(0.0268)***
Region Dummies	No	Yes	Yes	Yes	Yes
N	57610	57610	57610	57610	57610
R^2	0.2384	0.2425	0.2426	0.2425	0.2426

*Note: *, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors. Dependent variable is FemaleWorkorSearch.*

23.Pooled Data OLS Regression Results (Rural)

RURAL	I	II	III	IV	V
Age	0.0070	0.0057	0.0057	0.0060	0.0056
	(0.0004)***	(0.0004)***	(0.0004)***	(0.0004)***	(0.0004)***
Education	0.0213	0.0208	0.0209	0.0205	0.0207
	(0.0014)	(0.0014)***	(0.0014)***	(0.0014)***	(0.0014)***
Sons	0.0002	0.0073	0.0081	0.0091	0.0090
	(0.0034)	(0.0034)***	(0.0034)**	(0.0034)***	(0.0034)***
Daughters	0.0045	0.0120	0.0130	0.0134	0.0135
	(0.0033)	(0.0034)***	(0.0034)***	(0.0034)***	(0.0034)***
LogHusband-	-0.0551	-0.0559	-0.0552	-0.0576	-0.0615
Income	(0.0061)***	(0.0061)***	(0.0061)***	(0.0061)***	(0.0064)***
Grandmother	0.1735	0.1634	0.1642	0.1642	0.1639
	(0.0138)***	(0.0135)***	(0.0135)***	(0.0135)***	(0.0135)***
Year 1994	0.1099	0.1230	0.1188	0.1136	0.1125
	(0.0117)***	(0.0119)***	(0.0120)***	(0.0119)***	(0.0119)***
Year 2003	0.1263	0.1295	0.1292	0.1340	0.1349
	(0.0170)***	(0.0169)***	(0.0170)***	(0.0169)***	(0.0169)***
Husbands'	0.1264	0.0357	0.0357	0.0519	0.1425
Conservatism	(0.0087)***	(0.0156)**	(0.0159)**	(0.0239)**	(0.0496)***
Education*			-0.0061		
Conservatism			(0.0013)***		
Age*				-0.0015	
Conservatism				(0.0005)***	
Income*					0.0202
Conservatism					(0.0073)***
Distance to	0.0001	0.0002	0.0002	0.0002	0.0002
Istanbul	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Constant	0.1780	-0.0538	0.1467	0.1353	0.1872
	(0.0410)***	(0.0561)	(0.0461)***	(0.0467)***	(0.0479)
Region Dummies	No	Yes	Yes	Yes	Yes
N	14939	14939	14939	14939	14939
R^2	0.1575	0.1839	0.1839	0.1800	0.1800

*Note: *, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors. Dependent variable is FemaleWorkorSearch.*

areas. At first glance, this might seem surprising but when the traditional way of life in rural areas in Turkey is taken into account, the underlying reason for this positive influence becomes clear. In rural areas, women traditionally work and the husbands in fact want them to work. They are seen as a workforce and that is one of the reasons for the existence of bride money. Women do not have any choice whether to work or not and the decision is made by the elder people in the family or their husbands. Because the parents of the bride are losing one of their labourers, they should be compensated accordingly. Investing in the bride, the husband presumably prefers her to work, so it is not surprising that women work more in more conservative rural areas. On the other hand, conservative people in urban areas do not want their wives to work. Of course, reasons such as lack of education and experience are factors that prevent women from finding a job in urban areas as well. However, when we look from a conservative point of view, there might be also some other reasons. Women in rural areas work on farms with other women and men are not involved or even if involved they are part of the family, whereas if those in cities decide to work, they will have to work with men in the same environment. The perceptions of conservative men also tend to change when they move to urban areas. Whilst still in rural areas, they prefer their wives to work but once in urban areas, they change their minds. The difference in the impact of conservatism on female labour force participation between the most conservative urban area in Turkey and the least conservative one is 10 percentage points, which is equivalent to the influence of almost three years of education. On the other hand, in rural areas this difference is 9 percentage points.

The year 1994 dummy takes positive and highly significant values both for urban and rural areas, and the value is much higher in rural areas than in urban areas. On the other hand year, the 2003 dummy has a negative influence on FLFP in urban areas, and the opposite is true for rural areas. The previous literature claims that the economic crises in Turkey were

the main reasons for the decrease in labour force participation. I do not claim that they did not have any impact, but I do think that they were not the sole reason for the decline. Turkey had a crisis in 1994, but it also had another, more severe one in 2001. But the coefficient of the year 1994 dummy is positive for both urban and rural regions, meaning that in 1994, more women were working than in 2006. The year 2003 dummy's taking negative value for urban areas might be due to the crisis.

Though its impact is not very high, the distance to Istanbul variable takes positive and significant values for both urban and rural regions. Istanbul is the city that receives most of the migration in Turkey, being further from Istanbul makes the migration more costly. At the moment more than 1/7 of Turkey's population lives in Istanbul. Moreover, Istanbul is the city of culture[43] and it is a very interactive and socially dynamic place. There are many foreigners living in Istanbul as well as many people have migrated there from rural areas. Being far away from Istanbul therefore also means being far away from these interactions and being more isolated from change.

In the last three columns of the tables, conservatism is interacted with age, education and husband's income. Interactions with age and education have the opposite influence of the sign that the index itself takes, while the interaction with income has the same sign. Interaction with age is not significant. Hence, higher education weakens the influence of conservatism, and higher income strengthens it.

Furthermore, when we analyse the disentangled version of the indices for urban areas, all indices take negative values, with male norm being the highest. On the other hand, tradition and male norm take positive values in rural areas, while decision does not have any significant influence.

Traditional urban regions have less female labour force participation however higher education and age weaken the negative influence. Men hav-

[43] Istanbul is the capital of culture in Europe in 2010.

24.OLS Regression Results for Indices and Interaction Terms (Urban)

	Tradition	Decision	Male Norm	Conservatism
Index	-0.0375	-0.0032	-0.0400	-0.0514
	(0.0086)***	(0.0056)	(0.0118)***	(0.0092)***
Index*Age	0.0014	-0.0001	-0.0000	0.0003
	(0.0004)***	(0.0003)	(0.0006)	(0.0003)
Index*Education	0.0037	0.0056	0.0094	0.0025
	(0.0013)***	(0.0010)***	(0.0013)***	(0.0010)**
Index*Income	-0.0326	-0.0171	-0.0146	-0.0174
	(0.0061)***	(0.0053)***	(0.0083)*	(0.0045)***

*Note: *, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors. All other individual and household characteristics are controlled for as in table 22 but not shown here for simplicity as they have almost the same influence as in table 22.*

25.OLS Regression Results for Indices and Interaction Terms (Rural)

	Tradition	Decision	Male Norm	Conservatism
Index	0.0404	0.0294	0.1981	0.0357
	(0.0202)**	(0.0142)**	(0.0291)***	(0.0156)**
Index*Age	-0.0002	-0.0010	-0.0093	-0.0015
	(0.0008)	(0.0005)*	(0.0012)***	(0.0005)***
Index*Education	-0.0048	-0.0061	-0.0078	-0.0061
	(0.0026)*	(0.0015)***	(0.0029)***	(0.0013)***
Index*Income	0.0244	0.0210	0.1121	0.0202
	(0.0124)**	(0.0083)**	(0.0206)***	(0.0073)***

Note:, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors. All other individual and household characteristics are controlled for as in table 23 but not shown here for simplicity as they have almost the same influence as in table 23.*

ing more decision power does not seem to have a very high influence on women's decision whether to work or not. Likewise, having more men with more traditional perception of the status of women decreases the number of working women, but their having a higher education weakens the negative influence. Among the three indices, the highest negative impact comes from male norm. Calculating the impact of one standard deviation change of these quality variables on the dependent variable does not give enough information. For this reason, the differences between the extreme values are calculated. The difference in the impact of social norms on women working between the urban area with highest social norms in Turkey and the one with lowest social norms is 5.8 percentage points, which is equivalent to the influence of approximately 1.7 years of education. In the rural regions, on the other hand, all indices take positive values, male norm again having the highest influence.

IV Regression Results

Lastly, the results of the IV estimation are shown in tables 26 and 27, for urban and rural regions respectively. The results are in accordance with the OLS regression and altitude instruments the conservatism quite well. The IV estimation equations are exactly identified and the first stage regression has high explanatory power for both urban and rural regions, and the coefficient of altitude is highly significant. The correlation between logarithm of altitude and the conservatism index is almost 25% for urban areas and more than 45% for rural areas. The correlations, especially for urban regions, are not very high and this leads to some efficiency loss using IV compared to OLS, but the correlations are not too low to cause a problem of weak instruments. Both equations pass the test of weak instruments, though the one for urban areas has a smaller F test value in the Wald test. The IV regression overestimates the coefficient of the conservatism index slightly in the urban case and by more than double in the rural case with respect to the OLS estimates. This may be due to the fact that in the conservatism index, there is also varia-

tion within the region while the altitude is the same for the whole region. Though the logarithm of altitude is not a perfect instrument, it is not weak either.

Comparison of the Results with Previous Literature

The results are not only in accordance with the previous literature, they also add some further information. Education is one of the most important determinants of women's decisions to work, not only because of its effect on finding a job but also because the negative impact of perceptions and conservatism decreases with education.

The existence of childcare institutions is another determinant. In this study, we observe this through the presence of a grandmother in the household. Previous studies claim the lack of childcare institutions is a main factor that causes the decrease in female labour force participation in Turkey. I agree that it is an important factor but there is an increasing trend in the number of childcare institutions in Turkey, wherefore this cannot explain the downward trend in female labour force participation by itself. Furthermore, pre-primary education was recently made obligatory as well. Even though childcare institutions and their cost play a role in women's decisions to work, this is not sufficient to explain the downward trend in female labour force participation.

This study once again shows that urbanisation is one of the reasons for the decrease in female labour force participation. There are two mechanisms behind it. Firstly, when women that were working on farms in rural areas migrate to cities they are no longer eligible to find a job as they are not educated for the jobs in the cities. Secondly, people also carry their beliefs with them. People in rural areas tend to be more traditional and to have more traditional perception of the status of women. With migration these are also transferred to urban areas. In their book, Çarkoğlu and Kalaycıoğlu (2009) claim that urbanization is one of the reasons of increasing trend in conservatism. This chapter shows a new possible

26.IV Estimation Results (Urban)

FemaleWorkorSearch (Urban)	OLS	$1^{st}Stage$	$2^{nd}Stage$
Altitude		0.0636	
		(0.0010)***	
Husbands' Conservatism	-0.0514		-0.0579
	(0.0092)***		(0.0104)***
Age	0.0011	0.0054	0.0005
	(0.0002)***	(0.0001)***	(0.0003)**
Education	0.0334	-0.0007	0.0333
	(0.0005)***	(0.0002)***	(0.0005)***
Sons	-0.0032	-0.0035	-0.0025
	(0.0015)**	(0.0006)***	(0.0017)
Daughters	-0.0033	-0.0028	-0.0026
	(0.0015)**	(0.0006)***	(0.0016)
LogHusbandIncome	0.0192	-0.0089	0.0211
	(0.0029)***	(0.0010)***	(0.0026)***
Grandmother	0.0381	-0.0128	0.0404
	(0.0069)***	(0.0025)***	(0.0067)***
Year 1994	0.0181	0.0012	0.0126
	(0.0047)***	(0.0018)	(0.0047)***
Year 2003	-0.0645	0.0098	-0.0684
	(0.0073)***	(0.0025)***	(0.0066)*
Distance to Istanbul	0.0001	-0.0004	0.0002
	(0.0000)***	(0.0000)***	(0.0000)***
Constant	-0.3227	1.3559	-0.5324
	(0.0262)***	(0.0107)***	(0.0499)***
Region Dummies	Yes	Yes	Yes
N	57610	57610	57610
Centered R^2	0.2425	0.8064	0.2429
Partial R^2Excluded Instruments		0.0697	
F(1,57404) of Exc. Instruments		4297.44	

Note:, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors.*

27.IV Estimation Results (Rural)

FemaleWorkorSearch (Rural)	OLS	$1^{st} Stage$	$2^{nd} Stage$
Altitude		0.1695	
		(0.0029)***	
Husbands' Conservatism	0.0357		0.0829
	(0.0156)**		(0.0291)***
Age	0.0057	0.0083	0.0041
	(0.0004)***	(0.0002)***	(0.0005)***
Education	0.0208	-0.0017	0.0203
	(0.0014)***	(0.0006)***	(0.0013)***
Sons	0.0073	-0.0192	0.0122
	(0.0034)***	(0.0016)***	(0.0036)***
Daughters	0.0120	-0.0212	0.0165
	(0.0034)***	(0.0015)***	(0.0035)***
LogHusbandIncome	-0.0559	-0.0251	-0.0483
	(0.0061)***	(0.0025)***	(0.0058)***
Grandmother	0.1634	0.0045	0.1558
	(0.0135)***	(0.0055)	(0.0125)***
Year 1994	0.1230	-0.0174	0.0985
	(0.0119)***	(0.0052)***	(0.0117)***
Year 2003	0.1295	0.0453	0.1131
	(0.0169)***	(0.0070)***	(0.0160)***
Distance to Istanbul	0.0002	-0.0004	0.0004
	(0.0000)***	(0.0000)***	(0.0000)***
Constant	-0.0538	1.0220	-0.6391
	(0.0561)	(0.0297)***	(0.0954)***
Region Dummies	Yes	Yes	Yes
N	14939	14939	14939
Centered R^2	0.1839	0.8862	0.1905
Partial R^2Excluded Instruments		0.1853	
F(1,57404) of Exc. Instruments		3372.92	

*Note: *, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors.*

explanation for the link between urbanization and female labour force participation. Higher urbanization causes higher conservatism, which causes lower labour female force participation.

Another factor that the previous literature claims to be a reason for the decrease is the economic crises Turkey has faced over the recent decades. However, in this study it is shown that even if these have had some effect they cannot be the sole reason for the decrease.

Robustness

The first robustness check is to introduce also the standard error of the indices to the regression. I use the same methodology that I used to transfer the indices to the main data set. Using the 2006 HSS, I find the standard errors of the indices with respect to cohort, sex, region and whether they live in an urban area or not and I transfer them to the main data set, respectively. Here the aim is to see in addition to the environment whether the dispersion of beliefs within that environment plays any role in women's working decision. One would expect this variable to have the opposite sign of the index variable. In case there exists a high dispersion in ideas of people within a region, the impact of environment will be less, as a person is more likely to find people that have closer beliefs to her.

Table 28 shows that even when the dispersion of beliefs are controlled for, the conservatism index remains significant except for the rural areas when the region-fixed effects are controlled for. In urban areas, having diverse beliefs does not play a significant role but it has the expected positive sign. Also, in rural areas the sign of standard error of husband's conservatism is as expected. Only in the last column, where the region-fixed effects are controlled the conservatism index loses its significance. In rural areas, dispersion of beliefs plays a more important role than the conservatism itself.

28.OLS Regression Results with Additional Variable (Std. Error of the Index)

	Urban		Rural	
Age	0.0013	0.0012	0.0074	0.0061
	(0.0002)***	(0.0002)***	(0.0004)***	(0.0004)***
Education	0.0336	0.0334	0.0211	0.0208
	(0.0005)***	(0.0005)***	(0.0014)***	(0.0014)***
Sons	-0.0042	-0.0034	0.0007	0.0075
	(0.0015)***	(0.0015)**	(0.0034)	(0.0034)**
Daughters	-0.0043	-0.0035	0.0050	0.0123
	(0.0015)***	(0.0015)**	(0.0033)	(0.0034)***
LogHusband-	0.0163	0.0188	-0.0533	-0.0553
Income	(0.0029)***	(0.0029)***	(0.0061)***	(0.0061)***
Grandmother	0.0370	0.0380	0.1735	0.1625
	(0.0070)***	(0.0069)***	(0.0138)***	(0.0135)***
Year 1994	0.0162	0.0203	0.1098	0.1229
	(0.0048)***	(0.0048)***	(0.0118)***	(0.0119)***
Year 2003	-0.0596	-0.0648	0.1163	0.1259
	(0.0072)***	(0.0073)***	(0.0171)***	(0.0169)***
Husbands'	-0.0741	-0.0429	0.1115	0.0182
Conservatism	(0.0061)***	(0.0103)***	(0.0092)***	(0.0163)
Std. Err. of	0.0591	0.0896	-0.5779	-0.5340
Husband's Con.	(0.0420)	(0.0466)	(0.1311)***	(0.1461)***
Distance to	0.0000	0.0001	0.0001	0.0002
Istanbul	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Constant	-0.2011	-0.3209	0.2459	0.0051
	(0.0188)***	(0.0262)***	(0.0437)***	(0.0580)
Region Dummies	No	Yes	No	Yes
N	57610	57610	14939	14939
R^2	0.2385	0.2425	0.1587	0.1847

*Note: *, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors.*

As discussed in the methodology section, the indices can be formed only for the year 2006. Even when the indices are transferred to other data sets by making some assumptions, there is not any variation between the years. In order to have some time variation, I introduce two more variables using the general election results. Using the question in the Voter Tendency Survey "Where would you locate yourself on the political scale from 1 to 10, 10 being the most rightwing" and the answer they gave to the question asking the actual party they voted for, each political party is associated with a number on the scale by taking the weighted averages of the responses. Three groups are formed: Right, centre and left. The parties that are suited on the left side of the scale between numbers 1 and 4 are considered to be leftwing parties. The ones in the middle taking the values 5 and 6 are the centre ones, while the rightwing parties take values from 7 to 10. Of course, a party which has the value 7 is not as radical right as one that has the value 10, so the votes received by the different parties are multiplied by the unit distance they are from the centre. For example, the votes received by parties located at the values 3 and 8 are multiplied by 2, while the ones located at the values 1 and 10 are multiplied by 4.

All the surveys used in this paper only have information at the regional level, but the election results are at a district level. In order to take into account the fact that not all districts have the same importance in a region, each district is weighted with the number of deputies they have in parliament. The average votes for each party in each region are calculated accordingly. Subsequently, the parties are grouped as right, centre and left using the method described above. In the end, we have the percentage of rightwing, centre and leftwing parties for each region. Unfortunately, it is not possible to distinguish even further, so these variables remain as regional variables.[44]

[44] When forming the variables I am using 12 regions (including some sub-regions) as I used for the indices. In the regression I control for 7 regions (no sub-region, only main regions).

29.OLS Estimation Results for Urban Areas with Additional Variables

FemaleWorkorSearch (Urban)	I	II	III
Husbands' Conservatism	-0.0728	-0.0438	-0.0306
	(0.0061)***	(0.0093)***	(0.0105)***
Std. Err. of Husband's			0.1244
Conservatism			(0.0477)***
Radical Right	-0.1077	-0.0515	-0.0541
	(0.0134)***	(0.0180)***	(0.0181)***
Radical Left	-0.0057	-0.0132	-0.0222
	(0.0177)	(0.0198)	(0.0201)
Age	0.0012	0.0011	0.0012
	(0.0001)***	(0.0002)***	(0.0002)***
Education	0.0334	0.0333	0.0333
	(0.0005)***	(0.0005)***	(0.0005)***
Sons	-0.0036	-0.0030	-0.0033
	(0.0015)**	(0.0015)**	(0.0015)**
Daughters	-0.0039	-0.0032	-0.0035
	(0.0015)***	(0.0015)**	(0.0015)**
LogHusbandIncome	0.0182	0.0198	0.0195
	(0.0029)***	(0.0029)***	(0.0029)***
Grandmother	0.0380	0.0382	0.0381
	(0.0070)***	(0.0069)***	(0.0069)***
Year 1994	0.0142	0.0186	0.0226
	(0.0053)***	(0.0054)***	(0.0056)***
Year 2003	-0.0623	-0.0644	-0.0639
	(0.0076)***	(0.0078)***	(0.0078)***
Distance from Istanbul	0.0000	0.0001	0.0001
	(0.0000)***	(0.0000)***	(0.0000)***
Constant	-0.1604	-0.2967	-0.2916
	(0.0192)***	(0.0271)***	(0.0271)***
Region Dummies	No	Yes	Yes
N	57610	57610	57610
R^2	0.2396	0.2427	0.2428

*Note: *, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors.*

30.OLS Estimation Results for Rural Areas with Additional Variables

FemaleWorkorSearch (Rural)	I	II	III
Husbands' Conservatism	0.1223	0.0439	0.0309
	(0.0089)***	(0.0163)***	(0.0173)*
Std. Err. of Husband's			-0.3625
Conservatism			(0.1509)**
Radical Right	-0.0525	-0.0303	-0.0289
	(0.0350)	(0.0507)	(0.0507)
Radical Left	-0.3072	-0.1946	-0.1706
	(0.0442)	(0.0579)***	(0.0588)***
Age	0.0068	0.0057	0.0060
	(0.0004)***	(0.0004)***	(0.0004)***
Education	0.0208	0.0207	0.0207
	(0.0014)***	(0.0014)***	(0.0014)***
Sons	0.0022	0.0077	0.0078
	(0.0034)	(0.0034)**	(0.0034)**
Daughters	0.0067	0.0124	0.0126
	(0.0033)**	(0.0034)***	(0.0034)***
LogHusbandIncome	-0.0502	-0.0536	-0.0534
	(0.0062)***	(0.0061)***	(0.0061)***
Grandmother	0.1684	0.1604	0.1602
	(0.0138)***	(0.0135)***	(0.0135)***
Year 1994	0.1417	0.1419	0.0226
	(0.0130)***	(0.0138)***	(0.0056)***
Year 2003	0.1549	0.1519	-0.0639
	(0.0180)***	(0.0191)***	(0.0078)***
Distance to Istanbul	0.0001	0.0002	0.0002
	(0.0000)***	(0.0000)***	(0.0000)***
Constant	0.2154	-0.0084	0.0268
	(0.0422)***	(0.0569)	(0.0583)
Region Dummies	No	Yes	Yes
N	14939	14939	14939
R^2	0.1622	0.1856	0.1859

*Note: *, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors.*

Table 29 and table 30 show the results for urban and rural regions, respectively. In the last columns of the tables, I also introduce the standard error of husband's conservatism. Even when the political tendency variables are introduced the impact of the conservatism remains highly significant. But in urban areas, being in a region that has a high intensity of radical rightwing party supporters decreases female labour force participation more than being in a conservative region. As expected, radical leftwing does not have any influence on women working in urban areas. In rural areas, on the other hand, it is the opposite. Being in a radical leftwing region has a higher influence on female labour force participation than being in a conservative region in absolute terms. Different from urban regions, political tendency influences women working in the opposite direction of the conservatism index in rural regions. Being in a radical leftwing rural area decreases female labour force participation, which is not a big surprise. Left-oriented people would probably be against the fact that women do all the work in rural areas.

Lastly, the standard error of husband's conservatism is introduced and the conservatism index still remains significant for both urban and rural areas, though it loses some of the level of its significance for rural areas. In both regions, the conservatism index and standard error of conservatism index have opposite signs. In urban areas, radical right remains significant and positive and in rural areas radical left remains significant and negative also after controlling for the dispersion of beliefs.

Conclusion

This chapter analysed the determinants of mothers' decisions to work and the impact of conservatism on this issue. Different data sets are used in order to determine the main factors that influence whether women work. Each data set has some pros and cons and they are used in such a way as to complete each other. To my knowledge, the 2006 Household Structure

Survey, which is a unique data set about perceptions in Turkey, is used for the first time in an academic paper. Using this data set and polychronic principle component analysis, three indices and one index that combines all three are formed and these indices are later transformed into other data sets. The tradition index measures to which extent people sustain their traditional values and follow them. Men's higher decision power is measured by the decision index, which takes higher values in families where men make the final decision about family issues. The last index is called the male norm index, which is calculated by taking into account the answers to some questions about perceptions in the data set. The conservatism index is formed by using polychronic principle component analysis, this time taking into account all the variables used to form the previous indices.

After all the indices have been transformed into a pooled data set which consists of three different data sets from different years, an instrumental variable approach is used to test the validity of the indices. Altitude is chosen as an instrument for conservatism. By using this instrument, endogeneity problems are prevented from still having significant results.

This chapter shows that social beliefs and behaviours also play an important role in women's decision to work. Women are not alone when they are making their decisions and the environments they live in affect their behaviour. Women that live in a conservative and traditional environment where men have a higher decision power and stronger social norms tend to stay at home, as expected by society, and become housewives. Moreover, the conservative environment that a woman lives in has a greater influence on her decision to work or not rather than how conservative her husband is. The difference in the impact of conservatism on female labour force participation between the most conservative urban area in Turkey and the least conservative one is 10 percentage points, which is equivalent to the influence of almost three years of education. On the other hand, in rural areas this difference is 9 percentage points.

Education plays an important role in women's decision to work through two channels. The first one is an already known fact that with higher education it is easier to find a job. The second one, shown in this chapter, is that a high education level weakens the influence of conservatism.

Urbanization is one of the most important reasons for the decline in female labour force participation, not only because of the lack of job opportunities for women in cities but also because conservative men's preferences differ between urban and rural areas.In their book, Çarkoğlu and Kalaycıoğlu (2009) claim that urbanization is one of the reasons of increasing trend in conservatism. This chapter shows another link: The link between conservatism and female labour force participation. Higher urbanization causes higher conservatism, which leads to lower female labour force participation.

If Turkey prefers to stop this decreasing trend and to encourage women to increase female labour force participation, it first has to give more importance to education, not only for children but for adults as well. Education does not only mean literacy here; the education system in Turkey should be reformed in such a way that will recognise women also as people that have equal powers and rights in the family.

Last but not the least, this chapter shows that conservatism and social norms play a very important role in females' decision to work. The only way to improve this, again, is education. A nationwide education campaign for all inhabitants of the country might provide a good background to form a society purged of any backward ideas about women. Though I am aware that it is a kind of utopia, it cannot hurt to try.

B Appendix

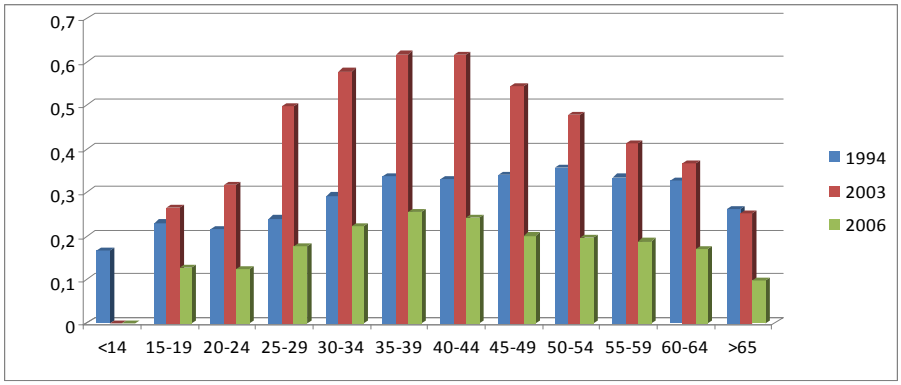


Figure B.1: Percentage of working mothers by cohort

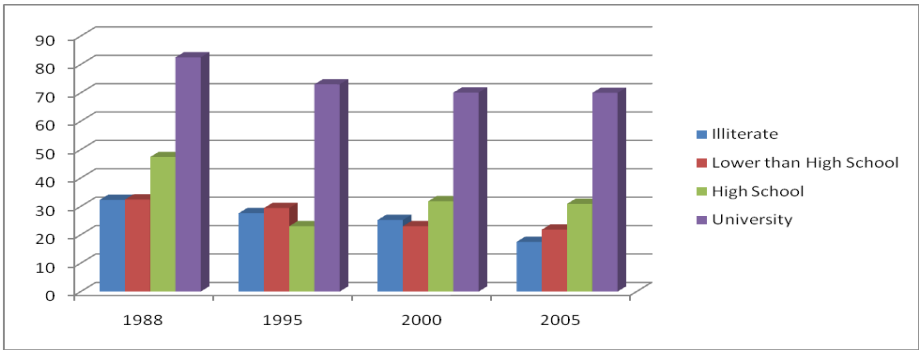


Figure B.2: LFP by year and education level

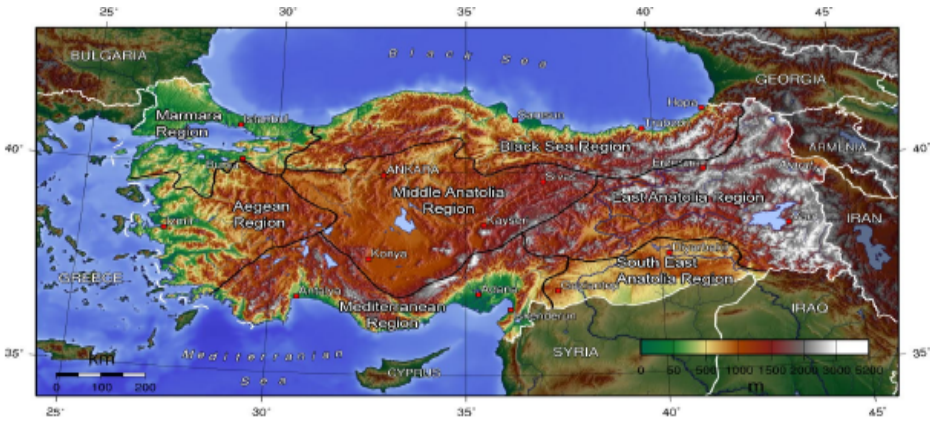


Figure B.3: Map of Turkey showing the altitude of the regions

31.Comparison of OLS and Probit Results

	Urban		Rural	
	OLS	Probit	OLS	Probit
Age	0.0011	0.0006	0.0057	0.0060
	(0.0002)***	(0.0002)***	(0.0004)***	(0.0004)***
Education	0.0334	0.0326	0.0208	0.0215
	(0.0005)***	(0.0005)***	(0.0014)***	(0.0014)***
Sons	-0.0032	-0.0034	0.0073	0.0074
	(0.0015)**	(0.0020)**	(0.0034)***	(0.0038)*
Daughters	-0.0033	-0.0037	0.0120	0.0129
	(0.0015)**	(0.0019)**	(0.0034)***	(0.0037)***
LogHusband-	0.0192	0.0188	-0.0559	-0.0559
Income	(0.0029)***	(0.0029)***	(0.0061)***	(0.0061)***
Grandmother	0.0381	0.0374	0.1634	0.01596
	(0.0069)***	(0.0066)***	(0.0135)***	(0.0126)***
Year 1994	0.0181	0.0212	0.1230	0.1363
	(0.0047)***	(0.0051)***	(0.0119)***	(0.0133)***
Year 2003	-0.0645	-0.0591	0.1295	0.1435
	(0.0073)***	(0.0064)***	(0.0169)***	(0.0195)***
Husbands'	-0.0514	-0.0754	0.0357	0.0323
Conservatism	(0.0092)***	(0.0121)***	(0.0156)**	(0.0166)*
Distance to	0.0001	0.0001	0.0002	0.0002
Istanbul	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Constant	-0.3227		-0.0538	
	(0.0262)***		(0.0561)	
Region Dummies	Yes	Yes	Yes	Yes
N	57610	57610	14939	14939
R^2	0.2425		0.1839	
Pseudo R^2		0.2332		0.1704

*Note: For empirical specification see the methodology section *, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors.*

32.Comparison of OLS and Probit Results

	Urban		Rural	
	OLS	Probit	OLS	Probit
Education*Conservatism	0.0025	0.0103	-0.0061	-0.0066
	(0.0010)**	(0.0011)***	(0.0013)***	(0.0018)***
Age*Conservatism	0.0003	-0.0002	-0.0015	-0.0012
	(0.0003)	(0.0006)	(0.0005)***	(0.0006)**
Income*Conservatism	-0.0174	-0.0124	0.0202	0.0307
	(0.0045)***	(0.0070)*	(0.0073)***	(0.0089)***

*Note: For empirical specification see the methodology section. *, **, *** indicate statistical significance at the 10, 5 and 1%, respectively. Figures in parentheses are robust standard errors.*

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