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Contents

Abstract

Do children with access to private tutoring feel happier than those without? In answering this question, this paper offers a novel way to understand the potential merit of providing private tutoring for children. Using a unique data set on Vietnamese children from Round 2 of the Young Lives 2006 Survey, this paper explores the link between taking extra classes and a child's subjective well-being, measured by degree of satisfaction regarding their current and future life. Estimation results from Ordinary Least-Square regressions indicate such a link to be positive and significant, which is further confirmed by Ordered Probit regressions aiming to control for the discontinuous nature of the dependent variable. To control for potential endogeneity of households' choice to purchase extra classes, the method of Propensity Score Matching is applied. Results from different versions of nearest-neighbour matching and Kernel matching indicate that children with private tutoring tend to feel happier about their current life, although the long-run effect of taking extra classes on a child's subjective well-being is more sensitive to the matching methods used.

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Chapter 1

Introduction

The transition to a market economy tends to substantially increase the amount of private tutoring in countries where it previously did not exist, for example Vietnam, China and many Eastern European countries (Bray 1999a). In this paper, we follow Dang and Rogers (2008) and define private tutoring as fee-based tutoring that provides supplementary instruction to children in academic subjects they study in the mainstream education system. One explanation for the increasing popularity of private tutoring is that the returns to education have risen in these transition economies, which in turn leads to a higher demand for both formal education and private tutoring. Meanwhile, the public education system in these countries is often regarded as inadequate (Kim and Lee 2004). In Vietnam a typical school day is short, as is a typical academic year. In fact, despite a very high primary school enrolment rate, most primary school students receive little more than half of the teaching input of the international standard (Ha and Harpham 2005). According to Dang (2007b), in Vietnam, about 34 per cent of households with children in school purchase private tutoring, and 90 per cent of these households spend 1-5 per cent of their total expenditure on private tutoring.

Nevertheless, there has been been much debate over the benefits and costs of private tutoring. On the one hand, it is argued that taking extra classes can improve students' academic performance, hence reducing the probability of repeating grades, increasing students' competitiveness in higher education and consequently improving their job market prospects. It is also hypothesised that private tutoring can contribute to the accumulation of human capital, especially when the public education system is inadequate. However, existing empirical studies only provide mixed evidence for such claims. For example, Dang and Rogers (2008) reported mixed results on the impact of private tutoring on academic performance in studies that do not control for endogeneity in having private tutoring, while studies that do control for such endogeneity generally find a positive impact of private tutoring on students' academic performance. On the other hand, there are worries that private tutoring may impose heavy costs on households and exacerbate social inequality as poor households may not be able to afford it for their children. There is also concern

that the popularity of private tutoring may disrupt the public education system, and that teachers may pressurise students to take extra classes. Policies towards private tutoring also differ across countries. While private tutoring is not an issue in some countries, it has been controlled and regulated at various times in others such as Korea, Cambodia and Myanmar (Bray 1999a).

In this paper, we will investigate the potential impact of private tutoring on children from a novel angle by exploring the relationship between taking extra classes and a child's subjective well-being, which is defined as the child's self-evaluation of his/her current life and expectations of what it will be in four years time. The key question we ask is whether taking extra classes will make children feel happier, and if so, whether such an effect is persistent in the long run. To our best knowledge, there is no existing study that answers this question.

The sample for this study is collected from Round 2 of the Young Lives 2006 survey on Vietnamese children who were then aged 12. Out of the total of 899 children in this sample, 46.6 per cent of them were reported to have taken extra classes in the six months before the survey was conducted. This paper is organised as follows: Section 2 gives a brief review of the education system in Vietnam. It also defines subjective well-being and discusses the existing empirical findings on the relationship between education and subjective well-being. Section 3 describes the structure of the data. In Section 4, we introduce the econometric strategies we will be using, and the results from estimating the models are presented. The summary and conclusion of our findings can be found in Section 5.

Chapter 2

Literature Review

2.1 Children's Education in Vietnam: A Brief Review

There have been major reforms in the education system in Vietnam ever since its economic transition. According to the current Education Law, in Vietnam the schooling age is 6 years old. Primary education is compulsory for every child aged from 6 for five years (from Form 1 to Form 5). Following primary education, basic secondary education lasts for four years from Form 6 to Form 9. Those in Form 6 must be 11 years old and have primary education diplomas. High school education is completed in three years from the tenth to twelfth forms, and those in the tenth form must be 15 years old and have basic secondary education diplomas. As the children in our sample were 12 years old when the survey was conducted, this indicates that they should be in basic secondary education at most.

Despite being a developing country, Vietnam's primary school enrolment rate is outstandingly high compared to many other countries. According to World Bank statistics in 2000, the primary school enrolment rate was 94.5 per cent and the primary school completion rate of the relevant age group was 95.9 per cent. However, in the same year the enrolment rate for secondary school was only 61 per cent and as low as 9.5 per cent for tertiary school. Significant challenges in educational access and quality remain, and there are even more obstacles to be overcome in rural areas.

The inadequacy of formal schooling is one possible reason why taking extra classes is becoming increasingly popular in Vietnam. As pointed out by Ha and Harpham (2005), the combination of a short school day and a short academic year means that most primary school students receive little more than half of the international normal annual teaching input. The popularity of taking extra classes is also reflected by the number of students taking extra classes in the sample used in this paper. In the sample of 899 12-year-old students, around half reported having taken extra classes in the six months before the interview. It has become a major concern that taking extra classes could add to the cost burden of households. Although we do not have the statistics for students

in basic secondary education, according to the Vietnam Household Living Standards Survey 2002, around 25 per cent of annual average education expenditure for a primary school student goes on extra classes (World Bank 2003).

2.2 Definition and Measurement of Subjective Well-being

The key question this paper attempts to answer is 'Do children feel happier if they are provided with private tutoring?'. To answer this question, the first step is to provide a definition of 'happiness' or alternatively subjective well-being. It is generally accepted that there are three major components of subjective well-being: positive affect, negative affect and life satisfaction (Andrews and Withey 1976; Diener 1984). The first two components refer to individual differences in affective response tendencies, while the latter variable refers to cognitive and evaluative responses. Positive affect includes such positive emotions as joy and happiness, and negative affect includes such negative or unpleasant emotions as anxiety, sadness and guilt. Life satisfaction is defined by Diener (1984, 1996) as a global assessment of the quality of one's life. More specifically, *global* life satisfaction refers to the aggregate of satisfaction in specific life domains and it is often instrumented by a single score. On the other hand, if the focus of the study is life satisfaction in *specific* domains such as family, income, job and friends, more than one score reflecting different life domains is usually applied.

In this research, we will focus on the children's global life satisfaction based on their responses to the survey questions: 1) Suppose there are nine steps on this ladder. Suppose we say that the ninth step, at the very top, represents the best possible life for you and the bottom represents the worst possible life for you. Where on the ladder do you feel you personally stand at the present time? 2) Where do you think you will be on the ladder in four years from now? Answers to these questions are coded numerically from one to nine with a higher value indicating a higher degree of life satisfaction. These variables reveal children's assessment of their current life and expectations for the future, and are used in this study as the indicators of children's subjective well-being.

2.3 Empirical Evidence for the Relationship between Education and Subjective Well-being

There are many studies on the relationship between education and subjective well-being, but most focus on formal education and look at adults or college students. A positive effect of formal education attainment on adults' subjective well-being has been found in several studies. Ross and Willigen (1997), using two national surveys conducted in 1990 and 1995, argued that education

is valuable to individual well-being because it provides access to non-alienated paid work and supportive relationships. In particular, they found that the well educated had lower degrees of emotional and physical distress than the poorly educated. However, these findings from Ross and Willigen (1997) may be less relevant if children are the objects of the study.

However, not all studies support the finding that formal education levels or academic achievement are significantly correlated with subjective well-being. Much research on adults has found that demographic variables such as education, gender and income account for only modest amounts of variance in their subjective well-being ratings (Andrews and Withey 1976; Diener 1984; and Wilson 1967). In particular, Witter, Okun, Stock and Haring (1984) concluded that educational attainment only accounts for 1 per cent and 3 per cent of the variance in adult subjective well-being. The insignificance of the education effect is also found in Huebner (1991) in which a sample of 79 children from regular classrooms in Grades 5 to 7 were studied. The estimation results indicated that none of the demographic variables, including school grades, correlated significantly with Student Life Satisfaction Scores (SLSS), which was the measurement for school children's subjective well-being in their study. In contrast, all of the personality measures correlated significantly in the predicted directions with the SLSS. A further study by Huebner and Alderman (1993) failed to find a significant difference between groups of low-performing and normally-performing elementary students on life satisfaction.

In summary, most existing studies focus on the relationship between formal education levels, academic achievement and subjective well-being. Among the existing studies, there is no unanimous agreement as to the significance of formal schooling for life satisfaction. Little attention has been drawn to the relationship between private tutoring and children's subjective well-being. This paper is a modest attempt to bridge this gap in the literature.

Chapter 3

The Structure of the Data

3.1 The Young Lives Project

The sample used in this study is taken from the Young Lives 2006 survey. The Young Lives project is a long-term panel study following two cohorts of young children across a number of different countries. For the purpose of this study, attention is restricted to the Older Cohort of Vietnamese children born in 1994. There have been two rounds of surveying in the year 2002 and 2006. At the time of the Round 2 data collection, these children were aged 12. We only use the Round 2 data because information on the children's subjective evaluation of their lives is absent in Round 1.

The Round 2 Young Lives survey provides detailed information on a sample of 990 children. There are three parts to the survey. Firstly, the selected parents or care givers of the Young Lives children completed a household questionnaire, giving detailed information on household characteristics including parental background, household education levels, household livelihood and assets, household consumption and expenditure, social capital, economic changes and child health. In this part of the survey, households were also asked whether the child participated in extra classes. Secondly, each child was asked to complete a child questionnaire, which asked about schooling, time allocation, health status, social networks, and particularly their feelings and attitudes. Finally, parents or care givers were asked to complete a community questionnaire which was used to gather background and demographic information. All questionnaires were carried out via a face-to-face interview.[1] For the purpose of empirical analysis, entries that reported missing values for any reason are excluded and it is assumed that variables are missing at random. Consequently, the sample used in this paper consists of 899 individuals, corresponding to 455 males and 444 females respectively.

[1] For more information on the Young Lives Project, please visit http://www.younglives.org.uk/

3.2 Data Definition and Description

Subjective Well-being Measures

CLADDER: This variable is constructed based on children's answers to the question, 'There are nine steps on this ladder. Suppose we say that the ninth step, at the very top, represents the best possible life for you and the bottom represents the worst possible life for you. Where on the ladder do you feel you personally stand at the present time?' Answers to this question are coded from 1 to 9 where a higher value indicates a higher degree of life satisfaction. It is worth noting that the ranking of CLADDER is ordinal rather than cardinal, so for example, the difference between 1 and 2 is not necessarily the same as the difference between 5 and 6.

CFARLAD: In the survey, children were asked about their perception of their future life. The survey question was 'Where do you think you will be on the ladder in four years from now?'. Similar to CLADDER, CFARLAD is ranked in an ordinal manner from 1 to 9 with a higher value indicating more positive views about future life status.

DIFFLAD: This variable measures the difference between children's perception of their life in four years time and that of their current life. Therefore, DIFFLAD is positive if the child predicted an improvement in their life, and negative if a deterioration is expected.

Children's Education

EXTRA: This dummy variable takes the value of 1 if the child participated in extra classes additional to regular schooling in the last six months before the survey, and is 0 otherwise. As mentioned previously, Vietnamese schools tend to have very short school days and a short academic year. As a result, without extra tuition children would receive only a little above half of the international normal annual teaching input (Ha and Harpham, 2005). As a result, extra classes are very popular in Vietnam: 46.6 per cent of the children in our sample took extra classes. For children who took extra classes, around seven hours per week on average was spent on attending them. Nevertheless, attention should also be drawn to the great variation in number of hours per week spent on extra learning, as shown by the histogram in Figure 3.1.

GRADLOW: All children in our sample are currently enrolled in school, and Figure 3.2 is a histogram of school grades. It can be seen that most children in this data set were in Grade 7 at the age of 12 when the survey was conducted. Nevertheless, 29.55 per cent of the sampled children reported that they were below this standard grade for 12 year olds. The dummy variable GRADLOW is hence constructed to be 1 if the child was in a grade lower than Grade 7. It is

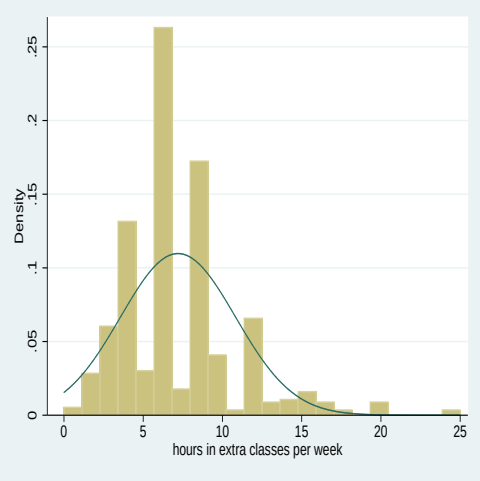

Figure 3.1: Extra Classes

hypothesised that children will feel less happy if they are in a lower grade than they should be.

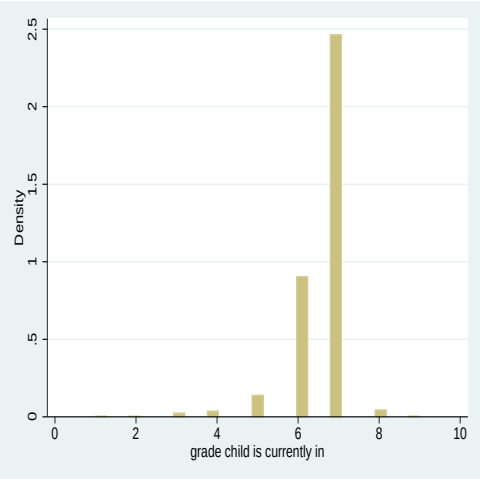

Figure 3.2: Current School Grade

PROUD: In the survey, children were asked whether they agreed with the statement 'I am proud of my achievements at school'. This variable is constructed to equal 4, 3, 2 and 1 corresponding to the answers *strongly agree*, *agree*, *disagree*, and *strongly disagree*. The hypothesis is that children who feel proud of their school achievement will tend to be more satisfied about their current life as well as more positive towards their future life.

SCHOOLEN: In the household questionnaire, parents or care givers were asked to evaluate the overall school quality including teaching and infrastructure. This variable takes ordinal integer values from 1 to 4 and a higher value indicates a higher opinion of the school quality. In the sample, only 5 per cent of the households reported that the overall quality of the schools their

children attended was poor. 72 per cent of households regarded the school quality was reasonable and 23 per cent regarded it as good or extremely good. This indicates that formal schooling is generally regarded as reasonably good by households in our sample. However, we need to bear in mind that this kind of school quality evaluation is purely subjective and we lack the objective criteria for a more accurate evaluation due to the lack of necessary information in the data set.

Household Asset and Debt

WAI: The wealth and asset index is generated by taking the average of six indices: Livestock, Own Dwelling, Housing Quality, Own Consumer Durables, Services and Own Productive Assets, and is between 0 and 1.[2]

INCOME: In the survey, households were asked to report their total earnings in the last 12 months from different resources. We use this information to sum up the annual household income. Unlike WAI, this variable reflects a household's revenue flows, not its asset stocks.

DEBT: This variable takes the value of 1 if the household respondent reported having serious debts and is 0 otherwise. It is predicted that serious debts will be negatively related to children's happiness.

VNPOORHS: This variable takes the value of 1 if the household is on the official list of poor households in Vietnam and is 0 otherwise.

Other Control Variables

A set of demographic variables is added to the regression as a further control. This includes children's gender (FEMALE), rural location status (RURAL), ethnicity (MINORITY), religion (RELIGION),[3] household size measured by the number of family members (HHSIZE), region[4]and the number of siblings (SIB). Moreover, two variables reflecting children's health status are added as further controls. The variable LONGTERM equals 1 if the child has any long-term health problems. The variable HEALTHY takes value -1 if parents regarded the child as less healthy compared to children of the same age, 0 if equally healthy and 1 if healthier. The level of parental

[2]The construction of the indices is in the Appendix.

[3]The dummy variable FEMALE equals 1 if the child is a girl, 0 otherwise; RURAL equals 1 if the child lives in a rural area instead of a city; MINORITY equals 1 if the child belongs to a minority ethnic group, 0 otherwise; RELIGION equals 1 if the child has any form of religion, 0 otherwise.

[4]The Young Lives survey covers the following regions: the northern uplands, Red River delta, the central coastal, Mekong River delta, the highlands, and the south eastern. Due to the small number of observations, the central coastal, highlands and the south eastern are combined as other regions. Under such a classification, 19.80 per cent of the sample are from the northern uplands, 19.80 per cent are from the Red River delta, 20.24 per cent are from the Mekong River delta, and 40.15 per cent are from the central coastal, highlands or the south eastern area.

education is controlled by the variable PARENTED, with a higher value indicating a higher level of parental education.[5]

Statistical Description

Figure 3.3 shows three measures of children's subjective well-being (SWB): CLADDER, CFARLAD and DIFFLAD. The leftmost figure shows that most children would rank their current lives at level 5. The mean value in the sample is 4.80 and 42.4 per cent of the sampled children have a lower than average degree of satisfaction with their current life. Interestingly, when asked about their lives in four years time, most children believed that their lives would improve. The mean value rises to 6.33, with 49.1 per cent of the sampled children ranking their future lives above the value 6. Furthermore, only 1.4 per cent of children in our sample predicted that their future lives would be worse than their current lives. The histogram of the change in children's reported SWB scores, defined as DIFFLAD, is shown in the rightmost diagram in Figure 3.3.

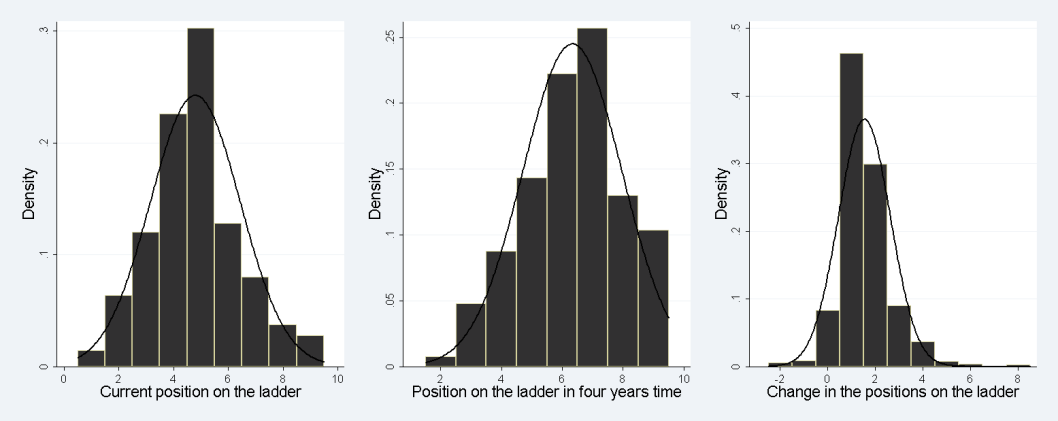

Figure 3.3: Position on the life satisfaction ladder: Current and Future

Tables 3.2 summarises the mean and variance of key variables. To make a clearer comparison, we divide the whole sample into a treated group and a control group. Children in the treated group are those who had taken extra classes in the six months before the survey, while those in the control group had not. There are 480 observations in the treated group and 419 observations in the control group. In the sample as a whole, there is an average 31.9 per cent increase in the life satisfaction ladder from the present to four years later. On average, the treated group has higher values of both CLADDER and CFARLAD than the control group. However, the average improvement is 27.81 per cent for the treated group, compare to 37.78 per cent for the control group. This indicates that children in the control group tend to be more optimistic about their

[5] If the education level of both parents is missing, this variable is substituted by the education level of the child's care giver.

life improvement in the short term. There are several other interesting differences between the two groups. The control group has a higher proportion of children at a lower than average grade in school and their parents' education level tends to be much lower. On average, children in the survey were reported to be less healthy than other children of the same age, as indicated by a negative mean value of HEALTHY. However, this figure is lower for children in the control group than those in the treated group. Moreover, the households whose children did not take extra classes tend to have less assets and a lower annual income, higher probability of having serious debt and of being listed as a very poor household. There are also clear differences in the demographic characteristics of the treated group and the control group in the sense that children who take extra classes tend to belong to a smaller household and have fewer siblings. They are less likely to belong to an ethnic minority. Interestingly, the proportion of children living in rural areas is much higher in the treated group than in the control group. This implies that the public education system may be less adequate in rural areas, and as a result households are more likely to purchase private tutoring. Moreover, on average, children taking extra classes have higher levels of satisfaction with their academic performance as shown by the mean values of PROUD for the two groups. However, such difference is only marginal. There is less distinction between the treated and control group in terms of self-reported school quality, long-term disease and religion.

	Whole Sample		Treated Group		Control Group	
Variable	Mean	Variance	Mean	Variance	Mean	Variance
CLADDER	4.799	1.645	5.221	1.624	4.315	1.533
CFARLAD	6.334	1.628	6.673	1.507	5.945	1.676
DIFFLAD	1.535	1.091	1.452	1.025	1.63	1.157
GRADLOW	0.304	0.460	0.215	0.411	0.406	0.492
PARENTED	2.845	1.039	3.196	1.021	2.444	0.906
PROUD	3.439	0.700	3.483	0.681	3.389	0.718
SCHOOLEN	2.809	0.518	2.819	0.523	2.797	0.512
LONGTERM	0.117	0.321	0.115	0.319	0.119	0.325
HEALTHY	-0.112	0.662	-0.058	0.660	-0.174	0.660
VNPOORHS	0.171	0.377	0.125	0.331	0.224	0.418
WAI	0.456	0.109	0.486	0.095	0.421	0.114
INCOME	17.505	21.719	22.083	22.953	12.260	18.920
DEBT	0.592	0.492	0.571	0.495	0.616	0.487
FEMALE	0.494	0.500	0.521	0.500	0.463	0.499
HHSIZE	4.874	1.362	4.738	1.277	5.031	1.440
SIB	1.829	1.335	1.556	1.082	2.141	1.519
RELIGION	0.933	0.249	0.921	0.270	0.947	0.223
MINORITY	0.115	0.319	0.029	0.168	0.212	0.410
RURAL	0.214	0.410	0.338	0.473	0.072	0.258

Table 3.1: Statistical Description of Key Variables

It is worth examining the raw correlations between key variables before we report the regression results. Table B in the Appendix reports the raw correlation between key variables. Both

CLADER and CFARLAD are strongly related to EXTRA and the magnitudes of these two correlations are smaller only than that between WAI and CLADDER and CFARLAD. As hypothesised, GRADLOW is negatively correlated with both CLADDER and CFARLAD. Also consistent with our prediction, feeling proud of one's academic achievement seems to affect children's life satisfaction in a positive manner, though the magnitude is small.

Chapter 4

Regression Models and Empirical Results

4.1 The OLS and Ordered Probit Regression Models

The model for Ordinary Least-Square (OLS) regressions is specified as following:

$$Y_i = X_i\beta + u_i, u_i \ N(0,1) \tag{4.1}$$

where i is for individual observation, $i = 1, 2...N$. Y_i are observed outcome variables including CLADDER, CFARLAD and DIFFLAD. X_i is a set of observable individual characteristics including EXTRA.

The OLS estimation results based on this regression model are reported in Table 4.1. Before discussing the estimation results, it is worthwhile noting that there is a problem with using a linear regression strategy like OLS regression for this study. Bear in mind that the three dependent variables (CLADDER, CFARLAD and DIFFLAD) are all categorical outcomes. However, one implicit assumption of linear regression is that the difference between the outcomes is cardinal. For example, the difference between 1 and 2 versus 9 and 10 on a discrete scale of 1 to 10 is assumed to be equal. The second implicit assumption of linear regression is that two respondents who give the same response should have exactly the same attitude. However, this is potentially problematic because a particular response can be consistent with *a range of* attitudes. Steward (1983) points out that ignoring the differences within the grouped data could lead to severe bias. Another closely related issue is referred to as floor or ceiling distortion (Hederker and Gibbons 1994). This is when a respondent would like to report a value higher or lower than permitted by the survey but is unable to do so. All these problems with linear regression make the Ordered Probit model an attractive alternative estimation strategy compared to OLS regression. In contrast to linear regression, the Ordered Probit model does not assume implicitly that the outcome variable is ranked cardinally and a particular response can result from a range of latent attitudes. The model for Ordered Probit regression can be expressed in the following way:

$$Y_i^* = x_i\beta + u_i, u_i \ N(0,1) \tag{4.2}$$

where Y_i^* is the underlying latent variable representing respondent i's propensity to agree with the statement. The relationship between Y_i and Y_i^* is:

$$Y_i = 1 \quad if -\infty < Y_i^* < \kappa_1 \tag{4.3}$$

$$Y_i = 2 \quad if \kappa_1 < Y_i^* < \kappa_2 \tag{4.4}$$

$$Y_i = 3 \quad if \kappa_2 < Y_i^* < \kappa_3 \tag{4.5}$$

$$... \tag{4.6}$$

$$Y_i = J \quad if \kappa_{J-1} < Y_i^* < \infty \tag{4.7}$$

where κ_1, $\kappa_2 ... \kappa_{J-1}$ are the cut points or thresholds. Let $P_i(Y)$ be the probability that individual i's response is Y, then we have

$$P_i(Y) = P(\kappa_{J-1} < Y_i^* < \kappa_J) = \Phi(\kappa_J - x_i\beta) - \Phi(\kappa_{J-1} - x_i\beta) \tag{4.8}$$

where $Y = 1, 2, ..., J$ and $\Phi(.)$ is the standard normal cumulative distribution function. The log likelihood function can be expressed as

$$LogL = \Sigma_i ln P_i(Y_i) = \Sigma_i ln[(\Phi(\kappa_J - x_i\beta) - \Phi(\kappa_{J-1} - x_i\beta)] \tag{4.9}$$

Maximising the above log likelihood function with respect to β yields the Maximum Likelihood Estimates (MLEs). The threshold parameters or cut points κ are unknown parameters and are estimated jointly with the coefficients by maximising the log-likelihood.

Empirical Findings from OLS and Ordered Probit Regressions

The estimation results for the OLS and Ordered Probit models are presented in Table 4.1. The first three columns contain the results for our benchmark OLS regression model. The last three columns contain the regression results of the Ordered Probit model. It shows that the pattern of estimated coefficients is similar for both OLS and Ordered Probit regression.

First, the estimated coefficients on EXTRA are both significantly positive for CLADDER and CFARLAD. This implies that children taking extra classes tend to be more satisfied with their current life. This positive link also exists in the long-run, although the estimated coefficients on EXTRA in the regression for CFARLAD are lower and less significant. The third and sixth columns of Table 4.1 show whether the differences in estimated coefficients for CLADDER and CFARLAD are statistically significant or not. Both OLS and Probit Ordered estimates on EXTRA in the regression for DIFFLAD are negative and significant at the 1 per cent level, implying that the estimated magnitude of the contemporary effect of taking extra classes on children's subjective well-being is significantly higher than the estimated magnitude of the long-run effect of taking extra classes.

Consistent with this estimation result, around 96.3 per cent of children who attended extra classes in our sample reported that they enjoyed this experience. Moreover, when asked if these extra classes were useful in terms of gaining knowledge and improving school performance, all the responding 464 students answered 'yes'. Therefore, children may feel happier taking extra classes because it helps to improve their academic performance or provides more opportunity to acquire knowledge. Nevertheless, there can be alternative explanations for the significant and positive link between taking extra classes and feeling happier. For example, children may simply enjoy being with other children during private tutoring, or they may feel that their parents cherish them more if they pay for extra classes. Nevertheless, all these possibilities are left open for further research when more detailed information is available.

Several other interesting results are also presented in Table 4.1. Children who are more proud of their school achievements are also more likely to have higher degrees of life satisfaction both for the current and future. Parental education levels also tend to have positive and persistent effects on children's subjective well-being. Being in a very poor household with a low level of assets, and living in rural areas are associated with a lower degree of satisfaction for both current and future life. Some factors such as being in a school grade lower than the average only have a temporary effect on children's subjective well-being. This is the case even if the child lives in a household with lower annual income or which is facing serious debt problems. On the other hand, the effect of household assets is both positive and persistent. This indicates that the negative effect of cash constraints or debt is only short-term. It is possible that children expect the income position of their parents to improve and the debt to be repaid in the future, and for their lives to subsequently improve. Some factors only tend to have a long-run effect on children's attitudes and feelings. It is shown that health problems only make children worry about their future, as the estimated coefficients on LONGTERM and HEALTHY are only significant in the regression for CFARLAD but not for CLADDER. Similarly, being a minority only has a long-run negative effect. One interpretation for these results is that children in our sample are very farsighted and they believe that health problems and belonging to an ethnic minority will affect their future access to higher education or better jobs. The results also show regional variations in terms of children's subjective well-being. Compared to children in the central coastal, highlands and south eastern areas, children in the Red River or Mekong River regions tend to be more satisfied with their lives.

Marginal Effects from Ordered Probit Regression

The results from the Ordered Probit regression are presented in the last three columns in Table 4.1. Estimation is based upon maximum likelihood. The pattern of the Ordered Probit results remain very similar to the OLS results. However, caution is called for when interpreting the mag-

	OLS & Ordered Probit Regressions					
	OLS			Ordered Probit		
Ladder	Current	Future	Change	Current	Future	Change
EXTRA	0.490***	0.252**	-0.239***	0.609***	0.319**	-0.394***
	(0.120)	(0.120)	(0.086)	(0.160)	(0.160)	(0.150)
GRADLOW	-0.257**	-0.110	0.147	-0.314**	-0.098	0.255
	(0.120)	(0.120)	(0.092)	(0.150)	(0.140)	(0.160)
PARENTED	0.172***	0.112**	-0.059	0.240***	0.137*	-0.143*
	(0.059)	(0.055)	(0.044)	(0.075)	(0.073)	(0.082)
PROUD	0.167**	0.175**	0.008	0.171*	0.226***	0.020
	(0.067)	(0.069)	(0.049)	(0.087)	(0.087)	(0.090)
SCHOOLEN	-0.020	-0.035	-0.015	-0.004	-0.042	-0.031
	(0.094)	(0.093)	(0.079)	(0.120)	(0.110)	(0.130)
LONGTERM	-0.183	-0.426***	-0.242**	-0.231	-0.512***	-0.351
	(0.160)	(0.150)	(0.120)	(0.200)	(0.190)	(0.220)
HEALTHY	0.081	0.214***	0.133**	0.140	0.280***	0.246**
	(0.078)	(0.080)	(0.063)	(0.098)	(0.100)	(0.110)
VNPOORHS	-0.545***	-0.544***	0.001	-0.779***	-0.700***	-0.083
	(0.140)	(0.150)	(0.110)	(0.190)	(0.190)	(0.190)
WAI	3.118***	2.882***	-0.236	4.214***	3.678***	-0.631
	(0.580)	(0.580)	(0.380)	(0.760)	(0.780)	(0.680)
INCOME	0.006**	0.004	-0.002	0.008**	0.005	-0.004
	(0.003)	(0.003)	(0.002)	(0.004)	(0.004)	(0.003)
DEBT	-0.214**	0.033	0.247***	-0.255**	0.032	0.369***
	(0.098)	(0.100)	(0.072)	(0.120)	(0.130)	(0.130)
FEMALE	-0.072	0.038	0.110	-0.067	0.047	0.174
	(0.096)	(0.098)	(0.072)	(0.120)	(0.120)	(0.130)
HHSIZE	0.016	-0.052	-0.0681**	0.019	-0.084	-0.122*
	(0.046)	(0.050)	(0.031)	(0.059)	(0.061)	(0.065)
MINORITY	-0.161	-0.516***	-0.355***	-0.227	-0.606**	-0.611**
	(0.170)	(0.190)	(0.140)	(0.240)	(0.240)	(0.250)
SIB	-0.020	0.013	0.033	-0.010	0.047	0.041
	(0.051)	(0.058)	(0.039)	(0.067)	(0.071)	(0.071)
RELIGION	-0.314	-0.221	0.093	-0.472*	-0.303	0.0713
	(0.210)	(0.190)	(0.150)	(0.270)	(0.240)	(0.260)
RURAL	-0.530***	-0.351**	0.179	-0.736***	-0.486**	0.260
	(0.170)	(0.170)	(0.120)	(0.220)	(0.210)	(0.210)
NORTH	0.094	-0.072	-0.166	0.072	-0.142	-0.414*
	(0.150)	(0.160)	(0.120)	(0.020)	(0.190)	(0.220)
REDRIVER	0.557***	0.490***	-0.067	0.657***	0.624***	-0.159
	(0.170)	(0.160)	(0.120)	(0.220)	(0.210)	(0.210)
MEKONG	0.769***	0.661***	-0.108	0.843***	0.771***	-0.388*
	(0.170)	(0.170)	(0.130)	(0.220)	(0.220)	(0.220)
CONSTANT	2.459***	4.488***	2.029***			
	(0.530)	(0.520)	(0.390)			
Obser.	899	899	899			
R-Square	0.260	0.230	0.06			

Table 4.1: OLS and Ordered Probit regressions between education variables and subjective well-being (current and future levels and changes). Standard errors in parentheses. * indicates significance at the 5% level, ** indicates significance at the 1% level and *** indicates significance at the 0.1% level.

nitudes of the coefficients for the Ordered Probit model. The interpretation of the coefficients is in terms of the underlying latent variable model. The sign of the regression coefficients can be immediately interpreted as determining whether or not the latent variable Y_i^* increases with the regressor (Equation 4.2). Increasing one of the X_i's while holding the coefficient and the threshold parameters constant is equivalent to shifting the distribution of Y_i slightly to the right. The effect of the shift is unambiguously to shift some mass out of the leftmost cell. Assuming that the coefficient is positive for this X_i, $Prob(Y_i = 0|X)$ must decline. We are shifting some probability into the rightmost cell.

However, what happens to the middle cells is amibiguous because it depends on the two densities at the edge. Hence in the general case relative to the signs of the coefficients, only the signs of the changes in $Prob(Y_i = 0|X)$ and $Prob(Y_i = J|X)$ are unambiguous. The importance of interpreting the Ordered Probit coefficients correctly is often neglected and is highlighted in the literature. Without some extra calculation it would be unclear as to how the coefficients in the Ordered Probit model should be interpreted. Tables C.1 - C.3 in the Appendix present the computed marginal probabilities from the Ordered Probit model. For example, we can analyse the marginal effect of a dummy variable by comparing the probabilities that result when the variable takes its two different values (e.g. 0 and 1) while the other variables are held at their sample means.

Tables C.1 and C.2 in the Appendix present the marginal effects or probabilities for the children's current and future SWB from the Ordered Probit model. Graphical representations for variables EXTRA and WAI can be found in Figures 4.1, 4.2 and 4.3. Having extra tuition decreases the probability of a child reporting a low current ladder value. For example, the probability of a child reporting a ladder value of 3 or 4 is reduced by about 5 per cent compared to children without extra classes. Taking extra classes also means that the probability of reporting ladder values above 5 rises to about 10 per cent. Being in a grade lower than the average increases the probability of reporting poor current ladder values (from 1 to 4) and decreases the probability of the child reporting any values above 5. Feeling proud of one's school achievements also decreases the probability of lower ladder values. Having parents with higher levels of education encourages values above 5 and decreases probabilities of low values. It must be highlighted that having access to extra tuition, having parents with more education and feeling proud of one's school achievements all tend to increase the probability of obtaining a future ladder value of 7 and above.

Other household characteristics also play a significant part. Moving from the lowest to highest value in the wealth asset index (i.e. from 0 to 1) considerably reduces the chance of low ladder values. In addition, it also means that the probability of every outcome equal to and above 5 becomes substantial at about 10-30 per cent. Income works in the same way as wealth and assets, but the

effects are considerably smaller. Being on the poor household register significantly increases the chance of the child feeling pessimistic about their current and future lives. The probability of a child reporting a current ladder value of 2 to 4 becomes substantial and it also encourages low values of around 3 to 5 for the future. As expected, debts discourage high current SWB values in a similar way to being on the poverty register. Interestingly, living in the rural regions also lowers life satisfaction both for the present and future.

A child with long-term health concerns is again more likely to report low SWB values and this effect is more apparent for future SWB, where higher ladder values become very unlikely. A healthy child, on the contrary, is likely to report high current ladder values of around 5 to 7 and even higher values of around 7 to 9 for the future. The results for regions and minority ethnic groups once again appear to be important and this implies much regional variation and racial differences in Vietnam.

In summary, education variables matter substantially for children's SWB. In particular, extra classes and being in a grade lower than average affect a child's evaluation of their current life, while feeling satisfied and proud of one's academic achievements and having parents with higher levels of education have positive effects that carry into the future. Furthermore, as expected, the level of affluence of a household is the most central factor determining a child's SWB followed by extra classes. Other individual and household characteristics such as health and region are also important and should not be neglected, but the significance of extra classes and household wealth are far more remarkable in the case of Vietnam.

So far we have not controlled for potential endogeneity issues in our regressions. In the next section, we will attempt to control for these issues by using propensity score matching techniques.

4.2 Propensity Score Matching

In the previous section, we showed that children taking extra classes tend to have higher subjective evaluations of their current lives and futures, as indicated by results from OLS and Ordered Probit regressions. Alternatively, if taking extra classes is viewed as receiving a 'random treatment' and there are a proportion of children in the sample who received such treatment while others did not, the method of propensity score matching can be applied to evaluate the treatment effect based on the assumption that whether a child received the treatment or not is based fully on observed characteristics of both the treated and the control groups. The propensity score matching method was originally developed in the 1980s (Rosenbaum and Rubin 1983) and has its roots in a conceptual framework which dates back even further (Rubin 1974). The advantage of the propensity score

matching approach is that it does not impose additional assumptions about the functional form of the effect of the control variables on outcomes, which is in contrast to OLS or Ordered Probit regressions.

The non-parametric regression model for propensity score matching can be simplified in the following way:

$$Y_i = Y_{0i} + D_i(Y_{1i} - Y_{0i}) \tag{4.10}$$

The average effect of treatment on the treated group can be expressed as:

$$E(Y_1 - Y_0|D = 1) = E(Y_1|D = 1) - E(Y_0|D = 1) \tag{4.11}$$

Y_{1i}: The outcome of individual i when i is exposed to treatment.
Y_{0i}: The outcome of individual i when i is not exposed to treatment.
$D_i \in \{0, 1\}$: The indicator of the treatment received by individual i. D_i=1 when the child took extra class; D_i=0 otherwise.

Clearly, $E(Y_0|D = 1)$ is counterfactual, but if we assume the choice to be treated is absolutely random, it then follows that $E(Y_0|D = 1) = E(Y_0|D = 0)$. This is a very strong assumption and a weaker one is the Conditional Independence Assumption (CIA), which means that if one can control for observable differences in characteristics between the treated and non-treated groups, we have $Y_0 \perp D|X$. In line with this reasoning, it is hence necessary to select from the non-treated pool a control group in which the distribution of observed variables is as similar as possible to the distribution in the treated group.

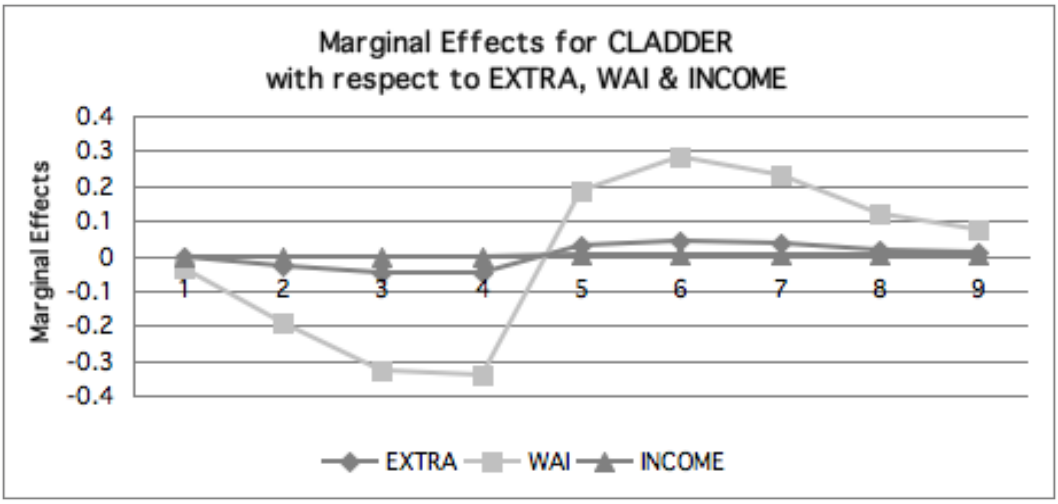

Figure 4.1: Marginal Effects for CLADDER

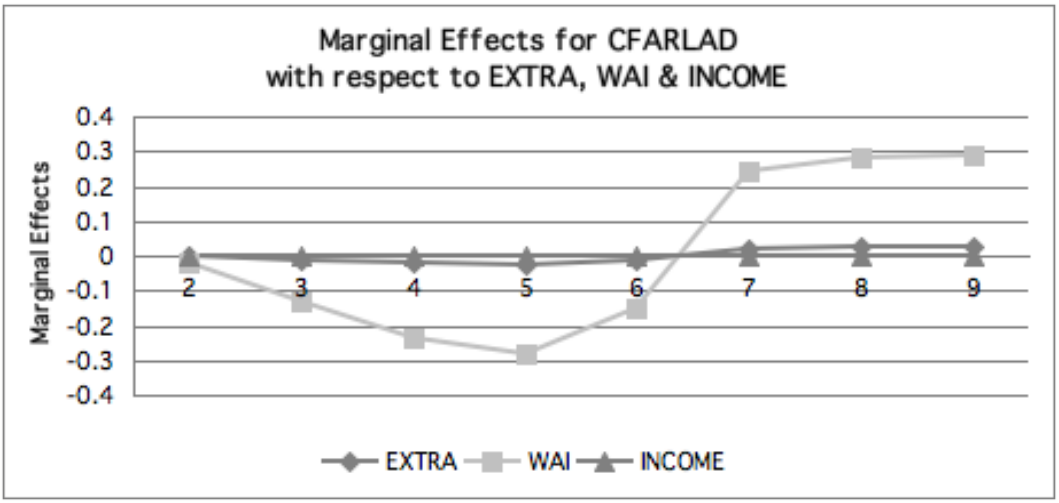

Figure 4.2: Marginal Effects for CFARLAD

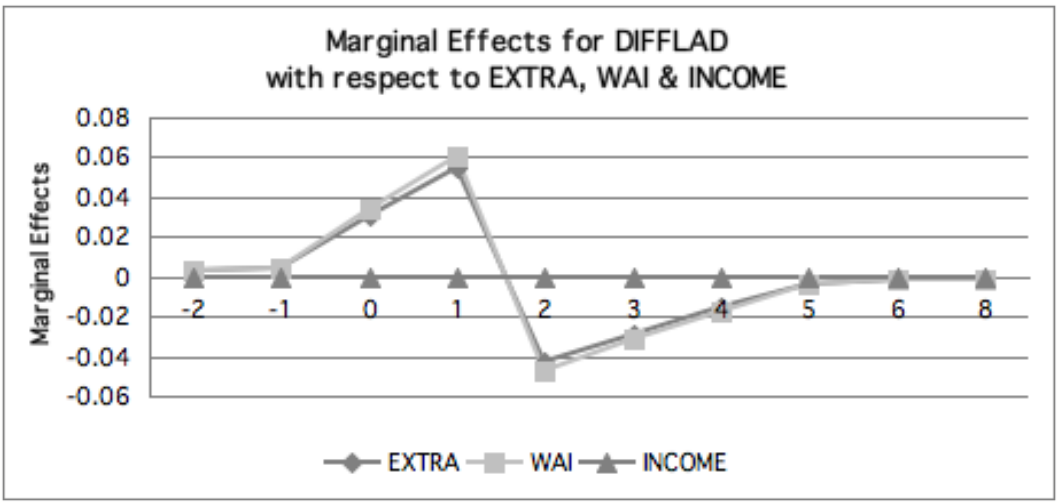

Figure 4.3: Marginal Effects for DIFFLAD

Of course, as the number of characteristics used in the matching procedure increases, the chances of finding a match is reduced. This obstacle was overcome by an important result (Rosenbaum and Rubin 1983) showing that matching on a single index reflecting the probability of participation could achieve consistent estimates of the treatment effect in the same way as matching on all covariates. This index is the propensity score and this variant of matching is termed 'propensity score matching'. In practice, either Probit or Logit regression is first used to calculate the propensity score, which is the probability of individual's being treated. If we define $p(x) = Pr\{D = 1|X = x\}$, the propensity score matching method assumes that $Y_0 \perp D|p(x)$, which is known as the Balancing Condition. Different matching methods can then be applied to estimate the average treatment effect, such as nearest-neighbour matching and Kernel matching.

In this section, we will report the results from propensity score matching. The first step is to

estimate the propensity score for both the treated and the control group. We can either choose the Logit or Probit model for estimation and the dependent variable is EXTRA. However, as Green (2008) points out, when the outcome variables are not binary, the Logit model is based on a stronger assumption than the Probit model, making the latter the preferred choice. Therefore, we will use a Probit model to estimate the propensity of taking extra classes.

As discussed earlier, propensity score matching assumes that whether a child took extra classes or not is based fully on his or her *observable* characteristics. Hence, we need to be cautious about the choice of variables used to estimate the probability of taking extra classes, as Heckman, Ichimira and Todd (1997) showed that omitting important variables can seriously increase bias in the resulting estimates. It has been suggested that the choice of variables to be included in the Probit estimation should be based on economic theory as well as existing empirical findings. Moreover, the implication of the Conditional Independence Assumption is that only variables that are unaffected by participation should be included in the estimation of the propensity score. Most importantly, we need to test the Balancing Condition to ensure that the distribution of covariates in the treated and control subjects is balanced. Only when this requirement is satisfied can we be confident about any estimated treatment effect as children can then be regarded as receiving the treatment of extra classes randomly. Using this criteria, we choose a set of variables as explanatory variables, shown in Table 4.2, to estimate the propensity of taking extra classes.

The estimated results from the Probit regression are presented in Table 4.2. The table shows that parents with higher education levels tend to be more likely to send their children for private tutoring. Children with lower self-reported school quality are also more likely to attend extra classes, which implies that inadequacies in the public education system indeed affect the demand for private tutoring in Vietnam. This is also reflected by the highly significant estimated coefficient on the dummy variable RURAL. It indicates that children in rural areas are much more likely to take extra classes, which again implies that the inadequacy of formal education may be a more serious obstacle in rural areas. Consistent with our expectations, children from wealthier families and with fewer siblings are more likely to attend extra classes. However, we did not find any effect of liquidity constraints or debt on a household's decision to purchase private tutoring.

Table 4.3 provides the description of the estimated propensity score. The whole sample is divided into five blocks to ensure that the mean propensity score in each block is the same for treated and control groups. Table 4.4 shows the number of observations in each of the five blocks for both the treated and control observations. The test for balancing conditions is passed so we can ensure that the distribution of all the covariates for the treated and control subjects is indeed balanced in each block.[1]

[1]The tests for the Balancing Condition are done by the command pscore in STATA.

Probit Regression for Propensity Score Matching					
Dependant Variable	EXTRA				
Independent Variable	Coef.	Std. Err.	z	P>z	95% Conf. Interval
GRADLOW	-.050	0.111	-0.450	0.652	-0.268 0.168
PARENTED	0.248***	0.058	4.260	0.000	0.134 0.362
SCHOOLEN	-0.171**	0.094	-1.810	0.070	-0.356 -0.014
LONGTERM	-0.031	0.160	-0.190	0.846	-0.346 0.283
HEALTHY	0.091	0.077	1.190	0.233	-0.059 0.242
VNPOORHS	-0.214	0.140	-1.530	0.127	-0.487 0.060
WAI	1.426***	0.517	2.760	0.006	0.413 2.439
INCOME	0.000	0.003	0.013	0.896	-0.005 0.006
DEBT	0.040	0.100	0.400	0.692	-0.156 0.235
FEMALE	0.192**	0.098	1.970	0.049	-0.006 0.378
HHSIZE	-0.040	0.053	-0.740	0.457	-0.144 0.065
SIB	-0.115**	0.055	-2.110	0.035	-0.223 -0.008
RELIGION	0.031	0.205	0.150	0.878	-0.371 0.434
NORTH	-0.552***	0.150	-3.690	0.000	-0.845 -0.259
REDRIVER	0.818***	0.155	5.280	0.000	0.514 1.121
MEKONG	-0.254*	0.150	-1.700	0.090	-0.549 0.040
RURAL	1.004***	0.160	6.280	0.000	0.690 1.317
Cons.	-0.758*	0.460	-1.650	0.099	-1.659 0.143
No. of Obs.	899				
Pseudo R2	0.269				

Table 4.2: Probit Regression for Propensity Score Matching. * indicates significance at the 5% level, ** indicates significance at the 1% level and *** indicates significance at the 0.1% level.

Description of the Estimated Propensity Score				
	Percentiles	Smallest		
1%	.0353798	.0040445		
5%	.0937722	.0121933		
10%	.1714528	.0165611	Obs	899
25%	.2666844	.0206214	Sum of Wgt.	899
50%	.5165133		Mean	.534121
		Largest	Std. Dev.	.2860702
75%	.8149149	.9846022		
90%	.9034962	.9853105	Variance	.0818362
95%	.9436915	.9902	Skewness	-.0474505
99%	.976846	.9908283	Kurtosis	1.579527

Table 4.3: Description of the estimated propensity score

After deciding on the appropriate set of variables for estimating the propensity score, we proceed to use different matching strategies to estimate the Average Effect of Treatment (ATT). It is sensible to start with nearest-neighbour (NN) matching and restrict the number of neighbours to one. In such one-to-one matching, the observation from the control group is chosen as a matching partner for a treated observation that is closest in terms of propensity score. We also imposed common support for the NN matching. By doing so, observations out of the common propen-

Test for Balancing Conditions			
Inferior of block	Participated in extra classes		
	No	Yes	Total
0	114	17	131
0.2	159	61	220
0.4	78	69	147
0.6	42	111	153
0.8	26	222	248
Total	419	480	899

Table 4.4: Test for Balancing Conditions

sity score range will be dropped so as to avoid matching observations with extremely different propensity scores. It is worthwhile noting that 21 observations in the treated group are dropped after imposing the common support and all these observations have the highest estimated probability of taking extra classes. The control group, on the other hand, is not affected. We also allow for matching with replacement so the same observation could be used for matching more than once.

Based on the estimated Probit regression, we calculated both the unmatched and matched mean values for CLADDER, CFARLAD and DIFFLAD for the treated and control groups, as presented in Table 4.5. ATT is positive and significant for CLADDER. This result confirms our previous findings from the OLS and Ordered Probit regressions that children taking extra classes feel more satisfied about their current life than those who do not. However, we have to bear in mind that we cannot eliminate the possibility that unobservable factors that were omitted from the set of matching variables may affect households' choice to provide extra classes for their children, and if so, the result could be biased. Therefore, caution is called for when interpreting this positive link between taking extra classes and subjective well-being as a causal relationship.

Nearest-Neighbour Matching: No. of Neighbours=1						
Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
CLADDER	Unmatched	5.221	4.315	0.906***	0.106	8.560
	ATT	5.211	4.789	0.423**	0.220	1.920
CFARLAD	Unmatched	6.673	5.945	0.728***	0.106	6.860
	ATT	6.658	6.381	0.277	0.221	1.250
DIFFLAD	Unmatched	1.452	1.630	-0.178***	0.073	-2.450
	ATT	1.447	1.592	-0.146	0.134	-1.09

Table 4.5: Nearest-Neighbour Matching: No. of Neighbours=1. * indicates significance at the 5% level, ** indicates significance at the 1% level and *** indicates significance at the 0.1% level.

To improve the quality of matching, the method of using more than one nearest neighbour has been suggested. Table 4.6 presents the estimated ATT by setting the number of nearest neighbours to one, two or three. Furthermore, the problem of poor matches could also be alleviated by

imposing a tolerance level on the maximum propensity score distance (caliper). Applying caliper matching means that those observations from the control group are chosen as a matching partner for a treated observation that lies within the caliper ('propensity range') and is closest in terms of propensity score. As Smith and Todd (2005) note, a possible drawback of caliper matching is that it is difficult to know *a priori* what tolerance level is reasonable. Moreover, if only a small number of matches could be performed, the variance of the estimates would subsequently increase. The second, third and fourth rows of Table 4.6 report the matching results with increased number of neighbours or imposing caliper with an arbitrarily chosen value of 0.01. It can be seen that the ATT for CLADDER is positive and significant no matter which restriction is imposed, indicating the robustness of the positive effect of extra schooling on children's subjective well-being. The ATT for CFARLAD becomes significant when the number of nearest neighbours for matching is increased to more than one and it is insignificant under caliper matching. Hence, the significance of the ATT for CFARLAD is more sensitive to changing the matching method, while the results for CLADDER are very robust to any of these changes.

The matching methods used so far have the common property that only a few observations from the control group are used to construct the counterfactual outcome of a certain treated observation. Kernel matching provides non-parametric matching estimators that use weighted averages of all observations in the control group to construct the counterfactual outcome. Thus, one major advantage of kernel matching is the lower variance achieved by using more information. When applying kernel matching, one has to choose a certain kernel function and the bandwidth parameter. Generally speaking, high bandwidth values would yield a smoother estimated density function, thus leading to a better fit and a lower variance between the estimated and the true underlying density function. On the other hand, underlying features may be smoothed away by a large bandwidth leading to a biased estimate. How to choose the optimal bandwidth is beyond the scope of this paper, but we have chosen two kinds of Kernel matching methods with the bandwidth 0.01 and reported the estimation results for comparison. As reported at the bottom of Table 4.6, we chose the Gaussian kernel function and the Epanechnikov function with bandwidth 0.01. It shows that the estimated ATT is positive and significant for both CLADDER and CFARLAD, which confirms our previous findings. As expected, the standard errors of the estimated ATT tend to be smaller with Kernel matching.

In summary, estimation results from various propensity score matching methods in this section show that the positive effect of extra schooling on Vietnamese children's subjective well-being, measured by their assessment of current life, remains significant and robust. However, the effect of extra schooling on children's perception of their life status in four years time is much more sensitive to the specification of the matching methods used.

Propensity Score Matching: Comparing Results from Different Matching Methods						
	CLADDER			CFARLAD		
Matching Method	Treated	Control	ATT.	Treated	Control	ATT
NN (neighbour=1,common)	5.211	4.789	0.423**	6.658	6.381	0.277
			(0.220)			(0.221)
NN (neighbour=2,common)	5.211	4.712	0.499***	6.658	6.253	0.405***
			(0.191)			(0.194)
NN (neighbour=3,common)	5.211	4.729	0.483***	6.658	6.251	0.407***
			(0.182)			(0.188)
NN (neighbour=1,cal=.01)	5.216	4.767	0.449***	6.669	6.638	0.301
			(0.220)			(0.222)
Epanechnikov (bandwidth=.01,common)	5.208	4.697	0.510***	6.653	6.276	0.377***
			(0.180)			(0.192)
Gausian (bandwidth=.01,common)	5.211	4.691	0.521***	6.658	6.260	0.398***
			(0.170)			(0.181)

Table 4.6: Propensity Score Matching: Comparing Results from Different Matching Methods. * indicates significance at the 5% level, ** indicates significance at the 1% level and *** indicates significance at the 0.1% level.

It is important to bear in mind that estimation results from propensity score matching are only valid if the selection into treatment is entirely based on observable characteristics. There may be unobservable factors which also affect children's subjective well-being which we are unable to control for. If the choice of taking extra classes were correlated with any of those omitted unobservable factors, the estimation results from propensity score matching would be biased. In this case, we can use instrumental variables for the dummy variable EXTRA. If we can successfully find instrumental variables that are uncorrelated with omitted unobservable factors and are informative about households' choice of taking extra classes, the IV regression can yield unbiased estimates. However, it is often extremely difficult to identify a suitable set of instruments (Blundell and Costa Dias, 2000; Heckman, 1995) and the IV approach for this paper is left for further research.

Chapter 5

Conclusion

The findings of this paper suggest that there is a strong relationship between taking extra classes and the subjective well-being of children in Vietnam. The OLS and the Ordered Probit estimations found strong evidence that children taking extra classes tend to feel more satisfied about their lives at present and are also more optimistic about their futures. There can be more than one explanation for this result. It is possible that children who attend extra classes find them useful in helping them perform better in school, as the quality of teaching may be higher than regular school classes due to smaller class sizes and longer teaching hours. Without extra tuition children would tend to receive only a little above half of the international normal annual teaching input. Children enrolled in extra classes are also likely to generate positive peer pressure on each other, which reinforces positive self identity and beliefs about oneself. Alternatively, children may feel happier if they believe their parents are purchasing private tutoring for them because they are cherished more highly. This positive link between private tutoring and children's subjective well-being is further supported by applying propensity score matching techniques to control for potential endogeneity of households' choice to purchase extra classes. The positive effect of extra classes on children's current subjective well-being is shown to be more robust than that in the long run.

Private tutoring is becoming increasingly popular in Vietnam and there have been much debate over its merits and costs. This paper investigates the relationship between taking extra classes and children's life satisfaction, which is a novel approach for understanding the possible impact of private tutoring in addition to conventional cost and benefit analysis. The positive link between taking extra classes and children's life satisfaction implies that there may be benefits in private tutoring that have not drawn much attention in previous studies.

In terms of policy implications, results from this paper indicate that access to private tutoring could influence children's current and long-term subjective well-being. Therefore, if the popularity

of private tutoring is due to the inadequacy of formal schooling, the government should improve both the quantity and quality of public schooling. Nevertheless, further research which better controls for endogeneity issues is necessary in order to establish a more convincing causal relationship between private tutoring and children's subjective well-being.

This paper also leads to several other interesting discoveries. We find that higher parental education levels and feeling proud of one's academic achievements both contribute to a higher subjective well-being score. Being in a grade lower than the child's peers has a short-term negative impact on a child's life satisfaction. Consistent with previous studies, we found that poverty and debts all contribute to significantly lowering a child's perception of life, but there is evidence that these effects are not persistent, in contrast to the negative effect of having fewer assets. Being less healthy, having a long-term illness or belonging to an ethnic minority also matter significantly but only in the long run. We also find significant regional variation in terms of subjective well-being for Vietnamese children. In particular, those in the rural areas tend to feel less satisfied with their lives.

Appendix A

Construction of Household Wealth Index

The Household Wealth Index is constructed by taking the average of the following six indices:

1. Housing quality: To construct this index, we first scaled the number of rooms per person for each household by 1.5. Any value greater than 1 is set to 1. Then, we added 1 to this scaled number if the household has any of the following characteristics: 1) the walls are made of brick or concrete; 2) the roof is made of asbestos-cement roofing sheets, asbestos sheets, concrete/cement, gal vanished iron or tiles/slates; 3) the floor is made of cement/tile, concrete/cement, granite stone, marble stone or polished stone. The total value is then divided by 4 to give the housing quality index. If any of the component variables are missing, the housing quality index will be missing as well.

2. Services: This index is based on whether or not the household has electricity, the source of drinking water, type of toilet facility and the most common type of fuel used for cooking. To calculate the variable, we add 1 if 1) the household has electricity; 2) drinking water is piped into the dwelling or the yard; 3) the household has their own toilet facility; 4) gas/electricity or paraffin is used for cooking. The resulting value is divided by 4 to give an index between 0 and 1. If any of the component variables are missing, then this variable will be set as missing as well.

3. Livestock: The categories of livestock include cow, calf, bullock, buffalo, horse/mule, goat, pig, poultry/bird and rabbit. Denote i for each category of livestock, P_i the relative price level of each category, and N_i the maximum number of each category a household held in the sample. For each household, first multiply the number of each category of livestock by P_i, and then divide it by N_i. Sum up this scaled number for each category for each household, and any summed value greater than 1 is set to be one. This gives the index of Livestock.

4. Own dwelling: This index will take value 1 if the house belongs to the household; otherwise it will take value 0.

5. Consumer durables: In the household survey, the respondents were asked whether they owned the following consumer durables: television, radio, car, motorbike/scooter, bicycle, landline telephone, mobile phone, refrigerator, electric oven, table and chair, sofa, fan and bedstead. To calculate this index, we add 1 for each asset the household owns and then divide the value by the total number of assets (13).

6. Productive assets: There are three productive assets that a household may own, namely, tractors, farm equipment and sewing machines. We add 1 for each productive asset the household owns and then divide the value by 3.

Appendix B

Raw Correlation Between Key Variables

	EXTRA	CLADDER	CFARLAD	DIFFLAD	GRADLOW	PARENTED	PROUD	SCHOOLEN	LONGTERM	HEALTHY	VNPOORHS	WAI	INCOME	DEBT	FEMALE	HHSIZE	SIB	RELIGION	MINORITY	RURAL
EXTRA	1.000																			
CLADDER	0.274	1.000																		
CFARLAD	0.223	0.778	1.000																	
DIFFLAD	-0.081	-0.347	0.320	1.000																
GRADLOW	-0.207	-0.203	-0.165	0.060	1.000															
PARENTED	0.361	0.290	0.254	-0.058	-0.265	1.000														
PROUD	0.067	0.065	0.080	0.021	-0.020	0.003	1.000													
SCHOOLEN	-0.021	-0.010	-0.006	0.006	-0.048	-0.011	-0.109	1.000												
LONGTERM	-0.007	-0.059	-0.111	-0.077	0.053	0.048	-0.016	-0.041	1.000											
HEALTHY	0.087	0.113	0.160	0.068	-0.089	0.061	0.027	0.023	-0.257	1.000										
VNPOORHS	-0.131	-0.260	-0.246	0.026	0.130	-0.205	0.052	0.043	0.055	-0.052	1.000									
WAI	0.297	0.280	0.241	-0.062	-0.272	0.295	-0.030	0.035	-0.038	0.132	-0.260	1.000								
INCOME	0.226	0.184	0.156	-0.043	-0.127	0.368	0.019	-0.024	0.063	0.075	-0.191	0.263	1.000							
DEBT	-0.046	-0.089	-0.020	0.105	-0.018	-0.061	0.088	0.045	0.084	-0.052	0.059	-0.024	-0.090	1.000						
FEMALE	0.058	0.007	0.042	0.052	0.001	-0.007	0.051	-0.021	0.015	0.087	0.012	0.067	0.027	0.083	1.000					
HHSIZE	-0.108	-0.074	-0.106	-0.045	0.038	-0.214	-0.016	-0.001	-0.005	0.024	0.025	0.103	0.086	0.061	0.073	1.000				
SIB	-0.219	-0.150	-0.149	0.004	0.108	-0.314	-0.003	0.002	0.003	-0.051	0.098	-0.001	-0.065	0.082	0.033	0.680	1.000			
RELIGION	-0.053	-0.027	-0.014	0.021	-0.056	-0.026	-0.074	0.030	-0.069	0.069	0.003	-0.062	-0.060	0.022	0.024	-0.041	0.036	1.000		
MINORITY	-0.287	-0.207	-0.252	-0.065	0.211	-0.430	-0.046	-0.066	-0.022	0.008	0.142	-0.023	-0.233	0.022	-0.006	0.254	0.297	0.026	1.000	
RURAL	0.324	-0.031	-0.025	0.011	-0.108	0.250	0.037	-0.045	0.064	0.006	0.008	0.248	0.366	-0.086	-0.015	0.068	-0.076	-0.241	-0.1534	1.000

Table B.1: Raw correlation between key variables

Appendix C

Marginal Effects for Ordered Probit Model

	Marginal Effects for CLADDER								
CLADDER	1	2	3	4	5	6	7	8	9
EXTRA+	-.0055919	-.0293252	-.0500639	-.0499584	.0286394	.0426975	.0344526	.0176718	.0114782
GRADLOW+	.003193	.0165571	.0277971	.0267169	-.0172287	-.0234831	-.0184601	-.009258	-.0058341
PARENTED	-.0020005	-.0108551	-.018967	-.0194131	.0105255	.0163276	.0132269	.0067799	.004376
PROUD	-.0017881	-.0097023	-.0169527	-.0173515	.0094077	.0145936	.0118222	.0060598	.0039113
SCHOOLEN	-.0002083	-.0011303	-.001975	-.0020215	.001096	.0017002	.0013773	.000706	.0004557
LONGTERM+	.0024681	.0126113	.0208555	.0194954	-.0135367	-.0174824	-.013538	-.0067081	-.0041649
HEALTHY	-.0008934	-.004848	-.0084708	-.00867	.0047008	.007292	.0059072	.0030279	.0019543
VNPOORHS+	.0095438	.0432793	.0646381	.0511148	-.0504601	-.0518191	-.0377419	-.0179102	-.0106446
WAI	-.0348582	-.1891456	-.330491	-.3382645	.1834023	.2845005	.2304715	.1181357	.0762493
INCOME	-6.29e-08	-3.42e-07	-5.97e-07	-6.11e-07	3.31e-07	5.14e-07	4.16e-07	2.13e-07	1.38e-07
DEBT+	.0022549	.0123618	.0218455	.0228329	-.011539	-.0189135	-.0155293	-.0080471	-.0052663
FEMALE+	.0007949	.0043096	.0075258	.0076977	-.00418	-.0064769	-.0052462	-.0026891	-.0017358
HHSIZE	-.0002316	-.0012568	-.0021959	-.0022476	.0012186	.0018903	.0015313	.0007849	.0005066
MINORITY+	.0021261	.0109461	.0182252	.0172292	-.0116345	-.0153273	-.0119303	-.0059342	-.0037002
SIB	.0002623	.0014234	.002487	.0025455	-.0013802	-.0021409	-.0017344	-.000889	-.0005738
RELIGION+	.002526	.0149212	.0282956	.033104	-.010663	-.0252974	-.0222671	-.0121552	-.0084641
RURAL+	.0074683	.0354376	.0550876	.0467211	-.0401114	-.0449435	-.0335789	-.0162361	-.0098447
NORTH+	-.0010228	-.0056695	-.0101094	-.0107001	.0052054	.0087882	.0072562	.0037738	.0024781
REDRIVER+	-.0045177	-.0268972	-.0517547	-.062537	.0163048	.0465001	.042211	.0236394	.0170513
MEKONG+	-.005728	-.0346877	-.0683596	-.0865961	.0150606	.0617841	.0586737	.0340612	.0257918

Table C.1: Ordered Probit Marginal Effects when CLADDER takes values 1, 2, 3, 4, 5, 6, 7, 8 and 9. The probabilities are computed for each variable at each outcome by holding the other variables at their sample means. Symbol (+) indicates marginal effect for discrete change of dummy variable from 0 to 1.

	Marginal Effects for CFARLAD							
CFARLAD	2	3	4	5	6	7	8	9
EXTRA+	-.0015751	-.0122965	-.0215835	-.0252205	-.0132662	.0220248	.0258067	.0261104
GRADLOW+	.0005972	.0046536	.0081402	.0094577	.0048718	-.0083884	-.0096689	-.0096632
PARENTED	-.0006411	-.0050741	-.0089891	-.0105915	-.0056793	.0091385	.0108344	.0110021
PROUD	-.0010854	-.0085908	-.0152193	-.0179323	-.0096155	.0154722	.0183435	.0186275
SCHOOLEN	-.0002134	-.0016894	-.0029928	-.0035264	-.0018909	.0030426	.0036072	.0036631
LONGTERM+	.0033978	.0234091	.0370957	.0386387	.0137022	-.0411711	-.0395495	-.0355228
HEALTHY	-.0013015	-.0103012	-.0182493	-.0215024	-.0115299	.0185526	.0219956	.0223361
VNPOORHS+	.0045327	.0305339	.0476399	.0488874	.0164189	-.0530562	-.0501627	-.0447938
WAI	-.0168704	-.1335289	-.236556	-.2787252	-.149456	.2404881	.2851174	.2895311
INCOME	-2.38e-08	-1.88e-07	-3.33e-07	-3.93e-07	-2.11e-07	3.39e-07	4.02e-07	4.08e-07
DEBT+	-.0001027	-.0008119	-.0014368	-.001691	-.0009038	.0014624	.0017297	.0017541
FEMALE+	-.000281	-.0022244	-.0039409	-.0046441	-.0024916	.0040051	.0047507	.0048261
HHSIZE	.0002998	.0023728	.0042035	.0049529	.0026558	-.0042734	-.0050665	-.0051449
MINORITY+	.0043085	.0287929	.044558	.0452181	.014353	-.0500178	-.0463904	-.0408223
SIB	-.000084	-.000665	-.0011782	-.0013882	-.0007444	.0011978	.00142	.001442
RELIGION+	.0010892	.009227	.017323	.0218005	.0139403	-.0161303	-.0224003	-.0248494
RURAL+	.00266	.0191922	.0315906	.0343631	.0144046	-.0341526	-.0351299	-.0329279
NORTH+	.0003989	.003109	.0054381	.0063168	.0032505	-.0056071	-.0064575	-.0064488
REDRIVER+	-.0023537	-.0204034	-.0393224	-.0512529	-.0360192	.0336258	.0528146	.0629111
MEKONG+	-.002861	-.025122	-.0491974	-.065572	-.0488476	.0391562	.067629	.0848147

Table C.2: Ordered Probit Marginal Effects when CFARLAD takes values 2, 3, 4, 5, 6, 7 and 9. The probabilities are computed for each variable at each outcome by holding the other variables at their sample means. Symbol (+) indicates marginal effect for discrete change of dummy variable from 0 to 1

	Marginal Effects for DIFFLAD									
DIFFLAD	-2	-1	0	1	2	3	4	5	6	8
EXTRA+	.0032624	.0043445	.0307637	.0553243	-.0422881	-.0288183	-.0157615	-.0038661	-.0017426	-.0012183
GRADLOW+	-.0017848	-.0024157	-.0174638	-.0329136	.0241391	.016948	.0093819	.00232	.0010504	.0007385
PARENTED	.0008774	.0011707	.0082863	.0147031	-.0114451	-.0076712	-.0041503	-.001008	-.0004511	-.0003118
PROUD	-.000052	-.0000694	-.0004914	-.0008719	.0006787	.0004549	.0002461	.0000598	.0000268	.0000185
SCHOOLEN	-.000159	-.0002122	-.0015021	-.0026654	.0020748	.0013906	.0007524	.0001827	.0000818	.0000565
LONGTERM+	.0039981	.0050203	.0327403	.0466864	-.0441742	-.0258858	-.0131406	-.0030432	-.001323	-.0008784
HEALTHY	-.0019512	-.0026036	-.0184283	-.032699	.0254534	.0170602	.0092301	.0022417	.0010033	.0006935
VNPOORHS+	.0004171	.0005532	.0038824	.0067345	-.0053547	-.0035328	-.001897	-.0004581	-.0002043	-.0001405
WAI	.0036003	.0048041	.0340031	.0603348	-.0469655	-.0314789	-.0170309	-.0041362	-.0018512	-.0012795
INCOME	2.93e-08	3.91e-08	2.77e-07	4.91e-07	-3.82e-07	-2.56e-07	-1.39e-07	-3.36e-08	-1.51e-08	-1.04e-08
DEBT+	-.0034127	-.0044655	-.0308445	-.0518208	.0422448	.0274417	.0146648	.0035336	.001575	.0010835
FEMALE+	-.0015058	-.0020072	-.0141956	-.0252	.0195854	.0131506	.0071253	.001733	.0007765	.0005377
HHSIZE	.001029	.0013731	.0097187	.0172447	-.0134235	-.0089972	-.0048677	-.0011822	-.0005291	-.0003657
MINORITY+	.0067123	.0081383	.0507566	.0641579	-.0672178	-.0371064	-.018323	-.0041604	-.001788	-.0011695
SIB	-.00048	-.0006404	-.0045329	-.0080432	.0062609	.0041964	.0022704	.0005514	.0002468	.0001706
RELIGION+	-.0010038	-.0013148	-.0090693	-.0150157	.0124623	.0079697	.0042159	.0010065	.0004457	.0003035
RURAL+	-.00188	-.0025685	-.0188227	-.0367831	.0260264	.0187968	.0105446	.0026342	.0012004	.0008519
NORTH+	.0034861	.0044466	.0296242	.0448793	-.0402468	-.0244334	-.0126225	-.0029625	-.0012987	-.0008723
REDRIVER+	.0015503	.0020266	.0139448	.0229633	-.0191431	-.0122072	-.0064506	-.0015391	-.0006813	-.0004637
MEKONG+	.0030443	.0039062	.0262261	.0405342	-.0357259	-.0219363	-.0113916	-.0026837	-.0011791	-.0007943

Table C.3: Ordered Probit Marginal Effects when DIFFLAD takes values -2, -1, 0, 1, 2, 3, 4, 5, 6 and 8. The probabilities are computed for each variable at each outcome by holding the other variables at their sample means. Symbol (+) indicates marginal effect for discrete change of dummy variable from 0 to 1

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Save the Children UK (staff from the Rights and Economic Justice team in London as well as staff in India, Ethiopia and Vietnam).

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