DETERMINANTS OF SCHOOL ATTAINMENT IN TURKEY AND THE IMPACT OF THE EXTENSION OF COMPULSORY EDUCATION

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Abstract

The aim of this paper is first to explain the main factors that affect the demand for education in Turkey both for boys and girls, then to investigate whether or not there are any differences between genders, and finally to try to evaluate the impact of the extension of compulsory education in Turkey, which took place in 1997. It is concluded that income growth, improvement in parents' education and fertility control 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; however, it has not had any effect on the probability that mothers start working or fathers get additional jobs. On the other hand, it has had a 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 drop out rates an increase in school enrolment does not necessarily mean an increase in school graduation rates.

I- Introduction

The importance of education in economic development is a well-known fact. There are many studies that show the contribution of education not only to economic growth but also to individual and social development. Accordingly, improvement in education plays an important role, especially in the development of the developing countries like Turkey. However, it is unfortunately not possible to say that Turkey's performance regarding education is good. As Wigley and Wigley (2005) state, concerning the education level of its adult population, Turkey is out-performed by

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most of the countries with a lower GDP per capita and by those countries with a similar or higher level 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[1]. Wigley and Wigley (2005) highlight that Turkey's female illiteracy rate is higher than it is in many other countries. Considering all these facts, it is important to understand the main factors that affect school enrolment in Turkey, and design policies accordingly.

Contrary to developed countries, Turkey has extended its compulsory education 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 80.3%[2]. 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), while 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%.

In 1997, Turkey extended the length of compulsory education from five to eight years. Before 1997, after five years of compulsory education there were three years of secondary school and three years of high school, after which the students could attend universities depending on their wishes and more importantly on their successes in the university entrance exam. In 1997, primary education and secondary education were combined and became compulsory by a new law. Although the extension of compulsory education obviously increased children's enrolment rates into the new compulsory three years of the former school (three years of optional education after five years of compulsory education before the extension), 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

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[1] Countries included in this survey are Indonesia, Jamaica, Philippines, Paraguay, China, Peru, Turkey, Thailand, Brazil, Mexico, Malaysia, and Chile.
[2] 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.

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. It can be concluded that, especially for girls, 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 should be investigated and their results improved.

The aim of this paper is first to explain the main factors that affect the demand for education in Turkey both for boys and girls, then to investigate whether there are any differences between genders or not, and finally to try to evaluate the impact of the extension of compulsory education in Turkey, which took place in 1997.

The outline of this paper is as follows. In the following section there is a brief literature review; and in the one after that the data is described. These are followed by section IV, in which the model and the methodology are explained. Estimation results are presented in section V, and section VI is devoted to analysing the impact of mothers on school attainment. After this, section VII analyses the effects of the extension of compulsory education, and the final section VIII concludes.

II- Literature Review

There are many papers that evaluate the effects of the extension of compulsory education on various aspects of society. As it is very recent in Turkey, there have not been many studies about this subject. Using the data of 1994 and 1999, Dayioglu (2005) makes a simulation to see the effects of this extension on child labour in Turkey. In another paper by Dulger (2004), the rationale and the objectives of the program are described. 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 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?

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There is a huge literature on the determinants of school attainment especially 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 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, have higher school attainment in China. In a more recent study again about 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 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, which was proposed by King and Lillard (1983; 1987). In this study an ordered probit model is used, and censoring bias is controlled.

There might be many factors that have an impact on school attainment within a country; and 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 guide to form future policies.

III- 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 26256 households in Turkey, while the 2002 survey was applied to 9555 households from all over the country. In the 1994 data there are 11659 children between the ages of 16-20 in relation to the household head, while the 2002 data has 3659 children within the same age range in relation to the household head.

The average years of schooling for children and their parents are given in Table 1 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[3].

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.

IV- Model and Methodology

The model used in the first part of this paper and the empirical specification are taken from Tansel (2002), in which the determinants of school attainment in Turkey are analysed for the year 1994. This paper was chosen, because she uses the ordered probit estimate, which is the most appropriate estimate for this type of analysis and the reason for this is explained in the following sections. In this survey it is also possible to see the effects of the extension of compulsory education on the determinants that have an impact on the probability of school attainment, as both the 1994 and 2002 data sets are used, being aware however of the fact that the change will not only be due to the extension of compulsory education. As opposed to Tansel (2002), the effects of the number of children in the family and the composition of gender among the children are checked as well.

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. Whereas additional schooling brings higher future earnings as a benefit, it postpones at the same time the entry time of individuals

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[3] An interesting thing in the table is the fact that although education level increases monotonically with the age for each age group, for 20 year-old girls it is lower than it is for 19 year-old ones. This result does not change, even when the average years of schooling are calculated for all the people in that age group including those who have left their family and formed their own household. More interestingly, for the ages 21 and 22 it continues to increase monotonically. It can not be a cohort effect as it happens in both years, so it most probably is noise in the data.

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 that private sector and also the private 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, eventhough returns to education should be higher in this sector. This fact may affect 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[4]. 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[5]. 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,

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

ceteris paribus. Furthermore, if schooling is a luxury good, then the income effect would be very large especially for low income households.

In this paper ordered probit models are formed for middle and high school attainments[6]. In 1997, the primary and secondary education in Turkey were 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 means five years of compulsory education and three years of secondary school, while in 2002 compulsory education is eight years. Following Tansel (2002), the latent demand for the desired level of schooling, S^* is defined as:

$$S^* = \hat{\beta} X + \varepsilon \qquad\qquad (1)$$

where X is a vector of individual and household explanatory variables; 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 counterpart of S^*. In this case it is better not to use Ordinary Least Squares (OLS), as S is discrete and OLS assumes that the dependent variable is continuous and unlimited. Moreover, as level of education takes only positive values, OLS estimation is inappropriate due to non-negativity constraint.

Depending on the years of schooling, K categories are formed and each individual is assigned to one of these categories. Illiterate individuals have zero years of schooling, while two years of schooling indicates that the individual 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 and university graduates have eleven and fifteen years of schooling, respectively. Those who have graduate level degrees are assumed to have seventeen or more years

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[6] The same analysis is also done using binary probit and the results are shown in the appendix. It can be observed in tables A1 and A2 that although the values of the coefficients change, their sign and significance level are generally the same.

of schooling. Following Tansel (2002), the ordinal variable S is defined to take a value of k, if S^* falls in the kth category:

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

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

$$\text{Prob } (S = k) = F(\alpha_k - \hat{\beta}X) - F(\alpha_{k-1} - \hat{\beta}X) \tag{3}$$

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

$$\partial \text{ Prob } (S = k) / \partial X = \beta[f(\alpha_{k-1} - \hat{\beta}X) - f(\alpha_k - \hat{\beta}X)] \tag{4}$$

where f is the standard normal density function.

In Turkey, children start primary education at the age of 7, so they can finish their compulsory education at the earliest, when they are 15 years old and when they finish high school they are at least 18. Furthermore, 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 children are separated into two groups 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, while 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. The reason for forming these groups is the fact that the final school attainment of the children who are still in school at the time of the survey is unknown. This can potentially bias the estimates of school attainment. As Holmes (1999) suggests, defining samples including only those above the approximate age of school completion is a way of dealing with censored bias, although it has the caveat of throwing away many observations of people who are younger. That is the motivation for calculating the earliest ages of graduation from schools and for forming the groups accordingly. Furthermore, in this survey only children who are part of the household are taken into account. Finally following Tansel (2002) the upper bound of age is restricted to 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. 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.

Children are grouped as boys and girls; and the following variables are used as determinants of schooling: children's age, children's age squared, parents' education, two dummies showing whether mother and father are self-employed, one dummy showing whether only mother is present in the household, one dummy showing whether only father is present in 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.

Children's age and children's age squared show the age effects and whether there is a non-linear effect of age on schooling or not. Parents' education is divided into mothers' and fathers' 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, more highly educated mothers may have larger bargaining power in the household and may decide to invest more in their children's human capital. Dummies for parental self-employment are used to investigate whether self-employed parents force their children to work at their own place or not. In order to understand whether living with only a mother or only a father affects the school attainment or not, the dummies *only mother* and *only father* are used. Total household expenditure is used as a 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 school attainment or not due to the fact that in rural areas there are fewer schools, less qualified teachers, higher opportunity cost for children because of farm employment opportunities or child

labour needs at home. Furthermore, in rural areas families are more likely to be credit constrained than the ones in urban areas, as rural families operate with less cash per level of consumption. Another caveat of rural areas is the fact that they have historically 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). The number of children is used to capture whether the households are credit constrained or not, and also to understand the relationship between fertility and investment on education. Finally, for the girls' school attainment determinant, the percentage of boys in the family is used to see whether parents prefer to spend money on girls or boys, when they are deciding how much to invest in their children's human capital. Likewise, the percentage of girls is used to estimate the boys' school demand function.

V- Estimation Results for School Attainment

Tables 2 and 3 present the ordered probit estimation results for middle and high school attainment respectively. As discussed before, it considers children aged 16-19 for middle school and children aged 18-20 for high school. The following ordered probit estimations are used:

$$EduBoy_i = \beta_0 + \beta_1 X_i + \varepsilon_i, \text{ and} \tag{5}$$
$$EduGirl_i = \beta_0 + \beta_1 X_i + \varepsilon_i \tag{6}$$

where $EduBoy_i$ and $EduGirl_i$ are the education levels of boys and girls, respectively, and X_i is the vector of control variables such as the age of the child, the squared age term, the percentage of girls in the total number of children in the household for the first regression and the percentage of boys for the second one, the number of children in the household, the total expenditure of the household, the number of years that the mother and the father have spent on education, dummy variables that take value one, when the child lives only with his or her mother or his or her father, dummy variables that take value one, when the mother or the father is self-employed, and finally a dummy variable that takes value one, if the household is living in a city. The effect of having a grandparent within the family has also been controlled for, but as it did not

turn out to be significant in any of the cases, it has been dropped and the results are not presented here.

We observe no age effects for boys, but when the regression is re-done by omitting the variable age square, a negative age effect is observed in middle school attainment, while a positive effect is observed for high school attainment for both 1994 and 2002. On the other hand, there is a significant negative age effect for girls, which is larger for the year 2002. Furthermore, a non-linear effect of age on schooling is observed for girls, meaning older girls attain lower schooling. Moreover, although again we do not observe any age effect for boys, for high school estimates we observe a positive age effect for girls, but in order to understand on which side of the distribution we are, OLS is run only by including age rather than both age and age square. It is observed that we are on the decreasing side. So it can be concluded that older girls are less probable to finish both middle and high school.

Having more boys in the household has a significant negative effect on girls' middle school attainment, and even worse, this negative effect is larger in 2002. On the other hand, in high school attainment the coefficient estimate for the percentage of boys loses its significance in 2002. It can be suggested that now that girls are able to finish middle school, having more boys in the family does not have any significant effect on their high school attainment anymore, although it used to have a negative effect in 1994. Meanwhile, the number of girls in the family does not have any significant effect on boys' school attainment at any level as expected.

The coefficient estimate for the number of children is negative and highly significant in all levels of school attainment both for boys and girls. Furthermore, it can be observed that its negative effect is higher for girls and for the year 2002. It is more efficient 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 a 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 credit constrained, and under this constraint they preferred to send their sons to school instead of their daughters, as an increase of the

level of education of a boy is more beneficial for the future especially in a country like Turkey.

All previous research about school attainment presents a strong effect of parents' education on the school attainment of their children, and Turkey is not an exception. The impact of parental education level is positive and highly significant for both levels of schooling and for both genders. As found in many other studies before, the education level of mothers has a higher effect on girls' school attainment than on that of boys. Furthermore, it can be observed that the estimate of the coefficient for mother's education level is higher in 2002 than the one in 1994, showing that the importance of mother's education has recently increased. On the other hand, although in all levels and for both genders, except for the girls at high school level, the coefficient estimate for fathers' education level is higher than the one of mothers' education level, it shows a decreasing trend. It might be predicted that in the next years the importance of mothers' education level may surpass fathers' education level. This might be explained by the fact that the education level of females and consequently their entrance into labour force has recently 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 estimate of the dummy for mothers being self-employed takes a negative and significant value for both genders in 1994 for high school attainment, and in 1994 for middle school attainment but only for girls. It might be concluded that some factors during this period including the extension of compulsory education eliminated the negative effect of mothers being self-employed. On the other hand, the negative effect of fathers being self-employed still persists, although it shows a decreasing trend for the children in the of middle school age group. The coefficient estimate of this dummy is negative and significant for both genders and education levels except for the girls who are in the high school age group. For middle school children, the negative effect of having a self-employed father is higher for boys than it is for girls, which could have been expected, as boys are more likely to take over their fathers jobs. The boys are most probably trained to take over the job, while the girls are given some simpler tasks to do. When we consider the children at high school level, we observe an increase in the negative effect for boys,

while the highly negative effect on girls in 1994 loses its significance in 2002. It might be concluded that self-employed fathers prefer to train their sons rather than their daughters after and even during their compulsory education.

The coefficient estimate of the dummy variable urban, which represents residence in a city that has more than 20001 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 can not be said for high school attainment. The coefficient estimate of this dummy has a higher value for boys in 2002 than it had in 1994, while it has a lower value for girls in 2002 than it had in 1994. It might be concluded that the changes which occurred during this period including the extension of compulsory education were more beneficial for girls' high school attainment than for boys in urban areas.

Furthermore, the last rows of Table 2 and Table 3 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 is increased 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.

VI- 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 reasons for this in more detail, so this concept is analysed in a separate section.

Table 4 presents the distribution of the mothers that live only with their children according to their marital status. From the table, it seems like in 2002 the number of the alone parents decreases; however, this is due to the fact that the 2002 data has less observations than the 1994 data. In the first part of the table, the important thing to compare is the difference between mothers and fathers. It can be observed that number of alone fathers is much less than the number 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, but also it might be concluded 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 recent years there is a substantial increase in divorce rates in Turkey. This is mostly due to the increase in economic and social freedom of women.

In 1994 over 70% of alone mothers were alone, as their husbands passed away and approximately 20% of mothers have husbands living abroad or in another city. Being divorced and living separate do not constitute a high proportion of the alone mothers. This result is not surprising, as in those years despite divorce's legal nature, it was not practiced as much as it is today due to being found against the social norms.

In 2002 data, it can be observed that more than 60% of the mothers living only with their children are divorced and over 20% is still married, meaning that the father is working in another city or abroad. The other options like the death of the father or the parents' decision of living separately instead of divorcing do not have a high proportion of the sample. Considering the fact that most of this sample contains

divorced mothers, it might be concluded that mothers give more importance to the education of their children, which is higher to their daughters, when they have power to decide. Moreover, 20% of the sample contains the families, the father of which is 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 with his family) and this decreases the credit constraint on the family. On the other hand, in 2002, the estimate of the coefficient 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 can be observed that the coefficient values for dummy only mother are higher for 2002 than 1994. This is in accordance with the increase in economic and social power of women. 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 and separated. The same ordered probit regression is run and the results are presented in Table 5 and Table 6 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. Only the ones that are significantly changed relative to the previous case in at least one of the columns are added for simplification.

In Table 5, it can be observed that divorced mothers do not have any significant effect on girls' school attainment. Probably divorce of parents cause some negative effects on the psychology of the children. However, there is a high and significant effect of having a widow mother. Furthermore, for 2002 a positive and significant effect for having a separated mother is also observed, although it is not as high as the impact of widow mother. In general, the analysis for the girls proves that when mothers have power to decide, the girls' school attainment increases.

On the other hand, Table 6 presents the same analysis for boys' school attainment. The interesting thing about this analysis is the fact that in 2002 divorced mother has a positive effect on boys' high school attainment, while the impact of widow mother is negative. 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 by their own. Seeing this impact on high school attainment might show that the boys start to work earlier instead of going to school to be able to help their family to survive. On the other hand, widow mother has positive impact on boys' school attainment in 1994, while it has negative impact in 2002. This might be due to decrease in the living standards in Turkey after the economic crisis. In 2002 it became more difficult for a family to survive without a father than it was in 1994. Lastly the positive effect of having a separated mother in 1994 loses its significance in 2002. Here, another interesting thing is the fact that for girls, separated mothers do not have any significant impact in 1994; however, they start to have a positive and significant impact in 2002. 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. This might be due the increase of women in labour force in Turkey, so investing in girls' education also started to bring higher returns in the future.

VII- 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.

a) 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 1 and 2 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. It might be concluded that in terms of enrolment the extension was more 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 3. 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.

Another question would be whether this combination of schools has caused any change in classroom size or students per teacher ratio. Figures 4 and 5 present 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 6 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.

b) 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 5 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, it might be concluded 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 can not be known, as the options in the survey are 0, 2, 5 and 8 years, but it is the same for both years and both groups, so this should not affect 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 drop out rates. In the first box in Table 7, 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:

$$Edu_{ij} = \beta_0 + \beta_1 X_{ij} + \beta_2\ After_{ij} + \beta_3\ Treat_{ij} + \beta_4\ Aftertreat_{ij} + \varepsilon_{ij} \qquad (7)$$

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 ordered probit 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 8.

The results present that after controlling for individual and family characteristics, 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.

c) 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 first 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 a child both at the age of 16-17 and 18-19 are excluded from the sample. The following probit regression is used:

$$P_i = \beta_0 + \beta_1 X_i + \beta_2 Treat_i + \beta_3 After_i + \beta_4 AfterTreat_i + \varepsilon_i \qquad (8)$$

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 divided by 100; 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 average education level of the girls and boys in the household. 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 9.

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 higher education level husband earns good 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 firstly 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, otherwise it is not a common issue in Turkey except for the rural areas. In the families that are engaged in agricultural sector the working probability of the mother is higher. Expectedly also the existence of a working child in the family increases the probability for the mothers to work. Most probably, children are forced to work, if the income of their parents is not enough to survive. 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. Another factor that decreases the probability for the mothers to work is the average education of the girls in the family. Here, there might be reverse causality. The girls in the families that have relatively

less income constraint have a higher probability to go to school and also in such families the probability for the mother to work is lower.

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 β_4 is not significant. The same 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:

$$Workinghour_i = \beta_0 + \beta_1 X_i + \beta_2 Treat_i + \beta_3 After_i + \beta_4 AfterTreat_i + \varepsilon_i \tag{9}$$

where *Workinghour* represents the total hours of 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 10.

The results present that the higher the education level of parents becomes, the more the working hours decrease, as one would expect, because high educated people would have a higher wage and a better job, which result in the removal of the need for further work. Besides, the more the parents' age becomes, the more the working hours increase, perhaps, due to the fact that the position at the 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. On the other hand, having a father working in public sector decreases the working hours in the household, as in the public sector the working time is fixed and it is not as many hours as in the private sector. Households that work on their farms or do some kind of agricultural work tend to spend more time on working. As expected, total number of working hours increases in the families, in which the mother works. 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

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because they do not work. As the average of the education of the girls in the family increases, the total working hours decrease. This might be because of two reasons. First might be the fact that instead of working, girls go to school. Second reason might be the case that higher income families have higher tendency to send their daughters to school and they do not work too many hours, as they already have a high level of wealth. The most important result of this analysis is the coefficient estimate of β_4, which shows the difference in differences estimate. It is positive and significant, meaning that the extension of compulsory education forced the credit constraint families to work for more hours.

Combining with the previous analysis it can be concluded that income constraint families in Turkey prefer to increase their working hours instead of having working mothers.

d) 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 is less than sixteen years old and 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:

$$ChildLabor_i = \beta_0 + \beta_1 X_i + \beta_2 Treat_i + \beta_3 After_i + \beta_4 AfterTreat_i + \varepsilon_i \qquad (10)$$

where the definition of the variables is the same as in the previous section. The results are presented in Table 11.

The results show that the reason why the children work is mostly income oriented. This is proved by the fact that the probability of working child decreases with the changes in income level. What is more interesting is the fact that mothers' education level increases the probability of child labour, while education level of fathers does not have any significant effect. Probably higher educated mothers are more aware and have higher tendency to report their working children. 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 fathers receive transfer for their children. Having a working mother has a very significant negative effect on the probability of child labour. Mothers prefer to work themselves instead of letting their child work. The results show that higher education of boys decreases the probability of child labour, while the coefficient estimate of average education of girls is not significant. Higher education means studying and working at school until a higher age; therefore, it decreases the probability of child labour. Interestingly this coefficient is not significant for girls. This is due the fact that there is not much female child labour reported in the survey. In the data set it is observed that in general boys are working, when they are children; however, in reality girls are also working. But usually girls do domestic work and they do not earn money, so their work is not reported. 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 5% level. It might be concluded that the extension of compulsory education was successful in decreasing the child labour, which is consistent with the simulation results of Dayioglu (2005).

VIII- Conclusion

This paper examines the main determinants of school attainment in Turkey and the effect of the extension of compulsory education on the school attainment. In order to observe the determinants of school attainment, ordered probit models are formed for middle and high schooling for the years 1994 and 2002. Education of parents, household income, and number of children in the household seem to be the main determinants for both boys and girls in both years, although the marginal effect is different for genders. These determinants affect girls' attainment more than that of 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 lost its positive significance, which it had in 1994 and

in 2002 for middle schooling. It is also proved that when mothers have the power to decide, they give more importance to their children's education. It might be concluded that income growth, increase in parents' education and fertility control contribute positively to children's school attainment, and their positive effect are higher for girls than boys. Turkey's gini coefficient was 0.38[7] in 2005, which is higher than all European Union countries. 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. If Turkey wants to reach the universal school attainment, she should take care of this problem. In Turkey abortion is legal and in the statistics it is observed that women are aware of pregnancy controls[8]; however, from the population growth we understand that they are not applied in practice[9]. 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, which can be solved by increasing the awareness of parents about this fact.

In order to see the impact of the extension of compulsory education, first, the overall statistics are checked. Although it seems like the extension increased the overall enrolment rate, the further analyses prove 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 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

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[7] 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/
[8] 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/
[9] Number of children per women shows a decreasing trend since 1990 but trend slows down after 2000. In 2001 the average number of children per woman is 2.25 and it becomes 2.19 in 2005 and stays the same in 2006.

decreasing the probability of child labour 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 substantially 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 a 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 drop outs, especially in rural areas. This might be done 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.

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Table 1

Average Years of Schooling for Boys, Girls and Parents,

Age 16-20, Turkey

	Boys (average years)		Girls (average years)		Fathers (average years)		Mothers (average years)	
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 the 1994 and 2002 Household Income and Consumption data sets of State Institute of Statistics, Turkey.

Average Years of Schooling for Boys, Girls and Parents,

Age 16-20, Turkey[*]

	Male(average years)		Female (average years)		Fathers (average years)		Mothers (average years)	
Age	**1994**	**2002**	**1994**	**2002**	**1994**	**2002**	**1994**	**2002**
16	6.78	7.10	5.97	6.59	5.21	6.08	3.37	3.71
17	7.28	7.75	6.26	6.84	5.44	5.85	3.56	3.97
18	7.47	8.25	6.35	7.13	5.14	5.91	3.42	3.73
19	7.64	8.75	6.56	7.46	5.04	5.90	3.42	3.61
20	7.80	9.04	5.96	6.91	4.80	5.60	3.32	3.53
Total	7.35	8.06	6.20	6.97	5.16	5.89	3.43	3.73

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

[*] All people between 16-20 years old are taken into consideration, even if they left their initial household and formed their own one.

Table 2

Ordered Probit Estimates of Middle Schooling Ages 16-19				
Variables	**Boys**		**Girls**	
Year	**1994**	**2002**	**1994**	**2002**
Age	0.5345 (0.6331)	-0.4200 (1.2367)	-1.3523[**] (0.6485)	-3.6792[***] (1.1647)
Age^2	-0.0162 (0.0181)	0.0107 (0.0352)	0.0391[**] (0.0186)	0.1029[***] (0.0333)
Percent Boys			-0.1689[**] (0.0841)	-0.4262[***] (0.1437)
Percent Girls	-0.0196 (0.0840)	0.0869 (0.1584)		
No of Children	-0.0788[***] (0.0109)	-0.0865[***] (0.0216)	-0.1699[***] (0.0104)	-0.1971[***] (0.0228)
Log Expenditure	0.0721[***] (0.0238)	0.2171[***] (0.0743)	0.1923[***] (0.0246)	0.2628[***] (0.0643)
Mother's Education	0.0465[***] (0.0068)	0.0720[***] (0.0137)	0.0884[***] (0.0070)	0.0923[***] (0.0171)
Father's Education	0.1013[***] (0.0073)	0.0797[***] (0.0174)	0.1191[***] (0.0072)	0.0551[***] (0.0129)
Only Mother	0.3237[***] (0.1032)	0.1422 (0.1750)	0.3283[***] (0.0969)	0.4032[**] (0.1580)
Only Father	-0.1855 (0.2314)	-0.7050 (0.4405)	-0.3420 (0.2534)	0.3939 (0.5120)
Mother Self-employed	0.1344[***] (0.0323)	-0.1153 (0.0929)	-0.1973[***] (0.0350)	-0.1110 (0.0889)
Father Self-employed	-0.2179[***] (0.0502)	-0.1715[**] (0.0791)	-0.2389[***] (0.0551)	-0.1653[**] (0.0741)
Urban	0.1702[***] (0.0383)	-0.0060 (0.1089)	0.4713[***] (0.0386)	0.1172 (0.0999)
-Log pseudo likelihood	3502.3363	977.55375	3554.5449	1137.883
Number of Observations	4966	1612	4707	1488
Prob(education=middle school)	0.6067	0.7680	0.4240	0.6095

Note: For empirical specification see Section V

[*], [**], [***] indicate statistical significance at the 10, 5 and 1% level, respectively.

Figures in parentheses are robust standard errors.

Table 3

Ordered Probit Estimates of High Schooling Ages 18-20				
Variables	**Boys**		**Girls**	
Year	**1994**	**2002**	**1994**	**2002**
Age	-0.7556 (1.7191)	0.2276 (3.1064)	5.1511*** (1.9457)	5.6038* (3.1657)
Age^2	0.0226 (0.0453)	-0.0009 (0.0821)	-0.1341*** (0.0513)	-0.1458* (0.0835)
Percent Boys			-0.1999** (0.1013)	-0.2695 (0 .1647)
Percent Girls	0.0620 (0.0943)	0.1044 (0.1625)		
No of Children	-0.0700*** (0.0127)	-0.0817*** (0.0230)	-0.1715*** (0.0129)	-0.2156*** (0.0275)
Log Expenditure	0.1230*** (0.0267)	0.1869** (0.0786)	0.1488*** (0.0321)	0.3117*** (0.0721)
Mother's Education	0.0518*** (0.0071)	0.0682*** (0.0142)	0.0855*** (0.0090)	0.1005*** (0.0159)
Father's Education	0.0874*** (0.0075)	0.0668*** (0.0132)	0.1175*** (0.0086)	0.0627*** (0.0156)
Only Mother	0.3126*** (0.1107)	0.0914 (0.1744)	0.3454*** (0.1137)	0.5378*** (0.1742)
Only Father	-0.5282* (0.2993)	-0.0129 (0.4222)	-0.3816 (0.2342)	0.5837 (0.5999)
Mother Self-employed	-0.1969*** (0.0323)	0.0422 (0.0974)	-0.1894*** (0.0463)	-0.1731 (0.1080)
Father Self-employed	-0.1317*** (0.0479)	-0.1724** (0.0805)	-0.2126*** (0.0562)	-0.0172 (0.0892)
Urban	0.1721*** (0.0441)	0.2201** (0.1096)	0.5500*** (0.0484)	0.2291* (0.1232)
-Log pseudo likelihood	3416.1655	1017.7223	2799.0096	1007.4001
Number of Observations	3162	988	2866	968
Prob (education=high school)	0.3707	0.4960	0.3193	0.6032

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

Table 4

Statistics of Mothers and Fathers Living without Husband or Wife and with Their Children						
	Living with only son(s)		Living with only daughter(s)		Living with at least one son and one daughter	
	1994	**2002**	**1994**	**2002**	**1994**	**2002**
Mother	534	213	452	175	849	240
Father	70	64	43	35	88	56

Distribution of Mothers that are Living without their Husband and with Their Children According to Their Marital Status (%)						
	Living with only son(s)		Living with only daughter(s)		Living with at least one son and one daughter	
	1994	**2002**	**1994**	**2002**	**1994**	**2002**
Divorced	1,2	26,3	1,3	19,7	1,4	22,6
Married	5,3	4,0	3,1	4,8	9,8	10,5
Living separate	0,7	3,2	0,5	3,3	1,5	4,6
Widow	21,9	0,5	19,8	0,0	33,6	0,5

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

Table 5

Impact of Alone Mother on Girls' School Attainment				
	Middle School		High School	
	1994	**2002**	**1994**	**2002**
Age	-1.3456** (0.6495)	-3.6076*** (1.1639)	5.0412*** (1.9476)	5.6630* (3.1636)
Percent Boys	-0.1560* (0.0842)	-0.4212*** (0.1440)	-0.1909* (0.1016)	-0.2788* (0.1656)
Mother's Education	0.0920*** (0.0071)	0.0974*** (0.0167)	0.0871*** (0.0090)	0.1057*** (0.0158)
Father's Education	0.1153*** (0.0070)	0.0427*** (0.0114)	0.1141*** (0.0084)	0.0501*** (0.0132)
Divorced Mother	**0.2565 (0.2695)**	**-0.0661 (0.1144)**	**0.4888 (0.3254)**	**0.0546 (0.1143)**
Widow Mother	**0.3254*** (0.0747)**	**7.6603*** (0.1825)**	**0.2886*** (0.0894)**	**8.6970*** (0.1568)**
Separated Mother	**0.2489 (0.2442)**	**0.6695* (0.3823)**	**-0.0015 (0.2058)**	**1.4342*** (0.4487)**
Only Father	-0.3785 (0.2544)	0.3850 (0.5138)	-0.4112* (0.2346)	0.5993 (0.5839)
Mother Self-employed	-0.2435*** (0.0392)	-0.1066 (0.0896)	-0.2248*** (0.0522)	-0.1632 (0.1087)
Father Self-employed	-0.2243*** (0.0544)	-0.2073*** (0.0704)	-0.2045*** (0.0589)	-0.0342 (0.0839)
Urban	0.4710*** (0.0387)	0.1112 (0.1008)	0.5498*** (0.0484)	0.2239* (0.1238)
-Log pseudo likelihood	3549.7401	2796.9648	1139.1873	1007.1404
Number of Observations	4707	2866	1488	968
Number of variables used	15	15	15	15

Note: For empirical specification see Section VI
*, **, *** indicate statistical significance at the 10, 5 and 1% level, 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 2 and Table 3 are also used in this analysis, the variables, coefficients of which do not change significantly, are not presented in this table for simplicity.

Table 6

Impact of Alone Mother on Boys' School Attainment				
	Middle School		**High School**	
	1994	**2002**	**1994**	**2002**
Divorced Mother	-0.2486 (0.3423)	-0.0250 (0.1366)	-0.0274 (0.3712)	0.3434** (0.1369)
Widow Mother	0.1612** (0.0758)	dropped	0.2215*** (0.0844)	-0.8723*** (0.1543)
Separated Mother	0.9110** (0.3638)	0.2682 (0.5173)	0.5133* (0.3082)	0.0335 (0.5774)
Only Father	-0.1985 (0.2315)	-0.7200 0.4400	-0.5455* (0.3008)	0.0083 (0.4165)
Mother Self-employed	-0.1509*** (0.0350)	-0.1143 (0.0937)	-0.2168*** (0.0341)	0.0199 (0.0971)
Father Self-employed	-0.2313*** (0.0508)	-01878** (0.0773)	-0.1342*** (0.0486)	-0.1506* (0.0785)
Urban	0.1753*** (0.0383)	-0.0113 (0.1093)	0.1808*** (0.0440)	0.2127* (0.1103)
-Log pseudo likelihood	3501.0961	977.6770	3415.3915	1014.1712
Number of Observations	4966	1612	3162	988
Number of variables used	15	15	15	15

Note: For empirical specification see Section VI
*, **, *** indicate statistical significance at the 10, 5 and 1 % level, 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 2 and Table 3 are also used in this analysis, the variables, coefficients of which do not change significantly, are not presented in this table for simplicity.
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Table 7

Boys' Education (Urban)			
	Treatment Group:16-17 years old	Control Group: 18-19 years old	Difference
After:2002	7.1299*** (0.2379)	7.1974*** (0.2684)	-0.0675 (0.0900)
Before:1994	6.9086*** (0.1275)	6.7834*** (0.1561)	0.1252** (0.0580)
Difference	0.2213*** (0.0745)	0.4140*** (0.0790)	**-0.1927*** **(0.1093)**

Boys' Education (Rural)			
	Treatment Group:16-17 years old	Control Group: 18-19 years old	Difference
After:2002	7.11129*** (0.5778)	6.8241*** (0.6243)	0.2888 (0.2222)
Before:1994	6.4522*** (0.1728)	6.2881*** (0.2005)	0.1641 (0.0907)
Difference	0.6607*** (0.1715)	0.5360*** (0.1828)	**0.1247** **(0.2508)**

Girls' Education (Urban)			
	Treatment Group:16-17 years old	Control Group: 18-19 years old	Difference
After:2002	6.6609*** (0.2337)	6.4618*** (0.2625)	0.1991* (0.1205)
Before:1994	6.2454*** (0.1252)	6.3565*** (0.1518)	-0.1111 (0.0734)
Difference	0.4155*** (0.0938)	0.1053 (0.1023)	**0.3102** **(0.1392)**

Girls' Education (Rural)			
	Treatment Group:16-17 years old	Control Group: 18-19 years old	Difference
After:2002	5.9661*** (0.4969)	6.0526*** (0.5577)	-0.0865 (0.3185)
Before:1994	5.1406*** (0.1433)	5.0156*** (0.1863)	0.1250 (0.1073)
Difference	0.8255*** (0.2072)	1.0370*** (0.2283)	**-0.2115** **(0.3091)**

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

Table 8

Regression Results of DiffinDiff Approach			
Variables	**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)
AfterTreat	-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)
Number of Observations	6578	6195	12773
R^2	0.1449	0.3057	0.2167

Note: For empirical specification see Section VII b
*, **, *** indicate statistical significance at the 10, 5 and 1% level, respectively.

Table 9

Estimation Results of the Probit Model for Mothers' Working		
Variable	**Coefficient**	**Standard Error**
Mother's Education	0.0674***	0.0082
Father's Education	-0.0201***	0.0078
Mother's Age	0.0009	0.0042
Mother's Age^2	0.0001	0.0001
Father's Age	-0.0117**	0.0056
Father's Age^2	-0.0002*	0.0001
Father Self-employed	-0.0277	0.0823
Father in Public Sector	0.0016	0.0018
Father Having a Second job	0.7828***	0.0722
Parents Engaged in Agriculture Sector	0.9736***	0.0507
Dummy for Child Labour	0.8725***	0.0657
Log Expenditure	-0.0459	0.0314
Urban	-1.0097***	0.0506
Number of Children Aged Between 0-6	-0.1426***	0.0431
Number of Children Aged Between 7-15	-0.0636***	0.0223
Average Education of Girls in the Household	-0.0256*	0.0154
Average Education of Boys in the Household	-0.0140	0.0152
After	0.2667	0.2122
Treat	0.0440	0.0520
AfterTreat	0.0002	0.0176
Constant	0.5326	0.4915
-Log Likelihood	1941.4918	
Number of Observations	4902	

Note: For empirical specification see Section VII c
*, **, *** indicate statistical significance at the 10, 5 and 1% level, respectively.

Table 10

Estimation Results for the Regression for Working Hours		
Variable	**Coefficient**	**Standard Error**
Mother's Education	-1.4544***	0.2703
Father's Education	-2.1052***	0.2367
Mother's Age	0.5239***	0.1651
Mother's Age^2	-0.0066***	0.0022
Father's Age	1.5314***	0.1909
Father's Age^2	-1.4479***	0.2451
Father Self-employed	11.2146***	2.9540
Father in Public Sector	-0.0160***	0.0025
Father Having a Second job	-0.7065	2.9985
Parents Engaged in Agriculture Sector	6.3615***	2.3159
Working Mother	58.0226***	2.0381
Log Expenditure	6.9607***	1.0864
Urban	-5.2680**	2.1900
Number of Children Aged Between 0-6	-3.5092***	1.2048
Number of Children Aged Between 7-15	-8.9814***	0.7382
Dummy for Child Labour	60.1480***	2.9311
Average Education of Girls in the Household	-1.4555***	0.4424
Average Education of Boys in the Household	-0.2685	0.4367
After	-22.1179***	7.1551
Treat	-7.5759**	1.8626
AfterTreat	1.5050**	0.6452
Constant	-56.5557***	16.9515
R^2	0.5106	
Number of Observations	4902	

Note: For empirical specification see Section VII c
*, **, *** indicate statistical significance at the 10, 5 and 1% level, respectively.

Table 11

Estimation Results of the Probit Model for Child Labour		
Variable	**Coefficient**	**Standard Error**
Mother's Education	0.0346***	0.0127
Father's Education	-0.0190	0.0125
Mother's Age	-0.0360***	0.0060
Mother's Age^2	0.0004***	0.0001
Father's Age	-0.0162	0.0095
Father's Age^2 / 100	-0.0002	0.0001
Father Self-employed	-0.2941**	0.1748
Father in Public Sector	-0.0066**	0.0031
Father Having a Second job	0.1425	0.0889
Working Mother	-0.4697***	0.0907
Parents Engaged in Agriculture Sector	-0.1384*	0.0821
Number of People Working in the Household	0.8180***	0.0536
Total Working Hour	0.0022***	0.0007
Log Expenditure	-0.2498***	0.0438
Urban	-0.0751	0.0799
Number of Children Aged Between 0-6	-0.0388	0.0463
Number of Children Aged Between 7-15	0.4833***	0.0292
Average Education of Girls in the Household	-0.0004	0.0294
Average Education of Boys in the Household	-0.1011***	0.0304
After	1.6845***	0.3140
Treat	0.1928**	0.0776
AfterTreat	-0.0608**	0.0256
Constant	0.9752	0.6826
-Log Likelihood	870.59106	
Number of Observations	4902	

Note: For empirical specification see Section VII d
*, **, *** indicate statistical significance at the 10, 5 and 1% level, respectively.

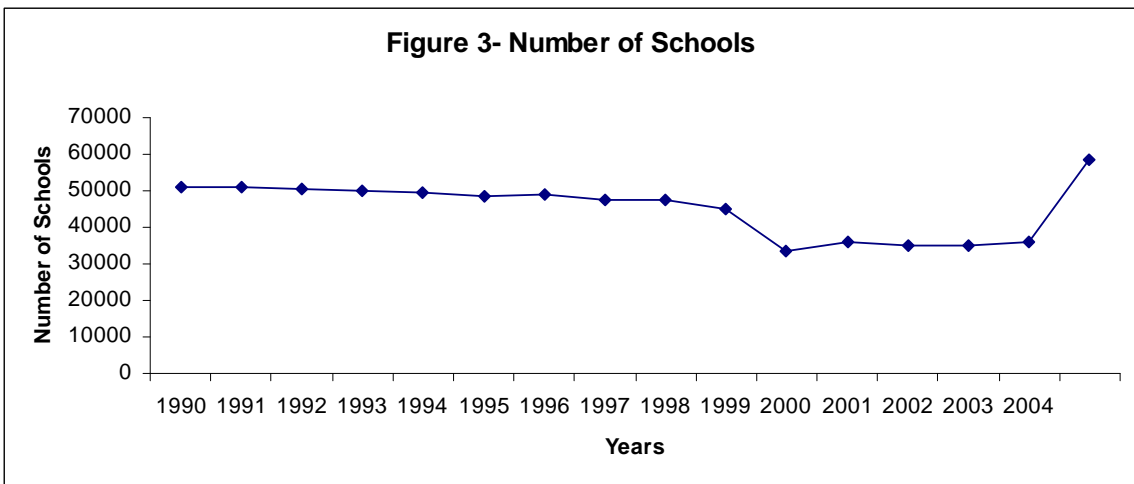**Number of Students** **Figure 1- Urban Middle School Enrollment**

Years

Boys ─── Girls

Number of Students **Figure 2- Rural Middle School Enrollment**

Years

Boys ─── Girls

Figure 3- Number of Schools
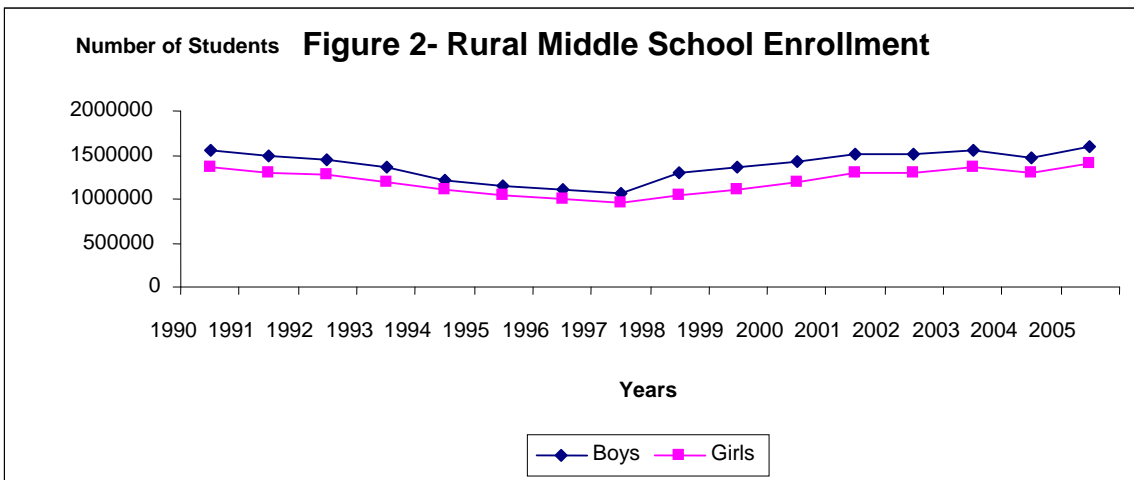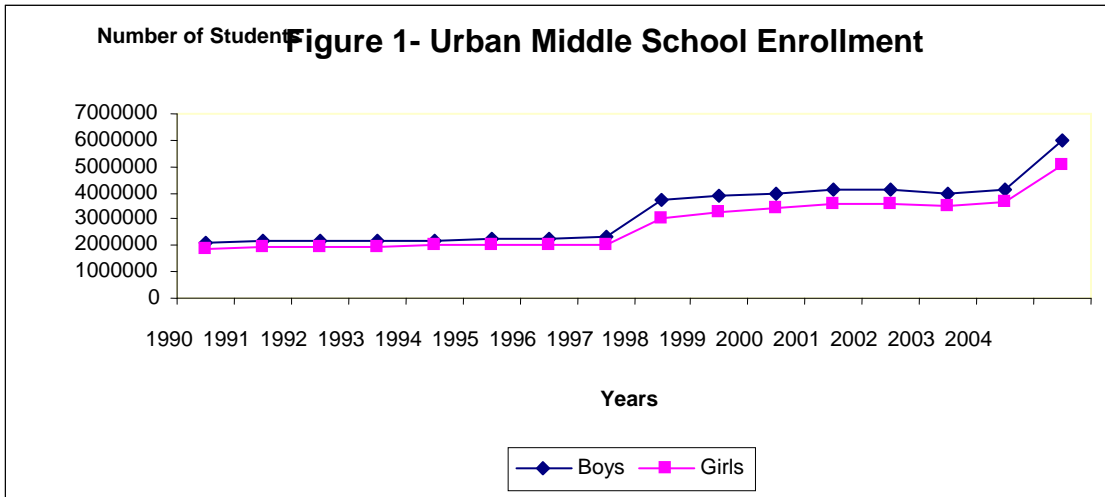

Years

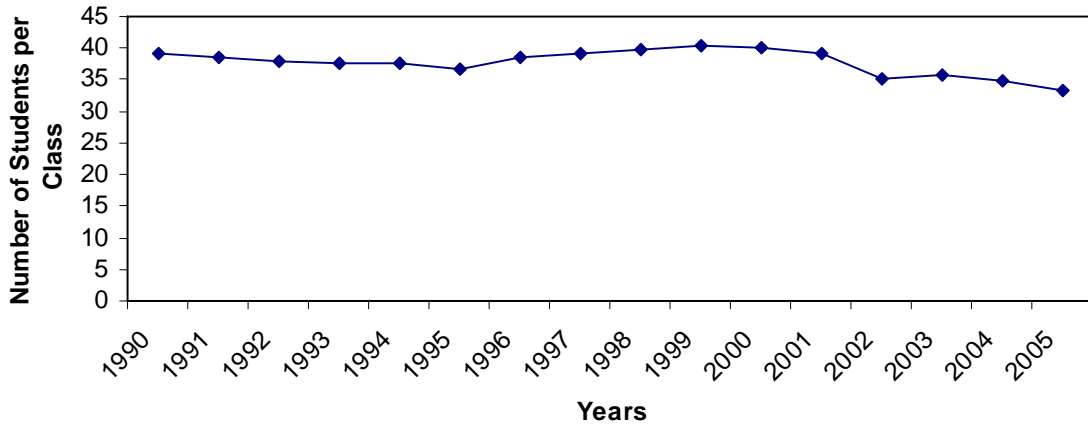**Figure 4- Average Class Size in Urban Areas**

Figure 5- Average Class Size in Rural Areas
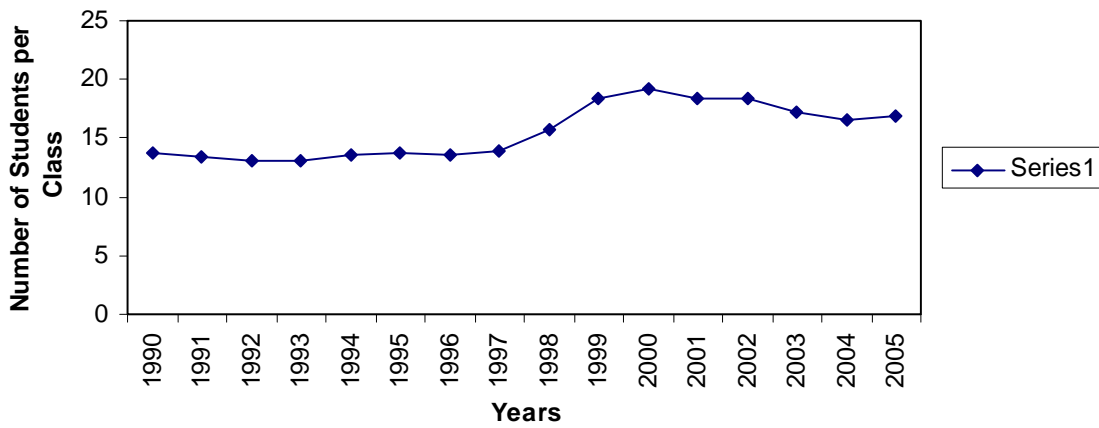
Figure 6- Average Number of Students per Teacher
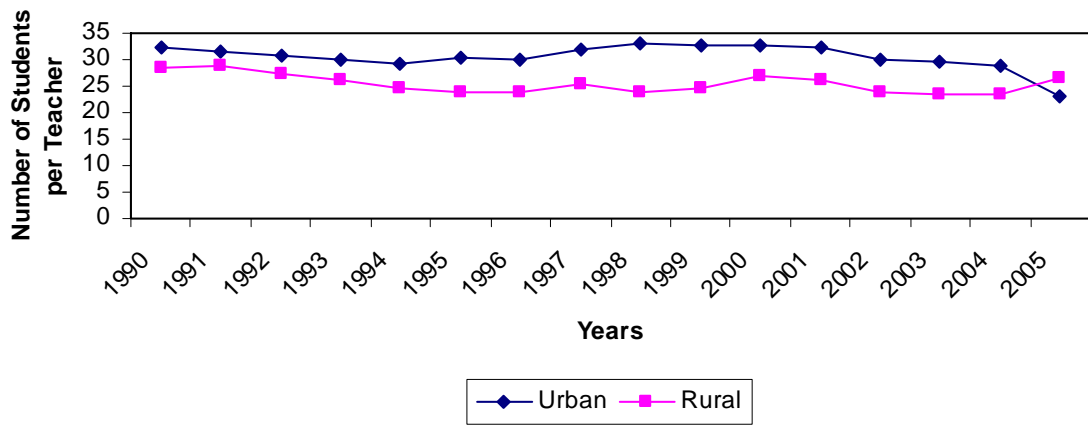
APPENDIX

Probit Estimates of Middle Schooling Ages 16-19				
Variables	**Boys**		**Girls**	
Year	**1994**	**2002**	**1994**	**2002**
Age	0.7867 (0.6719)	-1.6453 (1.3148)	-1.0405 (0.7466)	-5.3910*** (1.2878)
Age^2	-0.0239 (0.0193)	0.0437 (0.0376)	0.0302 (0.0214)	0.1506*** (0.0369)
Percent Boys			-0.0964 (0.0958)	-0.4667*** (0 .1603)
Percent Girls	-0.0301 (0.0872)	0.1234 (0.1661)		
No of Children	-0.0711*** (0.0114)	-0.0820*** (0.0235)	-0.1676*** (0.0135)	-0.1651*** (0.0264)
Log Expenditure	0.0845*** (0.0256)	0.2474*** (0.0787)	0.2115*** (0.0289)	0.3149*** (0.0717)
Mother's Education	0.0437*** (0.0071)	0.0734*** (0.0144)	0.0779*** (0.0081)	0.1012*** (0.0174)
Father's Education	0.1058*** (0.0074)	0.0923*** (0.0179)	0.1240*** (0.0081)	0.0535*** (0.0132)
Only Mother	0.2988*** (0.1119)	0.2393 (0.1830)	0.3271*** (0.1220)	0.4494*** (0.1620)
Only Father	-0.2465 (0.2675)	-0.7448 (0.5121)	-0.4064 (0.3222)	0.6229 (0.4969)
Mother Self-employed	-0.1166*** (0.0376)	-0.1511 (0.1024)	-0.2106*** (0.0504)	-0.1902* (0.1041)
Father Self-employed	-0.2830 *** (0.0639)	-0.1887* (0.0847)	-0.2870*** (0.0890)	-0.1952** (0.0802)
Urban	0.2085*** (0.0410)	-0.0513 (0.1196)	0.6687*** (0.0472)	0.1242 (0.1164)
Constant	-7.5851 (5.8644)	10.7244 (11.5165)	5.2195 (6.4910)	42.0815*** (11.2833
-Log pseudo likelihood	2929.2753	734.2897	2371.0927	776.0201
Number of Observations	4966	1612	4707	1488

Probit Estimates of High Schooling Ages 18-20				
Variables	**Boys**		**Girls**	
Year	**1994**	**2002**	**1994**	**2002**
Age	0.1362 (2.0041)	0.0337 (3.4053)	6.6891*** (2.3528)	8.9685** (3.6349)
Age^2	0.0024 (0.0528)	0.0078 (0.0897)	-0.1720*** (0.0620)	-0.2323** (0.0957)
Percent Boys			-0.0370 (0.1269)	-0.4029** (0.1977)
Percent Girls	0.1168 (0.1103)	0.1445 (0.1865)		
No of Children	-0.0767*** (0.0154)	-0.0837*** (0.0288)	-0.1541*** (0.0182)	-0.1603*** (0.0358)
Log Expenditure	0.1260*** (0.0321)	0.2497*** (0.0819)	0.1416*** (0.0403)	0.3187*** (0.0876)
Mother's Education	0.0399*** (0.0085)	0.0706*** (0.0154)	0.0749*** (0.0113)	0.1000*** (0.0176)
Father's Education	0.0871*** (0.0083)	0.0520*** (0.0147)	0.1210*** (0.0102)	0.0521*** (0.0160)
Only Mother	0.2339* (0.1345)	-0.0086 (0.1946)	0.1723 (0.1538)	0.5883*** (0.1863)
Only Father	-0.4124 (0.3542)	0.2288 (0.4816)	-1.5648*** (0.4229)	0.4690 (0.7116)
Mother Self-employed	-0.1670*** (0.0476)	0.0569 (0.1188)	-0.2337*** (0.0695)	-0.2991** (0.1372)
Father Self-employed	-0.2139*** (0.0759)	-0.1860** (0.0925)	-0.4585*** (0.1061)	0.0540 (0.1019)
Urban	0.1676*** (0.0532)	0.2547* (0.1364)	0.6867*** (0.0680)	0.2179 (0.1482)
Constant	-5.7792 (18.9928)	-8.9514 (32.2764)	-67.7068*** (22.3127)	-93.1584*** (34.5334)
-Log pseudo likelihood	1831.5217	588.8876	1329.3286	525.9078
Number of Observations	3162	988	2866	968