

**CAN VIETNAM ACHIEVE ONE OF ITS
MILLENNIUM DEVELOPMENT GOALS?**

An analysis of schooling dropouts of children

Vo Tri Thanh, Central Institute for Economic Management

Trinh Quang Long, Central Institute for Economic Management

Working Paper Series Vol. 2004-12

July 2004

The views expressed in this publication are those of the author(s) and do not necessarily reflect those of the Institute.

No part of this book may be used reproduced in any manner whatsoever without written permission except in the case of brief quotations embodied in articles and reviews. For information, please write to the Centre.

**CAN VIETNAM ACHIEVE
ONE OF ITS MILLENNIUM DEVELOPMENT GOALS?
An analysis of schooling dropouts of children¹**

Vo Tri Thanh

Central Institute for Economic Management
(CIEM), Hanoi, Vietnam

Email: Votrithanh@ciem.org.vn

Trinh Quang Long

Central Institute for Economic Management
(CIEM), Hanoi, Vietnam

Email: long@ciem.org.vn

¹ Funding from the International Centre for the Study of East Asian Development (ICSEAD) is gratefully acknowledged. Without the ICSEAD's support, this study could not be completed. The opinions expressed in this study are the responsibility of the authors and not of their organization, the Central Institute for Economic Management (CIEM).

Abstract

The objectives of this study are to identify the underlying determinants of the schooling dropout in Vietnam and to project its trend in the future up to 2015. Our examination is largely based on the three Vietnam's Living Standard Surveys conducted in 1992/93, 1997/98 and 2001/02 and the conventional framework of educational investment at the household level.

The major determinants of the schooling dropout choice by households are found to be variables of child's characteristics (such as age, working time, primary education, and number of siblings) and household economic situation (such as parental education, household's per capita expenditure, and cost of schooling). In general, the effects of these determinants on the schooling dropout probability are statistically significant. In particular, the schooling dropout probability has been very sensitive to the changes in the household's per capita expenditure and the direct costs of schooling, whereas recently the other determinants have had only minor impacts. In terms of schooling, girls have benefited more than boys did from their household's per capita expenditure increase, while they have suffered more than boys did from an increase in the direct cost of schooling. These differences, however, recently have narrowed substantially. The dropout situation is also regional specific and hence, a comprehensive approach is needed to deal with it. Moreover, at present the low quality of education is serious problem. Together with the parents' incorrect perception of and the community's attitude to education values, this may increase the possibility of children's schooling dropout. The dropout situation is also very much dependent on the public funding for education, which is still not effective in reducing the household current excessive financial burden and still biased against the poor regions.

The projection outcomes of the schooling dropout probability of children in the future up to 2015 is very much depending on the assumptions of the changes in the household's per capita expenditure and the cost of schooling. When the growth rate of the cost of schooling is much higher (for example, by 1.2 percentage points) than that of the household's per capita expenditure, the dropout rate would first decrease and increase again after 2010. The tentative assessments suggest that in these cases, there is a chance for Vietnam to achieve the national targets of the primary and lower secondary net enrolment rates in 2010. However, Vietnam could very hardly to achieve the MDG on the universal completion of primary education in 2015 and moreover, the achievements recorded by 2010 would be deteriorated. Regarding the scenarios, where the pace of changes in the cost of schooling is lower than that of the household's per capita expenditure, the projections seem to provide a rather bright picture in terms of achieving the national education targets in 2010 and the MDG on education in 2015. The projections also show that there is a reason to be more optimistic about the elimination of the gender gap in education by 2010.

TABLE OF CONTENTS

1. INTRODUCTION.....	4
2. AN ANALYTICAL FRAMEWORK AND INTERNATIONAL EMPIRICAL EVIDENCES....	6
2.1. A theoretical model of educational investment.....	6
2.2. Model implications	8
2.3. International empirical evidences	12
3. EDUCATIONAL CHANGES AND SCHOOLING DROPOUT SITUATION IN VIETNAM.	14
3.1. An overview of Vietnam’s economic reform, performance and educational changes	14
3.2. Schooling trends and dropout situation.....	19
3.3. Causes of schooling dropout – a qualitative analysis	25
4. EMPIRICAL EVIDENCE	31
4.1. Model specification, data and variables choice	31
4.2. Estimation results.....	35
4.3. Dropout probability projection	37
5. CONCLUSION	41
References.....	44
Appendix 1: Vietnam Living Standard Surveys	46
Appendix 2: Mean, Standard deviation, Minimum and maximum of some variables	47
Appendix 3: Marginal effects of determinants of the schooling dropout probability.....	48

1. INTRODUCTION

For a long time, education has been considered a mean for and a goal of development. Given the importance of education as well as Vietnamese people's tradition of the fondness for learning, since the first day of the independence in 1945 the Government of Vietnam (GOV) has paid a great attention on education, especially on the elimination of illiteracy in the country. In September 2000, by ratifying the Millennium Declaration together with 188 other nations, the GOV committed itself to achieving the Millennium Development Goals (MDGs), including the universal completion of primary education by 2015 and the elimination of the gender disparity in primary and secondary education by 2005 and to all levels of education no later than 2015. To adapt the MDGs to fit local circumstances, the GOV also set several concrete goals of educational development in its Comprehensive Poverty Reduction and Growth Strategy (CPRGS). For example, the goal of the net enrolment in primary school is set to increased to 97% by 2005 and to 99% by 2010; the goal of the net enrolment rate in lower secondary school is set to increased to 80% by 2005 and to 90% by 2010; and the gender gap in primary and secondary education and the gap with ethnic minorities will be eliminated by 2005 and by 2010 respectively (UNVN 2003)².

Vietnam has recorded great achievements in education. In 1945, more than 95% of the adult population was illiterate. According to the data from the Vietnam Living Standard Survey 2001/02 (VLSS 2001/02), the general adult literacy rate was about 91% and over 94% woman below 40 years of age were literate. Vietnam has also developed a comprehensive education and training system including primary education, secondary education, college and university education, postgraduate education and vocational training. In comparison with other countries at the same level of GDP per capita, Vietnam has a much higher literacy index. In 2001, Vietnam's Human Development Index (HDI)³ ranked at 109 among 175 countries, whereas its GDP per capita (in terms of USD PPP) ranked at 130 (UNDP 2003).

The Renovation (*Doi moi*) in 1986 and especially the market-oriented reform in 1989 marked a turning point in the history of Vietnam's economic development. Under the reforms, the education sector has experienced dramatic changes. On the one hand,

² In 2001, the levels of the net enrolment rates in primary and lower secondary schools were 92% and 67% respectively. The ratios girls to boys in primary and lower secondary education were 99% in 2001 and 93% in 1998 respectively. Note that the GOV has set both the development goals directly and not directly based on the MDGs (such as reducing vulnerability, improving governance for poverty reduction, reducing ethnic inequality, and ensuring pro-poor infrastructure development) (UNVN 2003).

³ According to the UNDP (various issues), the HDI is based on three basic indicators: longevity (measured by life expectancy at birth); educational attainment (measured by a combination of adult literacy and the combined gross primary, secondary and tertiary enrollment ratio); and standard of living (measured by real GDP per capita adjusted according to purchasing power parity). The higher the HDI of a country is, the better its human development is evaluated.

opportunities for being educated are open for everyone. Many educational institutions have been established nationwide and the education system has become more diversified and democratized (Nguyen Thi Minh Tam *et al* 1998). More and more children have enjoyed a greater access to higher quality education. On the other hand, a series of issues has emerged as a result of the change in the education system. As warning in the National Human Development Report 2001 (NCSSH 2001), Vietnam has to deal with “a number of major challenges” to education system, including school attendance, completion rates and general education quality. In order to achieve the educational development goals, it is very important to further integrate ethnic minorities and children from vulnerable families into the formal education cycle and to improve completion rates (UNVN 2003). In other words, it is require not only to get all the children into school but also to keep them in schools.

There were some studies attempting to discover determinants of schooling dropout in Vietnam⁴. These studies, however, suffer either from old data collected only up to 1998 or from lack of variables, which may be influenced by policy arrangements such as skews of government expenditure for education sector. A prompt and comprehensive analysis exploring how factors at the micro level (household level), at the meso level (community level) and at the macro level (economic policies, especially public spending) interactively affect the decisions of household to withdraw their children out from school system), increasingly emerges as a necessary requirement for government policies to be adjusted in order to achieve its goals.

The major objectives of this study are to fill the current gaps in understanding the dropout trend in Vietnam since the early 1990s and its determinants and to stimulate the dropout trends in Vietnam in the future up to 2015. Then the study can give some backgrounds for the evaluation of the possibility of achieving Vietnam’s educational development goals and for the suggestion of some relevant policy implications.

The analysis of the determinants of dropout is based on a conceptual framework containing elements of the conventional theories of educational investment at the household level. The econometric techniques of the probit models are applied for estimating the magnitudes and significances of the determinants of schooling dropout at three *different* time points, namely 1993, 1998 and 2002. The sources of data for estimations are from the Vietnam Living Standard Surveys (VLSS) conducted in 1992/93, 1997/98 and 2001/02. The same kind of probit model can also be estimated for the pooling data from three VLSSs and then, it can be used for the stimulation purpose.

The remainder of the study is structured as follows. Section 2 lays out an analytical framework for analyzing how the household makes decisions regarding their children's education. Section 3 reviews the schooling trends and the dropout situation in Vietnam during the period 1993-2002. In this section we also attempt to highlight the causes of schooling dropout through some stylized facts and observations. Section 4 presents the estimations of the probit models to reveal the factors determining the choice of children’s

⁴ See, for example, Vo Thanh Son *et al.* (2002) and Nguyen Thi Minh Tam *et al* (1998)

dropout. In addition, this section also projects the children's dropout rates in the future up to 2015 based on several scenarios. Section 5 concludes the study with a brief summary of our key findings and some policy implications.

2. AN ANALYTICAL FRAMEWORK AND INTERNATIONAL EMPIRICAL EVIDENCES

Education is widely regarded as both consumption good and an investment good. Parents educate their children because they enjoy having literate and well-educated children. Parents also invest in their children to ensure that their offspring will support them later in life. In this section, a standard model of parental and household decision-making regarding children's education is studied. The model basically follows one studied by Glick and Sahn (2000). This section also highlights some international empirical works supporting for the key conclusions from the model.

2.1. A theoretical model of educational investment

In this model, parents are viewed as the principle while their children are viewed as agents. Parents determine the educational level of their children. Also, *households are viewed as "unitary" households*, i.e. preferences of parents are identical or if their preferences are not the same, the household is assumed to act as if they were maximizing a single utility function.

Consider a household consisting of a father, a mother, and N children, among them m children are daughters and n children are sons (m+n=N). Parents are considered to live in two periods. In the first period, they work and raise their children. They will retire in the second period. In the first period, household consumption is total income after subtracting a proportion to invest in their children's schooling. Consumption in the second period depends on the remittances of their children's income, which in turn partly depends on the children's level of education obtained in the first period. In their schooling decisions, parents must trade off their current consumption (reflected by investment in children's schooling) against their future consumption and their children's wealth. The identical preference of parents is formally represented by a utility function as follow:

$$U=U(C_1, C_2, Y_{d1}, \dots, Y_{dm}, Y_{s1}, \dots, Y_{sn}) \quad (2.1)$$

in which, C_1, C_2 denote household (parental) consumption in the first and second period respectively; Y_{di} with $i=1, \dots, m$ and Y_{sj} with $j=1, \dots, n$ correspondingly denote the incomes generated by the i^{th} daughter and j^{th} son in second period.

This model can be specified in more detail as follows:

$$U = F(C_1) + G(C_2, Y_{d,1}, \dots, Y_{d,m}, Y_{s,1}, \dots, Y_{s,n}) \quad (2.2)$$

If the parents do not explicitly prefer one gender-specific child to the others, then for any k^{th} and l^{th} children $\partial G / \partial Y_k = \partial G / \partial Y_l$ and $\partial^2 G / \partial Y_k \partial Y_k = \partial^2 G / \partial Y_l \partial Y_l$ when $Y_k = Y_l$.

It is further assumed that the amount of children's income remitted to parents is proportional to each child's income. Children's income in the second period in turn depends on the level of schooling attained in the first period as well as child-specific variables Z such as sex, birth rank, etc. As parents' consumption in the second period depends on the transfers from their children's income, we can have a formal second period parental consumption:

$$C_2 = \sum_{i=1}^m \beta_i Y_{di} + \sum_{j=1}^n \gamma_j Y_{sj} \quad (2.3)$$

where β_i is the rate of transfer per unit wealth from the i^{th} daughter and γ_j is the rate of transfer per unit wealth from the j^{th} son.

Children's income depends on their level of schooling attained as well as their specific characteristics and hence, it can be formally presented as below:

$$Y_{di} = b_i S_{di} \quad \text{and} \quad Y_{sj} = g_j S_{sj} \quad (2.4)$$

in which $S_{d,i}$ with $i = 1 \dots m$ and $S_{s,j}$ with $j = 1 \dots n$ are the education of the i^{th} daughter and j^{th} son; b and g are the respective monetary returns to investment in human. The monetary returns to schooling investment also reflect gender of the child.

It is also assumed that in the first period, parents spend their total available time in the labor market while the time of children is divided between work and schooling. We have the household's full income constraint as below:

$$V + T_m w_m + T_f w_f + \sum_{i=1}^m (T_{di} - S_{di}) w_d^* + \sum_{j=1}^n (T_{sj} - S_{sj}) w_s^* = C_1 + \sum_{i=1}^m P S_{d_i} + \sum_{j=1}^n P S_{s_j} \quad (2.5)$$

The left-hand side of Equation (2.5) represents the total income of household in the first period, while the household's expenditure is on the right hand side. V denotes unearned income. T_m , T_f are total time that mother and father, respectively, work in the labour market. T_{di} , T_{sj} are the time that the i^{th} daughter and j^{th} son have, thus $(T_{sj} - S_{sj})$ and $(T_{di} - S_{di})$ are the time that the i^{th} daughter and j^{th} son devote to income generating activities. w_m , w_f , w_s^* , w_d^* are their wage rate respectively. P is the direct cost of education, which includes tuition fees, books, uniforms, etc. We assume that the cost of education is assumed to be identical for all grades and for both sexes.

Equation (2.5) shows that the cost of education consists of two components: the first ($P S_{d_i}$ for i^{th} daughter or $P S_{s_j}$ for the j^{th} son) is the direct cost and the second is the indirect cost that children have foregone when attending school.

Parents choose S_{di} and S_{si} to maximize their utility subject to the full income constraint and the constraints relating earnings to schooling and parental consumption to child earnings. By substituting Equations (2.3), (2.4), (2.5) into Equation (2.2), the following maximization problem is derived:

$$\begin{aligned} \max_{S_{d,i}, S_{d,j}} U = & F \{V + T_m w_m + T_f w_f + \sum_{i=1}^m [T_{di} w_d^* - (P + w_d^*) S_{d,i}] + \sum_{j=1}^n [T_{sj} w_s - (P + w_s^*) S_{s,j}]\} \\ & + G \{(\sum_{i=1}^m \beta_i b_i S_{di} + \sum_{j=1}^n \gamma_j g_j S_{sj}), b_1 S_{d1}, b_2 S_{d2}, \dots, b_m S_{dm}, g_1 S_{s1}, g_2 S_{s2}, \dots, g_n S_{sn}\} \end{aligned} \quad (2.6)$$

Solving this maximization problem results in a reduced-form equation that shows the demand for quantity of daughters' and sons' schooling as following:

$$S_{di} = S_{di}(w_m, w_f, V, P, S_m, S_f, Z_{di}, Z_{sj}, H) \text{ and}$$

$$S_{sj} = S_{sj}(w_m, w_f, V, P, S_m, S_f, Z_{di}, Z_{si}, H) \quad (2.7)$$

These equations are functions of the price of education, wage rates of parents, child-specific characteristics of all children (Z_{di} and Z_{sj} with $i = 1 \dots m, j = 1 \dots n$), unearned income, parents' education and other household (and community) factors (H).

2.2. Model implications

The maximization problem can be used for deeper examination of how "unitary" parents invest in their children's education. If an interior solution is assumed ($S_{d,i}$ and $S_{s,j} > 0$ with $i = 1 \dots m$ and $j = 1 \dots n$), the first order conditions (FOC) could be derived. For each daughter i , the first order condition is

$$\frac{\partial F}{\partial C_1} (P + w_d^*) = \frac{\partial G}{\partial C_2} b_i \beta_i + \frac{\partial G}{\partial Y_{d,i}} b_i \quad (2.8)$$

For each son j , the first order condition is:

$$\frac{\partial F}{\partial C_1} (P + w_s^*) = \frac{\partial G}{\partial C_2} g_j \gamma_j + \frac{\partial G}{\partial Y_{s,j}} g_j \quad (2.9)$$

Thus, parents invest in their children's education to the point that the marginal cost in terms of consumption in the first period equals the future marginal benefit. These marginal benefits are equal to the marginal utility of second period consumption multiplied by the remittance rate per unit of education (reflected in the children's wealth) plus the utility the parents derive from a marginal increase in the children's wealth, hence children's education.

Turning to the implication of the model for the resource allocation between children, in general, and between genders, in particular. If the market returns to the one child are higher than those to the other children, parents will invest more in that child's education since the utility of parents will increase due to increase in their consumption in the second period and due to higher total wealth of all their children. A similar conclusion could be derived when the rate of remittance of any child is larger than the others, or if parents are more concerned with any child's wealth than with other children's wealth.

If the wage rate of daughters and sons are equal, children's sexes do not matter in analysis. For children k^{th} and l^{th} , the parents will invest in their education to equalize their marginal benefit, i.e.

$$\frac{\partial G}{\partial C_2} \alpha_k k + \frac{\partial G}{\partial Y_k} k = \frac{\partial G}{\partial C_2} \delta_l l + \frac{\partial G}{\partial Y_l} l \quad (2.10)$$

where α_k, δ_l denote the rates of remittances, while k and l represent the monetary returns to investment in education of the k^{th} and l^{th} children respectively.

If $k > l$, the left hand side of Equation (2.10) is greater than the right hand side when evaluating at the same level of education. Since the marginal benefits to education are a decreasing function of education, Equation (2.10) is only satisfied at a point where $S_k > S_l$. When $\alpha_k > \delta_l$ or when $\partial G / \partial Y_k > \partial G / \partial Y_l$, the marginal benefits from the k^{th} child's education is higher than the marginal benefit from the l^{th} child's education, given that the educational levels of these two children are equal. By a similar argument, investment in the k^{th} child's education is higher than investment in the l^{th} child.

Some assumptions are made before studying the effects of changes in family factors. Firstly, it is assumed that there are two children, the l^{th} child and the k^{th} child. These children are either girls, or boys or a boy and a girl. Secondly, the monetary returns to education of the l^{th} child are higher than that to education of the k^{th} child, i.e. $l > k$.

Price elasticity will be investigated first. Given that the wage rates for the l^{th} child and k^{th} child are unchanged and equal, an increase in the direct costs of education will raise the marginal cost of education investment - that is, the left hand side of the FOC equations for these two children. In this case, the assumption of $l > k$ implies that the change in S_k that restores the equilibrium condition in the FOC equation for child k for each level of S_l is larger than the change in S_l that satisfies the l^{th} child's FOC equation for each level of S_k . That is the demand for education of the child with lower monetary returns to education is more price elastic than that of the child with higher monetary returns. Alternatively stated, when $l > k$, the marginal benefit from the education of child l decreases faster with S than does that from the k^{th} child's education. Hence the adjustment necessary to restore equilibrium is less with child l than child k . Thus, when the price of education increases, the child with lower monetary returns will suffer from larger reduction in educational investment than the child with higher monetary returns. Similarly, in the case that the rate of remittance in the second period of child l is higher than that of child k , the demand for education of child l is less price elasticity than that of child k .

In the case that the current wage rate of child k increase while that of child l and direct cost of education are unchanged and l is still higher than k (in addition, keep in mind that wage rates of these two children are assumed to be identical). The marginal cost of education of child k is now higher than that of child l . In this case, changes in S_k is required to restore the equilibrium condition of the FOC equation for child k while the equilibrium condition of the FOC equation for child l is in comparison with demand for education of that child before increase in current wage rate .

Things become more difficult when (1) the current wage rate of child l increase and that of child k is unchanged, or (2) current wage rates of both children increase but that of child l is higher than that of child k. If the monetary returns to education of child k is still lower than that to education of child l, the demand elasticity with respect to changes in current wage rates will depend partly on how large the differences between the monetary returns to education of child l and child k and partly on how different between the remittance rates of child l and child k. If these differences are large enough to offset the effects of changes in current wage rate, there will be not affect the demand for educational of both children.

Similarly, an increase in the income affects the first order conditions through the marginal cost of educational investment, i.e. the left-hand side of the FOC equations. This increase reduces the marginal utility of current consumption and therefore lowers the marginal cost. This fall in marginal cost is similar to a reduction in direct cost of education. Therefore, a rise in income leads to a greater increase in the investment in education for children who have lower monetary returns to education. Alternative stated, the demand for education of children with lower monetary returns to education is more income elastic that that of children who have higher monetary returns.

This model also implies that the price elasticity of demand falls with income and that a price elasticity of children with lower monetary returns to education falls faster with income than that of children with higher monetary returns to education. An increase in income lowers the marginal utility of current consumption and therefore, the marginal cost of human capital. This result implies that a rise in prices represents a larger increase in marginal cost at lower levels of income than at higher levels of income. Hence, increased prices will generate larger reductions in educational investment among families with lower incomes than among families with higher incomes.

Given production techniques in rural areas, gender of children will partly influence the opportunity costs of children, which, in turn, affect the probability to continue their schooling paths. In developing countries, it is potential that the opportunity cost of educating girls is higher than that of boys. Girls are typically demanded to perform more housework than boys, reflecting cultural or social attitudes toward the proper economic role of women and girls. Given these attitudes, the marginal cost of girls' time will be higher than boys', and consequently their demand for education will be lower as we have analyzed above. However, in some cases, the demand for boys' time is higher than that for girls'. In fact, the demand for gender-specific children's time depends on the production technique of household, which is assumed to be exogenous in this analysis.

For the same reasons, it would be expected that certain changes in household structure will affects daughters' schooling more strongly than sons'. An increase (assumed exogenous) in the number of very young children will raise the demand for the labour of girls in childcare in the home. In other words, under this circumstance, the opportunity cost of girls' education is higher than that of boys. Thus, their likelihood to be dropped out will increase. By the same logic, additional older siblings or presence of grand parents especially grand mother may reduce the opportunity cost of a daughter's time by providing substitutes for

household work or through economics of scale in household production, thereby reduce the likelihood to be withdrawn from school.

Gender of children will determine not only their opportunity cost but also their potential monetary returns to education in the future. Women are usually discriminated in the labour market even in developed countries in terms of access to employment or of earnings; the monetary benefit to their education, thus, is lower than that to sons'. In fact, there may be substantial returns to female schooling in non-market production, but parents may not be aware of these non-monetary benefits or may value them less than monetary ones. Even if educated girls go on to work and receive earnings on a par with men, income remittances to parents from married adult daughters, who join their spouses' families, may be lower than from adult sons. If that is not the case, i.e. the remittance rate is equal for both sons and daughters, the returns to parents from educating girls could be low. This could be explained by potentially lower quality of daughters' education than that of sons', which reflected regular interruptions in attendance or schoolwork resulting from household obligations.

Age of children will be considered in the parents' process of making decision on whether or not withdrawing them from schools. In rural production, the older children tend to have higher opportunity costs (larger foregone earnings) as well as higher direct cost of schooling (higher direct costs required higher grades), which increase the marginal cost of education, and hence in order to restore the equilibrium condition the resource used for investment in education for older children will be cut partly. This also means that the older children will face a higher chance to be withdrawn from school.

Parental education is expected to be positively associated with children's schooling. Educated parents are more able to assist in their children's learning, raising the returns relative to less educated parents, and are also more likely to recognize the benefits of schooling. Positive parental schooling impacts are also expected from a schooling as a consumption good perspective, since better educated parents are believed to enjoy educated children more than less educated parents; thus mother and father education will act as a taste-shifters in the schooling demand functions.

Now we will examine how these factors affect children's education investment within *the framework of the collective household model*. The model predicts that factors that raise the bargaining power of the wife should increase allocations to goods she prefers (The mother's education stands out as such factor for which our dataset provides information). Women with more schooling are able to earn more, improving her power in bargaining position and (if they are actually working) the level of income under their direct control. Thus, if women value the schooling of their children more than men do, maternal schooling will have stronger impact than parental schooling on children's education. Further, mothers may prefer to allocate more resources, including for human capital, to

daughters while fathers prefer sons⁵. Then increases in mother's schooling would have a larger beneficial effect on daughters' education than on sons', and father's schooling would favour sons' education (same-sex effect and cross-sex effect). The former is particularly plausible because the mother's bargaining power and her preferences for daughters' schooling are both likely to rise with her own education.

From the above analyses, we see that the relationships of maternal and child schooling are the same in both models. Under a bargaining framework, a larger maternal education impact on daughters' education than sons' may reflect maternal preferences for educating girls. In the unitary household model, households in which the mothers have high educational level also have strong common preferences for daughters' schooling. However, under the unitary household model, the problem will arise because of marital sorting: some husbands, especially educated men, will choose wives who are well educated or even better educated. This reflects their preferences for educated women hence for daughters' schooling. This problem results in heterogeneity in preferences between households rather than within household.

2.3. International empirical evidences

There have been a number of studies trying to explore the determinants of children's attainment. Most of studies related to determinants of children attainment, in general, and children's education, in particular, have viewed the process of children's attainment to be sequential choices made by family, which is considered as a production unit which employs real inputs to generate utility for its members (Haveman and Wolfe 1995). Most of these studies assumed that decisions makers in households are parents and they share a common utility function. Parents in these models act as children's gatekeepers through their control over children's access to educational resources made available by the Government and community (Lloyd and Blank 1996). Thus, children's attainment is influenced by choices made by parents regarding the amount of family resource allocated to children, the timing of their distribution, the number of children, etc.

Concerning measurement of educational attainment, a variety of measures have been studied. These measures include categorical dummy variables (whether the child graduate from a certain level of education) and continuous variables, indicating the extent of attainment (annual earnings), depending on the issues to be addressed.

Reduced form equations for the dependent variables of interest are widely estimated using methods ranging from OLS techniques (for studies related to years of schooling such Datcher (1982) or Duncan (1994), to binomial probit (for studies exploring categorically educational attainment), and to Heckman two-step procedures (Cockburn 1999). However, the reduced-form approach is preferable to the alternative of including the endogenous

⁵ This does not mean that fathers love their sons more than their daughter, even in some cases, fathers express their love to daughter much more than to sons. However, as rationally economic agents, fathers prefer to invest in their sons.

variables without suitable instrumentation, which can lead to biased and inconsistent estimates.

The determinants of children's educational choices can be grouped into three main categories: individual, household and community characteristics. Among which variables describing parental characteristics or choices are the most commonly used in studies of children's educational attainments? In fact, parents with immediate costs and longer-run returns in mind, will make decisions regarding children's schooling.

Parental human capital, measured by the number of years of schooling attained, is the most fundamental economic factor. The empirical studies have shown that in general this factor is statistically significant and quantitatively important for children's education and for children's decision to withdraw from schools, no matter how it is defined. The human capital of the mother is usually more closely related to the attainment of the child than is that of the father.

The family's income level in which a child grows up is perhaps the best measure of the level of economic resources devoted to the child by the parents. However, income variable may be a rather crude proxy of the economic resources available to a child. Often family income is recorded only in a single year, and hence measures permanent income with error. And it may convey little about family allocation of income to children and fail to capture other economic resources devoted to the child (Haveman and Wolfe 1995). Most of studies have employed the ratio of the income level of the family to the income needs of the family, reflecting its size and structure. Family's income is positively associated with the educational attainment of the child, and the variable is statistically significant in many studies that found out a positive association.

Income variability may lower children's educational attainment since it may be accomplished in part through increased child labor participation, thus reduced educational participation. Jacoby and Skoufias (1997) found that rural Indian households adapt to negative income shocks by reducing school attendance and increasing labour participation among their children as a form of self-insurance.

The effects of family structure and the extent of mother's work on children's education have regularly been studied. Growing up in a one-parent family (or experience divorce or marital separation) is negative related to the level of school attained and is statistically significant. Evidence on the effects of mother's work on children's educational choices is mixed.

Other variables related to parental investments such as the number of geographic moves during childhood, the number of siblings, religiousness have been found to have statistically significant and quantitatively large effects on children's educational attainment.

Children's characteristics also affect their own educational attainment. Most empirical work study boys and girls separately and do not directly test the role of sex (Cockburn 1999). In the cases, where pooled data were run with a boy dummy, it had a positive effect on children's education attainment.

Canagarajah and Coulombe (1997) specifically tested also the relationship between school and work participation in a simultaneous equation model. They found that the relationship is negative and significant. Thus factors that reduce child labour participation would increase school participation.

The relationship between child's age and child's schooling attendance are negative in most of studies. However, this relationship is not simply linear. Admassie (2002) found that the probability of going to school increases with age and decreases with its square, suggesting an inverted U-shaped relationship.

In addition, community characteristics also are found affecting the children's attainment. Many studies use schooling characteristics as proxy for community characteristics and find that presence, proximity, and quality of local schools should have positive effects on school participation while the impact of school costs should be the opposite.

3. EDUCATIONAL CHANGES AND SCHOOLING DROPOUT SITUATION IN VIETNAM

As mentioned in Introduction, the Renovation, especially the market-oriented reform since 1989, has resulted in the dramatic changes of education system in Vietnam. This section gives a brief overview of Vietnam's economic reform, performance and educational changes. Then the section reviews the dropout trends in Vietnam during the period 1993-2002 (based on the three VLSSs). It also attempts to look at the possible causes of the schooling dropout situation.

3.1. An overview of Vietnam's economic reform, performance and educational changes⁶

Prior to the 1980s, Vietnam's economy was essentially a centrally planned economy at a low development level. Economic reform in Vietnam was initiated in the early 1980s. However, only the Renovation (*Doi moi*) in 1986 and especially the radical market-oriented reform of 1989 marked a turning point in the history of Vietnam's economic development. In March of 1989, Vietnam adopted a radical and comprehensive reform package aimed at stabilizing and opening the economy, and enhancing freedom of choice for economic units and competition so as to change fundamentally the economic management system in Vietnam. The measures undertaken hereafter included:

- Almost complete price liberalization;
- Large devaluation and unification of the exchange rate;
- Increases in interest rates to positive levels in real terms;
- Substantial reduction in subsidies to the state-owned enterprises (SOEs);
- Agricultural reforms with the replacement of cooperatives by households as the basic decision-making unit in production and security of tenure for farm families;
- Encouragement of the private sector, including foreign direct investment (FDI);

⁶ Overview of the economic reform process is largely adapted from Le Dang Doanh *et al* (2002) and Vo Tri Thanh (2004).

- Removal of domestic trade barriers and creation of a more open economy.

Despite broad and fast liberalization, it was recognised even in 1996 that significant restrictions remained, for instance in the areas of trade and market entry. The reforms of the SOEs and the financial sector have been limited and not keeping pace with economic development. There has also been a deep concern with the question of sustainable economic growth and development, especially during and after the Asian crisis in 1997-98. The challenges and difficulties facing Vietnam had called for further Renovation process. However, in general during 1997- 99, Vietnam was reluctant to undertake a decisive and comprehensive reform program. The years of 2000-03 witnessed the implementation of the demand stimulus policy to revitalize the economy and the new stronger commitments to reform continuation. Some significant progresses were made, especially in the development of private sector and trade liberalization. Meanwhile, the reform of the SOEs, banking system, and public administration were slower than expected and this limited the effectiveness and efficiency of other reforms. In general, the reforms have accelerated somewhat but with uneven performances.

Table 3.1: Some macroeconomic indicators, 1991-2002

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
GDP growth (%)	5.8	8.7	8.1	8.8	9.5	9.3	8.1	5.8	4.8	6.8	6.9	7.0
Inflation (%)	67.6	17.5	5.2	14.5	12.7	4.6	3.6	9.2	0.1	-0.6	0.8	4.0
FDI (US\$ bill.) ^b	1.322	2.165	2.900	3.766	6.531	8.497	4.649	3.897	1.462	2.012	2.431	1.333
Export (USD bill)	2.087	2.581	2.985	4.054	5.449	7.256	9.185	9.360	11.540	14.308	15.027	16.706
- % change	-13.2	23.7	15.7	35.8	34.4	33.2	26.6	1.9	23.3	24.0	3.8	11.2
- % GDP	24.00	26.15	22.65	24.87	26.21	29.41	32.59	31.64	39.80	45.60	45.86	47.89
Import (USD bill)	2.338	2.541	3.924	5.826	8.155	11.144	11.592	11.499	11.622	15.200	16.200	19.730
- % change	-15.1	8.7	54.4	48.5	40.0	36.6	4.0	-0.8	1.1	30.8	3.4	19.73
- % GDP	26.88	25.74	29.77	35.74	39.23	45.17	41.13	38.87	40.09	48.44	49.44	56.68

Note: a) Estimated figures for 9 months; b) Total commitments

Source: GSO (various issues) and authors' estimates

Thanks to the Renovation and especially the market-oriented reforms, Vietnam escaped from crisis in the mid-1980s and the face of Vietnam's economy and society has changed significantly (Table 3.1). From 1990 to 1997, the GDP growth rate was maintained at around 8% per annum on average. The GDP growth rate, however, went down between 1997 and 1999, partly because of the Asian financial crisis, and partly because of the dissipation of reform effects. Since 2000, the economy has regained its high growth rate at around 7% per annum.

Successful economic development has resulted in overall improvement of people's welfare and significant poverty reduction irrespective of measurement methods. The food poverty incidence in Vietnam reduced from 25% in 1993 to 15% in 1998 and 11% in 2002, while the total poverty incidence, which is measured by adding the minimum non-food expenditures to the amount of the food poverty line, also declined from 58% to 37% and 29% respectively over these same years (SC 2003). That means that Vietnam has met well

ahead of schedule the MDG target of halving poverty rates between 1990 and 2015. Vietnam has also achieved notable results in human development. There has been a significant increase in Vietnam's (from 0.623 in 1994 to 0.688 in 2001, and correspondingly, the Vietnam's rank has been improved from 121 to 109). Vietnam now ranks 5th among the ASEAN countries, after Singapore, Malaysia, Thailand, and Philippines (UNDP 2003).

The progress in poverty reduction, however, is still fragile and several problems of poverty need to be addressed. First, around 95 percent of the poor are now living in rural areas, a higher share than that of 90% in 1998. Second, the poverty situation has spread unevenly among regions and poverty is deepest in the areas with high ethnic minority populations such as the Northern Uplands, the Central Highlands and the North Central Coasts. Third, the gap between rich and poor has tended to widen. The Gini coefficient for consumption expenditure went up to 0.37 in 2002 from 0.35 in 1998 and 0.33 in 1993. Moreover, the real expenditure per capita of the richest 20 percent of households in Vietnam in 2002 is some 6 times higher than that of the poorest 20 percent, up from some 4.6 times higher in 1993 (UNVN 2003). It seems to be that the lower the poverty incidence, the harder the poverty reduction (Table 3.2). This could be the case since fighting against "hard-core" poverty needs to be undertaken under a more comprehensive framework, implying an increasingly important role of the specific programs targeted on the poverty reduction.

Table 3.2: Poverty Incidence by Regions

Region	1992/3	1997/8	2001/2
Whole country	58.1	37.4	28.9
- Urban	25.1	9.2	6.6
- Rural	66.4	45.5	35.6
Area			
- Red River Delta	62.7	29.3	22.4
- Northern Uplands	81.5	64.2	43.9
- North Central Coasts	74.5	48.1	43.9
- South Central Coasts	42.7	34.5	25.2
- Central Highlands	70.0	52.4	51.8
- South East	37.0	12.2	10.6
- Mekong River Delta	47.1	36.9	23.4
Ethnicity			
- Kinh & Chinese	53.9	31.1	23.1
- Others	86.4	75.2	69.3

Sources: UNVN (2003), World Bank (1999), and World Bank *et al* (2003)

The GOV and Vietnamese people have traditionally accorded high priority to education. The right of all children and adults to education constitutes a central pillar of Vietnam's education law and Vietnam has devoted considerable efforts and resources to the realization of this right. The investments in education, much of which predates even the launch of market-oriented reform, have resulted in remarkable achievements in education.

Together with the economic reforms, however, the education sector has also experienced dramatic changes, especially in terms of financial provision and private participation.

The education and training establishments finance their operation via two financial sources: the State budget (including Central State budget, provincial budget and Official Development Assistance ODA) and the revenues raised by themselves. The responsibility of funding by State budget is divided between different levels of government⁷. The second financial source includes such items as tuition fees, other contributions by students/their parents and voluntary contributions by various donors.

Regarding the State budget, the share of funding for education and training in terms of GDP increased from 2.2% in 1993 to 3.2% in 2001. The proportion of funding for education and training in total budget expenditures also increased significantly, from 9.5% in 1993 to 11.9% in 2001⁸. However, the education and training budget has been concentrated on the current expenditures, which largely cover teachers' salaries. For example, in 2001, 81% of the total education and training budget was spent on current expenditures while the remaining, 19% was left for spending on capital construction and on curricula and goals education and training⁹. The budget constraints are hindering a considerable improvement of the quality of education and training system in Vietnam.

Population has been used as a dominant criterion in allocation of the public resources to education sector. While this criterion ensures the simplicity for resource allocation, it may not totally reflect the true need for public funding for education. A number of other criteria such as the number of students in an area, or the proportion of illiterate population, or of ethnic minorities, or the condition of education facility, should also be important. The empirical study by Vu Quoc Ngu (2004) shown that, as expected, population has significant and positive impacts on the public spending on education. At the same time, number of students and proportion of population with no degree have significant, but *negative* relations with the level of the public spending on education. Moreover, the variables such as proportion of illiterate population, share of ethnic minorities in population, teacher class ratio, and distance from commune centre to school, have no bearing on the level of public spending on education. In other words, the criteria currently being used in the allocation of the education funds needs to be reviewed.

The division of the responsibility between different government levels and the current criteria used for allocating the public resources to education sector also favour the rich areas. Although the South East and the Red River Delta regions rank first and third on per capita GDP, they rank first and second on per capita public expenditure on education and

⁷ The central government is responsible for the funding for the universities and colleges and the vocational training schools as well as the national programs such as "Education for all". The provincial governments are responsible for the funding for upper secondary schools. The district governments take care of the funding for lower secondary schools and all primary schools. Kindergarten and nursery are within the financial responsibility of the communes' authorities.

⁸ Authors' estimation based on the data in GSO (various issues). The goal of education and training budget is set to reach 15% in 2005 and 20% in 2010.

⁹ Authors' estimation based on the data provided via <http://www.edu.net.vn/Thongke/ngansach.htm>

training. Moreover, in general, the poorest 20% receive just over 10% of the total public funds (delivered mostly through primary education), while the richest 20% receive more than 35% (delivered through lower, upper secondary and higher education).

Regarding the other sources of funding, in an effort to reduce financial burden, in 1989 the GOV introduced tuition fees with only exemption given to the primary education (Le Bach Duong 2000). Generally, households have to pay two types of charge/fee: official tuition fee and informal charge. The official charges calculated on a per child basis, are flat and hence, create a greater burden per child for poor families than rich ones. The regressive nature of the charges increases as the amount of the charges increases.

While official tuition fees are low, the informal charges, set either at the central level or at the local level of school or commune, are fairly high for parents. However, this charge differs among families living in rural and urban areas and among educational levels. Table 3.3 reveals that richer families can afford much higher spending for education than the poorer ones. For example, on average the richest families spend for their children in primary education 5.8 times more than the poorest families do. Given the public resource limitation, the private spending can have a significant positive impact on the education quality. Thus, the students in the rich families can access to education with much better quality. As the poor have low income and the private spending for education increases along with higher education levels, the poor find it hard to send their children to schools especially at the secondary education.

Table 3.3: Out of pocket expenditures in education in 2002

	In VND '000 per year								In % of household expenditure
	Tuition fee	Contribution	Uniform	Textbook	School tools	Extra class	Others	Total	
Primary education									
Poorest	4.7	41.9	17.0	27.6	26.5	7.4	4.8	130.7	1.9
Near poorest	7.5	47.2	24.9	36.4	34.6	14.1	8.8	174.3	1.9
Middle	11.5	50.3	33.0	41.3	38.6	22.6	15.4	215.0	1.8
Near richest	26.4	59.8	44.9	44.9	43.8	44.7	22.0	129.8	1.8
Richest	131.1	102.5	73.9	58.8	62.6	218.2	89.3	756.7	2.4
Vietnam	27.8	56.0	34.4	39.5	38.6	47.2	22.3	270.3	1.9
Lower secondary education									
Poorest	30.7	51.3	28.3	49.0	40.4	15.5	9.1	225.7	2.9
Near poorest	45.9	56.4	39.1	56.3	49.3	28.9	16.0	293.2	2.9
Middle	55.0	60.5	44.5	62.7	54.7	45.6	18.0	343.1	2.7
Near richest	70.0	68.8	60.7	70.1	63.3	89.9	31.0	457.5	2.7
Richest	180.1	103.4	100.8	90.6	79.3	425.7	89.4	1076.0	3.1
Vietnam	72.2	66.7	53.1	65.0	56.8	107.5	30.3	454.8	2.9

Note: Those figures are estimated using data from the VLSS 2001/02

Source: World Bank *et al* (2003)

The private participation has been also reflected in its role in providing education services. With the permission of the GOV, a number of private-founded schools have been

established, under the form of semi-public schools, “people-founded” schools and purely private schools. The private-founded schools play a significant role in providing upper secondary education. In 2002, they accounted for 28.5% of total schools and 35.6% of total students at the upper secondary education level; but these figures, respectively, are only 0.6% and 0.3% for primary education and 1.2% and 2.7% for lower secondary education¹⁰. It is worth noting that most private-founded schools are located in urban areas and their most students are from wealthy families.

3.2. Schooling trends and dropout situation

Since the Independence in 1945, Vietnam has achieved a great success in improving the education status of all its citizens. The adult literacy rate increased from less than 5% in 1945 to about 91% in 2002. The literacy rate over the last decade, however, shows an uneven distribution between social groups. In 1992/1993, the distribution of literacy was relatively equitable in the middle of each expenditure *quintile*. By 1997/1998, the distribution was quite a bit steeper indicating a greater concentration of the illiterate among the lower income population and an increase in inequality (Bhushan *et al* 2001).

Table 3.4: Net enrollment rates (%)

	Primary			Lower secondary			Upper secondary		
	1993	1998	2002	1993	1998	2002	1993	1998	2002
Vietnam	86.7	91.4	90.1	30.1	61.7	72.1	7.2	28.6	41.8
Poorest	72.0	81.9	84.5	12.0	33.6	53.8	1.1	4.5	17.1
Near poorest	87.0	93.2	90.3	16.6	53.0	71.3	1.6	13.3	34.1
Middle	90.8	94.6	91.9	28.8	65.5	77.6	2.6	20.7	42.6
Near richest	93.5	96.0	93.7	38.4	71.8	78.8	7.7	36.4	53.0
Richest	95.9	96.4	95.3	55.0	91.0	85.8	20.9	64.3	67.2
Kinh/Chinese	90.6	93.3	92.1	33.6	66.2	75.9	7.9	31.9	45.2
Ethnic Minority	63.8	82.2	80.0	6.6	36.5	48.0	2.1	8.1	19.3
Urban	96.6	95.5	94.1	48.5	80.3	80.8	17.3	54.5	59.2
Rural	84.8	90.6	89.2	26.3	57.9	69.9	4.7	22.6	37.7

Note: Those who reported being in school and having only completed the level immediately below are considered enrolled at each level. At the secondary level, enrolment might thus include those who are in technical or vocational schools. However, the proportion of children of secondary school age who are in vocational or technical schools is very small (in 1998 it was estimated at 0.05 per cent for lower secondary and 1.69 per cent for upper secondary). Those figures are estimated using data from the VLSS 1992/93, VLSS 1997/98, and VLSS 2001/02

Source: World Bank *et al.* (2003)

Although a sharp decline in enrolment rate at all levels of education occurred from 1986 to 1991, this trend did not last long. Since 1992, the enrolment rate has began to increase at all school levels by all measurements. The net enrolment rate (NER) for children at the age

¹⁰ Authors’ estimation based on data provided via <http://www.edu.net.vn/Thongke/phothong.htm>

of primary education increased from 86.7% in 1993 to 91.4% in 1998 and slightly reduced to 90.1% in 2002. For children at the age of lower secondary education, the net enrolment rates also increased drastically from 30.1% in 1993 to 61.7% in 1998 and further increased to 72.1% in 2002 (Table 3.4)¹¹. Note that the pace of changes has been much slower during 1998-2002 than that during 1993-98. This means that the national targets of the NERs of 97% and 80% for children at the age of primary and lower secondary education by 2005 respectively, may be hard to be achieved. Moreover, in terms of NER, the gaps between Kinh/Chinese majority and ethnic minorities and between rural and urban areas, though declining, are still significant.

Together with the enrolment rate, at the beginning of each school year, the Ministry of Education and Training (MOET) issues a report in which the dropout rate is also presented. According to this report, a child is viewed as dropout if he/she did not continue his/her schooling given he/she had enrolled at least part of the last schooling year. This definition is sometimes criticized as inaccurate since it does not count those who do not continue to enrol in the school after having finished a given grade. This leads to the underestimation of school dropout situation in Vietnam¹².

Slightly different from the official definition used by the MOET, in this study, a child is called to be a dropout if he/she has not completely enrolled in schools in the 12 month prior to the survey, given he/she used to enrol in school sometime before. This definition provides a more precise picture of dropout situation in Vietnam, although it still suffers from some shortcomings such as inclusion of small number of children who had to postpone their education due to specific reasons and intended to continue their education in the next coming year.

As indicated by Figure 3.1, the school dropout rate dropped considerably, from as high as 27.7% in 1993 to as 12.4% in 2002. This reduction occurred largely during the period 1993 – 1998, which witnessed a booming of Vietnam's economy. In this period the dropout rate has reduced by 14.0 percentage points. However, in the following period from 1998 to 2002, the proportion of children dropped out of school has just reduced by 1.3 percentage

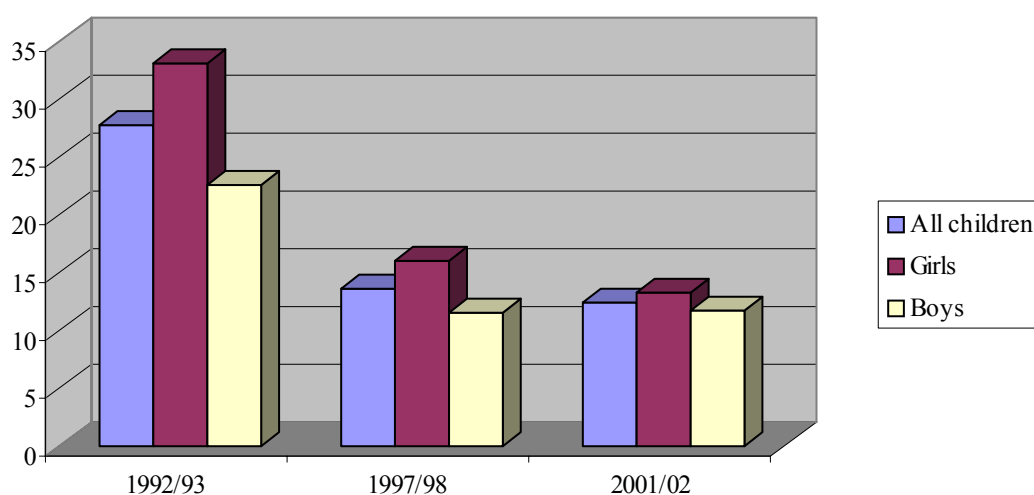
¹¹ The gross enrolment rate is the number of children enrolled in a level of education, regardless of age, as a percentage of the population of official school age for that level. The NER is the number of children enrolled in a level of education who are of official school age for that level, as a percentage of the population of official school age for that level.

¹² For example, in the schooling year 1999/2000, the number of pupils enrolling in the primary schools was 10,063,025. Of which the promotion rate, calculating by the ratio of those who satisfy qualifications to promote to higher grade over those enrolling in the beginning of the schooling year, was 92.5%, the repeat rate is 2.8% and the dropout rate is 4.7%. In the schooling year 2000/01, the promotion rate was 94.0%, the repeat rate is 2.3% and the dropout rate is 3.7%. In 2001/02, the promotion rate was 95.1%, the repeat rate is 1.8% and the dropout rate is 3.1%. This means that the dropouts are those who did enroll in the schools in the beginning of the schooling year but dropped out of schools during the schooling year.

points. Thus, the pattern of changes in dropout rate (and also in NER) seems to be in line with the pattern of poverty reduction in Vietnam during 1993-2002¹³.

The decline in school dropout rate was much pronounced for girls than for boys. The gap between boys' and girls' dropout rates narrowed from 10.4 percentage points in 1993 to 4.6 percentage points in 1998 and further to only 1.6 percentage points in 2002 (Figure 3.1).

Figure 3.1: Overall dropout rates in 1993, 1998 and 2002

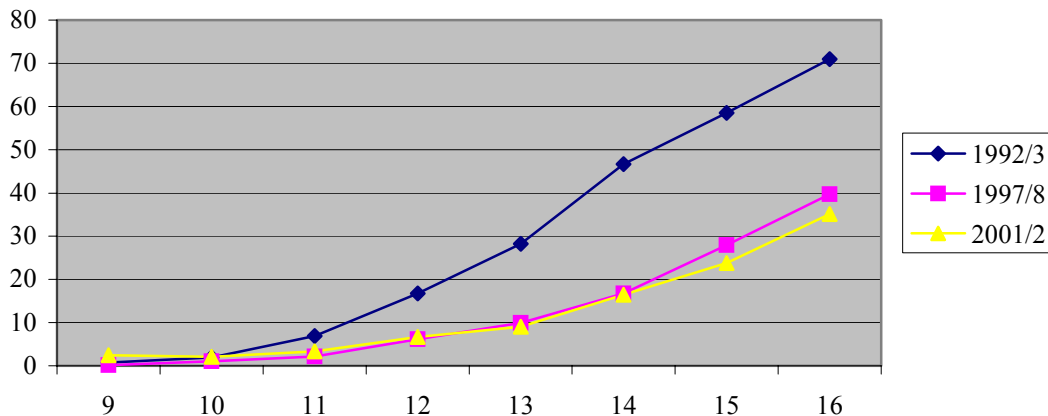


Source: Authors' calculation using VLSS 1992/93, VLSS 1997/98 and VLSS 2001/02

The school dropout rate varies considerably across various age groups. Figure 3.2 shows that the age that saw the largest withdrawal from school increased from around 12 years old in 1993 to 14 years old in 1998 and 2002. In 1993, from the age of 12, the proportion of children reported that they did not enrol in school in 12 months prior to the survey steeply increased from 16.7% for the children of 12 years old to 28.2% for children of 13 years old, 46.7% for children of 14 years old, 58.6% for children of 15 years old, and 71.0% for children of 16 years old. The situation improved rather well in 1998 and 2002. Only more than 6% of children of 12 years old reported not enrolling in school in the 12 months prior to the surveys. This figure slightly increased to 9.9% in 1998 and 9.0% in 2002 for 13-year-old children. From the age of 14, the number of those who did not enrol in school fairly rapidly increased from more than 16% for 14-year-old children to 39.3% and 35.2% for children of 16 years old in 1998 and 2002, respectively. This implies that the dropout situation did really improve during the last ten year, although the pace of changes again had slowed down during 1998-2002.

¹³ During 1993 – 1998, the poverty rate has reduced by nearly 21 percentage point from 58% to 37%, while that was only 8 percentage point during 1998 – 2002 (from 37% to 29%).

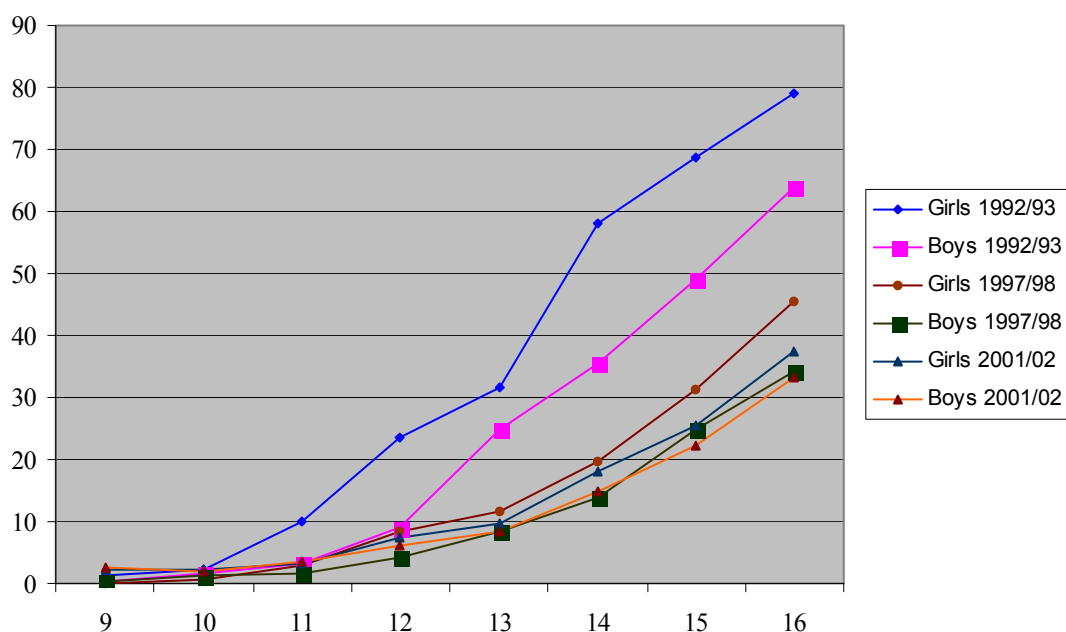
Figure 3.2: Dropout rates in 1993, 1998 and 2002, by age



Source: Authors' calculation using VLSS 1992/93, VLSS 1997/98 and VLSS 2001/02

Girls usually dropped out earlier than their male counterparts, although there is some sign of improvement in the recent years (Figure 3.3). In 1993, 23.6% of girls dropped out at the age of 12 while only 9.1% of boys dropped out at the same age. At the age of 16, 79.0% of girls dropped out and only 63.7% of boys did. In 1998, the number of girls dropped out of school at the age of 12 reduced significantly to 8.4%, but this figure was still twice higher than that of boys. Similarly, by the age of 16, the proportion of girls dropped out is still 11.2 percentage points higher than that of boys. In 2002, the situation had slightly changed. For children aged 9, 10 and 11, the percentage of those who did not enrol in school in the 12 months prior to the survey was slightly higher than that in 1993 and 1998, although the proportions of female and male dropped out of schools in 2002 generally were lower than that in 1993 and 1998. Moreover, the gap in dropout between girls and boys narrowed rather impressively. By the age of 16, the gap between girls' and boys' dropout rates was only 4.3 percentage points.

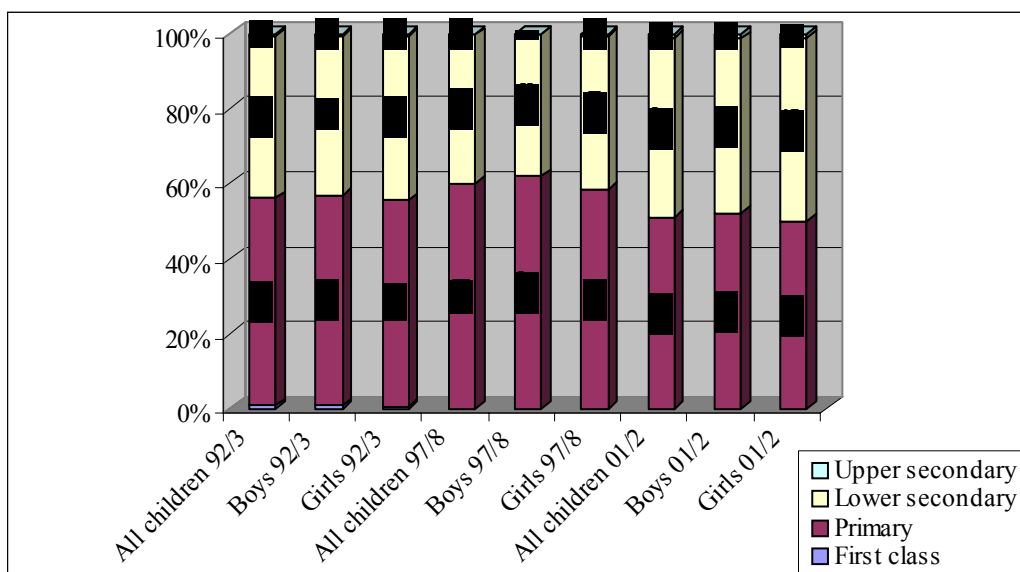
Figure 3.3: Dropout rates of girls and boys in 1993, 1998, and 2002, by age



Source: Authors' calculation using VLSS 1992/93, VLSS 1997/98 and VLSS 2001/02

Figure 3.4 displays the dropout distribution among the education cycles in 1993, 1998 and 2002. Most of dropout children selected to withdraw from education system at the primary education. This means that a considerable number of the children who dropped out of schools had only primary education or lower. In 1993, 55.3% of those who dropped out left school after finishing primary education or some classes in the primary cycle. This figure increases to 60.1% in 1998, and then reduces to 50.9% in 2002. Interestingly, dropout boys are more likely to leave schools after finishing the primary cycle or some classes in this cycle than girls do. This pattern can be seen in 1993, 1998 and 2002.

Figure 3.4: The dropout distribution among education cycles in 1993, 1998, and 2002

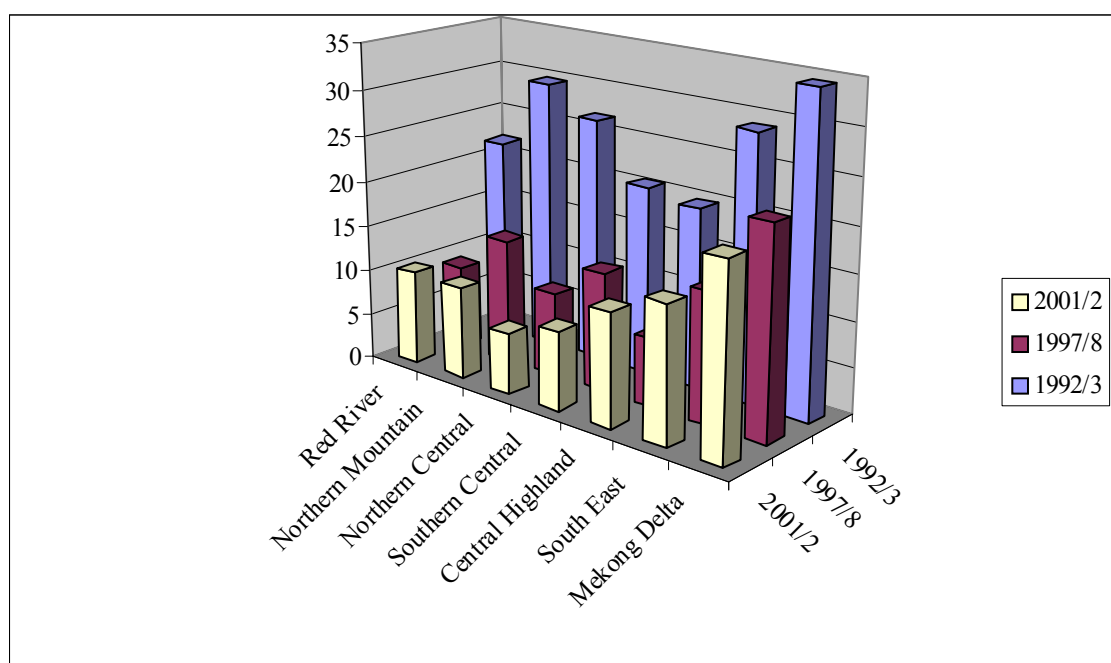


Source: Authors' calculation using VLSS 1992/93, VLSS 1997/98 and VLSS 2001/02

Figure 3.5 displays the school dropout rates across Vietnam's seven regions. Due to the regional specific characteristics and development, the dropout rates and the patterns of their changes are quite different from region to region. In 1993, the Central High Land, and Southern Central Coast regions had the lowest dropout rates, while Mekong River Delta and Northern Mountain regions had the highest dropout rates. In 2002, the lowest dropout rates could be observed in the Northern and Southern Central Coasts regions, while the highest rates were of Mekong River Delta and South East regions. The dropout rates declined in all regions from 1993 to 2002, but they slightly increased in some regions during 1998 - 2002. Surprisingly, the region recorded the highest achievement in reducing the dropout rate over the last ten years is the Northern Mountain, one of the poorest regions. Meantime, the Central Highland, another poorest region, was much less successful despite a sharp decline in the dropout rate between 1992/93 and 1997/98¹⁴.

¹⁴ Some economists have explained this phenomenon by presenting that during 1997/98 – 2001/02, there was a huge number of migrants from the Northern Mountain to the Central Highland and most of them were poor.

Figure 3.5: Dropout rates in 1993, 1998 and 2002, by region



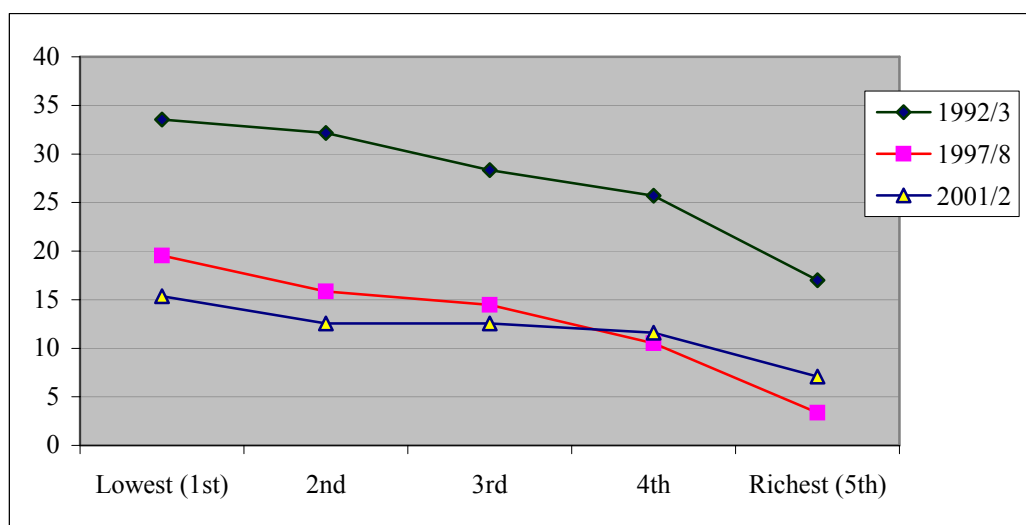
Source: Authors' calculation using VLSS 1992/93, VLSS 1997/98 and VLSS 2001/02

3.3. Causes of schooling dropout – a qualitative analysis

The theoretical framework and international evidences presented in Section 2 suggest that there are several factors, which may explain why children dropped out of schools. These factors can be ranged from family's economic situation and characteristics to those that are out of the household and child's immediate controls.

It is important first to look at the schooling dropout rates across *household expenditures quintiles*. Figure 3.6 shows that the dropout rate declined significantly for all expenditure quintiles over the period 1993-2002. For example, the dropout rate of children living in 20% poorest households declined from 33.5% in 1993 to 19.6% in 1998 and further to 15.3% in 2002. However, there remains a wide gap in dropout rates across expenditures quintiles, especially between 20% richest and 20% poorest households. Moreover, in the second spell from 1998 to 2002, the dropout rate surprisingly increased from 10.5% to 11.6% for those children living in the households belonging to the 4th expenditure quintiles and from 3.6% to 7.0% for those children living in the 20% richest households. This implies that during the last 5 years, the dropout rate may be less responsive to total household expenditure.

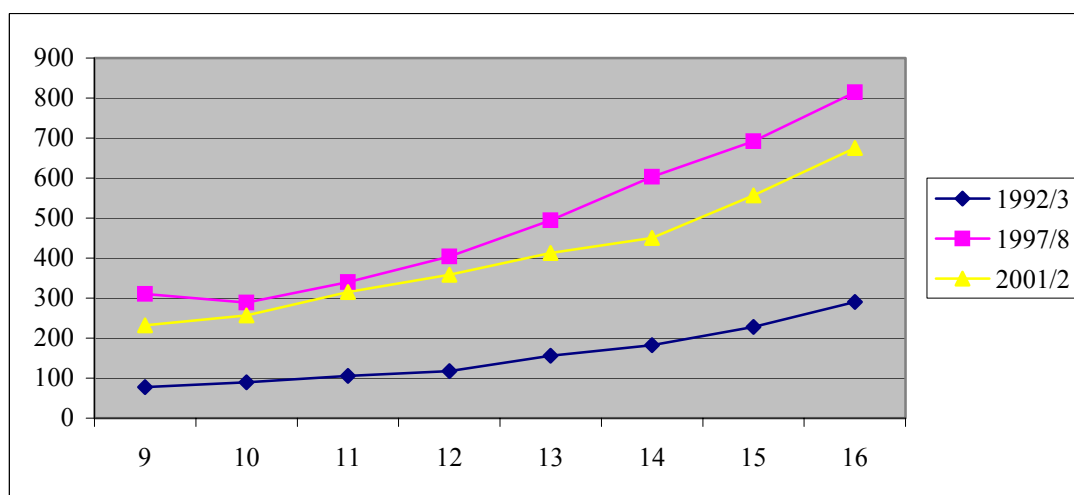
Figure 3.6: School dropout rate across expenditure quintiles



Source: Authors' calculation using VLSS 1992/93, VLSS 1997/98 and VLSS 2001/02

A decline in responsiveness of dropout rate to total household expenditure may be also reflected in the pattern of *household expenditures on education (or direct cost of schooling)*. During 1993 – 2002, the cost of schooling for a child increased by 126.3% while per capital expenditure increased just by 67.0% (Figure 3.7). Interestingly, the dropout rate fell rather fast during 1993-1998 when the cost of schooling increased quickly, meaning a rather weak association between the dropout rate and cost of schooling. Figure 3.7 also shows that the cost of schooling has increased as the child aged. For those children at the age of 9, the cost of schooling is about 3 times lower than that of children at the age of 16. This also helped to explain why the dropout rate is much higher among children at the higher ages. Higher the age of the child, higher the opportunity cost of attending school would be.

Figure 3.7: Cost of schooling per student in 1993, 1998 and 2002, by age



Source: Authors' calculation using VLSS 1992/93, VLSS 1997/98 and VLSS 2001/02

The cost of schooling per student is also very different from region to region (Table 3.5). Of all the regions, the average cost of schooling in the poorest region, Northern Mountain region, is lowest and the cost of the richest region, the South East region, is highest. This seems to be not corresponding to the change in dropout rates in these regions during 1993-2002 (see Section 3.2). While the cost of schooling could be important factor for explaining dropout situation in general, it alone hardly can explain the difference among the regions in terms of dropout rate. Indeed, the correlation coefficients by region between dropout rate and share of household expenditures on education in total expenditure are – 0.25 in 1993, 0.13 in 1998, and –0.60 in 2002.

Table 3.5: Direct cost of schooling per student by region (1994-prices; ‘000 VND)

Region	1993	1998		2002	
	Cost of school	Cost of school	% change compared to 1993	Cost of school	% change compared to 1993
Red River	93.41	288.05	208.37%	281.31	201.16%
Northern Mountain	57.32	132.73	131.56%	155.9	171.98%
Northern Central	68.27	209.49	206.86%	220.52	223.01%
Southern Central	204.36	388.15	89.93%	278.17	36.12%
Central Highland	110.19	190.46	72.85%	246.62	123.81%
South East	211.6	547.65	158.81%	403.87	90.86%
Mekong Delta	172.07	333.42	93.77%	216.6	25.88%
Whole country	95.35	269.33	182.46%	215.76	126.28%

Source: Authors’ calculation using VLSS 1992/93, VLSS 1997/98 and VLSS 2001/02

The dropout could be affected not only by the direct cost of education but also by *the indirect cost of schooling*. The later is, in fact, the forgone income from working rather attending school. Interestingly, while the direct cost of schooling increased fairly fast for each age categories, the indirect cost of education, proxied by time a child devoting for working, declined significantly. As shown in Table 3.6, on average a child in the age range from 9 to 16 used 479 hours per year to work in 2002, reducing from 884 hours per year in 1993.¹⁵ The Table 3.6 also indicates what can be expected that the number of hours that a dropout devotes for working is much higher than for that of those who not dropped out of schools. However, the difference has tended to widen in the recent years, meaning the opportunity cost of attending school relatively increased. Of course, this is only suggestive proposition since data of actual income generated by the dropouts or additional income, which can be created by the parents having now more time for their productive works.

¹⁵ We do not separate whether children worked for money or just did household work.

Table 3.6: Number of hours devoting to work per year, by age

Age	Gender	1993			1998			2002 ¹⁶		
		Whole	not drop	Drop	Whole	Not drop	Drop	Whole	Not drop	Drop
9	All	426	426	392	188	187	864	n/a	n/a	n/a
	Boys	420	420	364	170	168	864	n/a	n/a	n/a
	Girls	434	434	401	208	209	n/a	n/a	n/a	n/a
10	All	524	520	718	277	270	1003	200	193	517
	Boys	497	493	728	277	264	1414	184	179	416
	Girls	555	551	711	276	277	182	217	208	608
11	All	616	575	1178	414	403	985	279	262	766
	Boys	527	504	1216	376	373	718	249	231	763
	Girls	693	641	1166	457	437	1153	309	294	770
12	All	800	680	1397	470	445	864	379	332	1036
	Boys	656	586	1356	413	399	726	329	290	923
	Girls	929	780	1411	533	498	942	431	376	1134
13	All	915	691	1486	621	540	1352	468	385	1308
	Boys	820	670	1280	530	468	1196	394	336	1030
	Girls	1009	714	1645	727	626	1484	549	439	1572
14	All	1135	777	1544	716	590	1348	637	458	1548
	Boys	940	719	1339	617	522	1199	535	400	1316
	Girls	1336	869	1673	818	665	1457	746	523	1748
15	All	1348	743	1776	974	648	1799	809	527	1714
	Boys	1067	635	1516	836	565	1638	685	447	1522
	Girls	1649	932	1974	1127	748	1939	939	615	1890
16	All	1441	733	1731	1170	691	1880	1020	557	1872
	Boys	1219	687	1522	1038	635	1793	898	482	1739
	Girls	1686	821	1916	1303	760	1947	1158	650	2006
All	All	884	603	1618	625	462	1635	479	325	1560
	Boys	756	558	656	545	416	1519	415	285	1395
	Girls	1018	1432	1751	713	515	1727	547	368	1717

Source: Authors' calculation using VLSS 1992/93, VLSS 1997/98 and VLSS 2001/02

Parental education seems also to be an important factor since better-educated parents are more able to keep their children from dropping out of school. As suggested by Leclercq (2001), educated parents are more aware of the possible returns to their children's education and they are more likely to have access to information and social networks necessary for their children to engage into relatively human capital intensive activities yielding high returns to education. In addition, educated parents are more able to support their children through out the learning process, and living in a household where other persons are educated is bound to enhance a child's motivation and ability to cope with schooling. As Table 3.7 indicates, the dropout rate of children with father having upper secondary education or college and university degrees is much lower than that of those with father having no education or limited education (i.e. primary education). The case of

¹⁶ The VLSS 2001/02 did not ask about the working hours of children under 10.

mother's education is similar and even high mother's education seems to have stronger effect on schooling dropout. Interestingly, *given* the parent's education level, the dropout rate has been reduced overtime. For example, a third of children with father having no education dropped out of school in 1993, while only a sixth of those children were likely to drop out of school in 2002.

Table 3.7: Parental education and children's schooling dropout

	Father's education			Mother's education		
	1992/93	1997/98	2001/02	1992/93	1997/98	2001/02
No education	33.89%	21.03%	17.09%	38.55%	22.09%	18.22%
Primary education	35.65%	21.59%	21.48%	32.80%	20.06%	19.45%
Secondary education	25.00%	10.68%	9.60%	20.84%	8.13%	8.70%
Upper secondary education	14.77%	5.13%	3.82%	11.82%	2.78%	2.58%
College and University	4.31%	3.13%	0.87%	0.00%	0.00%	1.03%

Source: Authors' calculation using VLSS 1992/93, VLSS 1997/98 and VLSS 2001/02

In addition, some other factors also have impacts on schooling dropout. These factors are at the macro and meso level and generally out of household's controls. These factors include quality of education and community's and families' educational values.

The first is *quality of education*. Enrolment data may not be sound indicator because the quality and the relevance of the education and training system for the real life needs could differ very much. Vietnam's education and training system has never been criticized as much at present. There are two groups of factors affecting the quality of education: the first includes factors facilitating the learning process of student such as *curriculum and learning programs, teaching methods, and facilities for teaching and learning*; and the second relates to *teachers' quality*.

- In general, the curriculum is unsatisfactory and inadequate to provide students with knowledge and skills needed (Le Bach Duong 2000). Currently the MOET has paid much more attention on the education reforms and the fundamental changes of the textbooks. Some progresses have been made. In general, however, the reforms are still subject to strong criticism. Learning programs are considered “excessively burden”, but still lacking necessary knowledge to be provided for children. Teaching methods are inflexible and teacher-centred, which make the learners passive, uncreative and lacking in the capacity to act and participate. Meanwhile, school infrastructure is still in poor condition in spite of some improvement over the recent years. In general, classes in many rural areas are still in poor conditions (i.e. with leaf roofs and a shortage of tables and chairs) and over-crowded. There are on average 35.5 pupils per class in primary schools; 41.6 per class in lower secondary schools; and 48.4 per class in upper secondary schools. Schools at secondary levels often lack the normal studying material and experimentation facilities, let alone modern equipment (NCSSH 2001).
- Quality of teaching is now emerged as an alarming problem. Teachers lack appropriate in-service and career development opportunities and many are poorly trained. The

number of teachers with a lower secondary education certificate and 3 years of teaching training is much higher than the number of teachers with a upper secondary education and 2 years of teaching training (Oxfam GB 2000). In some disadvantaged areas, the level of unqualified teachers reached 50%. Remuneration is low compared to international standards and to salary levels of other sectors of the economy (UNVN 2003). These underpaid teachers have to divert their efforts to make extra earnings to supplement for their living needs. In the long term, their teaching skills, therefore, will inevitably be degraded. The quality of teachers is even more serious if the question of the quality of those who enrol in teaching training schools and colleges is raised. Special characteristics of children aged 6- 11 require primary education teachers to be very qualified. However, due to the lack of incentives, teacher training schools and colleges have received most students with low learning capabilities comparing to those enrolled in other colleges and universities (Le Bach Duong 2000).

Low quality of education causes people to doubt about the actual contribution of educated children to family income and this may lead to decision to withdraw their children from schooling system. The poor parents seem to have higher degree of suspicion relating to the contribution of education to their total household income. This, together with heavier burden of education, makes the poor likely to withdraw their children from schools. The lack of teaching quality and learning materials makes the lesson more boring and more difficult to understand for children. These, in turn, may discourage the learning of children. Consequently, the possibility of dropout could be increased.

Other important exogenous factors having impact on schooling dropout of children are *production technology, parents' perception of education value, and attitudes of people in the community to dropouts*. Of course, it should be taken into account the factor of *public finance for education*.

In rural areas, the production technologies are still common in the manual form, which require labours that have practical experiences and/or have expertise transferred generations by generations. This leads to a perception that "agricultural production does not require a high education" and that higher education is only necessary for persons who intend to work in the industrial sector and who want to escape from the village. Thus, having higher education level becomes less meaning and schooling dropout may become an option. Furthermore, it can be observed that people with high education can also be unemployed. This fact may further discourage many parents to continue to send their children to higher education level after finishing a certain education level.

The voice of community is also important factor affecting motives, goals and results of a child's studying. Nguyen Thi Minh Tam *et al* (1998) found surprisingly that 31.5% of teachers, 75.0% of people, and 69% of authorities in three communes in the Red River Delta region stay neutral towards the girls' schooling dropout. This kind of attitudes could make children think that it is indifferent for them to go or not to go to school.

The last but not least is the public finance for education. As mentioned in Section 3.1, the proportion of funding for education and training in total budget expenditures has increased

significantly during the last ten years. But most budget resources for education covers only current expenditures, especially the teachers' salaries. The budget limitation is still hindering a considerable improvement of the education quality. Moreover, the criteria currently being used in the allocation of the education funds are not appropriate and need to be reviewed. The study by Vu Quoc Ngu (2004) showed that the public spending for education has no effect on proportion of illiterate population, while the private spending for education has significant impact on the reduction of illiterate rate.

4. EMPIRICAL EVIDENCE

In this section, we use a probit model in order to investigate the determinants of the choice for children's schooling dropout in 1993, 1998 and 2002. In addition, this section also projects the children's dropout rates in the future up to 2015 based on several simulation scenarios with the assumptions on the key variables such as the direct cost of schooling, household's per capita expenditure growth rate, population growth rate, and GDP growth rate. The outcomes of the projection can help us to judge the possibility of Vietnam to fulfill its goals for achieving the educational MDGs.

4.1. Model specification, data and variables choice

A probit model is employed for investigating the determinants of probability of schooling dropout. The dependent variable ($DROPOUT_{ij}$) will take the value of 1 if the child j in the household i did not enrol school in the last 12 months, otherwise it will take value of zero. Whether an individual drops out of school or not is determined by the value of a latent variable y_{ij} (an index of the 'propensity' for schooling) that is defined by the following linear relationship:

$$y_{ij} = \beta_0 + x_{ij}\beta_1 + \varepsilon_{ij}$$

Where β is a vector of parameters, x_{ij} is a vector of independent variables, and the error term ε_{ij} is normally distributed¹⁷.

The conditional probabilities are derived as follows. Since y_{ij} is a latent variable so it is unobserved and y_{ij} ranging from $-\infty$ to $+\infty$, can generate the observed outcome (i.e. DROPOUT). An individual will drop out of school if the value of its latent variable exceeds a threshold parameter, which set to zero for normalization, and adversely, an individual will stay in school if the value of its latent variable is lower or equal to that threshold parameter. In the analysis of schooling drop out, y_{ij} is linked to the observed outcome $DROPOUT_{ij}$ by the following equation:

$$DROPOUT_{ij} = \begin{cases} 1 & \text{if } y_{ij} > 0 \\ 0 & \text{otherwise} \end{cases}$$

¹⁷ Note that because we have restricted our sample to include a child from a household so the second error term, which reflects the specific characteristics of the child from his/her siblings, will be omitted.

And the probability that a child will be observed to drop out, is as follow:

$$P(\text{DROPOUT}_{ij}=1 | \mathbf{x}) = P(y_{ij}>0 | \mathbf{x})$$

Given normality of u_{ij} , the following equation can be derived:

$$P(\text{DROPOUT}_{ij} = 1 | \mathbf{x}) = P(y_{ij}>0 | \mathbf{x}) = P(\beta_0 + \mathbf{x}_{ij}\beta_1 + \varepsilon_{ij} > 0 | \mathbf{x})$$

or

$$P(\text{DROPOUT}_{ij} = 1 | \mathbf{x}) = P(\varepsilon_{ij} \leq \mathbf{x}_{ij}\beta | \mathbf{x})$$

This is simply the cumulative distribution function of the error distribution evaluated at $\mathbf{x}_{ij}\beta$. Accordingly,

$$P(\text{DROPOUT}_{ij} = 1 | \mathbf{x}) = F(\mathbf{x}_{ij}\beta) \text{ or } P(\text{DROPOUT}_{ij} = 0 | \mathbf{x}) = 1 - F(\mathbf{x}_{ij}\beta)$$

The maximum likelihood of the estimation of schooling dropout would take the form:

$$L_i(\theta_i) = \prod_{j=1}^n P(\text{DROPOUT}_{ij})$$

The dataset used to run the regression is from three cross-sectional VLSSs 1992/93, 1997/98, and 2001/02. Note that a panel data could be formed only with the first two VLSSs but not with all three VLSSs because the sample in the third VLSS is completely different from the two previous VLSSs. All observations in the dataset used for estimation are children aged 9-16 at the time they were interviewed. All the children in the study must had enrolled in school previously, i.e. those children who had never been enrolled in school would be dropped from the sample used. If a family has more than a child in the objective age range, one of them is selected randomly while the others are dropped¹⁸.

The probability of school dropout is assumed to be dependent on child characteristics (sex, age, working time,...), and family characteristics (parental education level, the number of siblings, expenditure, and direct cost of children's schooling). All independent variables used for regression are defined in Table 4.1. The choice of these variables are much dependent on the theoretical suggestions, the analysis in the previous section, and the data availability:

- *Sex*: Gender of child may determine his/her opportunity cost of time and rate of transfers of his/her future wealth, and hence his/her demand for education. This variable takes value of 1 if the child is male and of 0 if the child is female.
- *Age*: Age can be also an important factor determining the opportunity cost of a child. The observation in Section 3 has shown that age has relatively high correlations with

¹⁸ One child per household is selected for the multivariate analysis because of the statistical problems that arise when observations are not independent - as is the case when analyzing data on children living in the same household. Appendix 1 presents some information of the three VLSSs.

some other variables such as the number of hours devoted for working or cost of education.

- *Number of hours devoting for working*: The higher is the number of working hours per year, the higher is the child's opportunity cost of going to school. However, the coefficient of this variable may be overestimated because the higher number of hours devoting for working may be the outcome of schooling dropout, not simply be the cause of dropout.
- *Parental education*: Obviously, as shown in the analysis in Section 3, this is essential factor. Household head's education and his/her spouse's education are considered separately. This variable takes value of 0, 1, 2, 3, and 4 if the household head or her/his spouse has no schooling, just finished the primary education, enrolled and/or finished lower secondary school; enrolled and/or finished upper secondary education; enrolled and/or finished higher education, respectively.
- *The number of family's siblings*: The more children a household has, the thinner is the household resource allocated to each child.
- *Cost of education*: Since the direct education cost of children who already dropped out of school is zero, the effect of this cost on household's decision may be underestimated. For those dropouts, the cost of education in our study is replaced by its mean for children of similar age living in the same regions.
- *Economic status of household*: The economic status of a household in which a child resides is perhaps the best measure of the level of economic resources that are available to devote to the child by the parents. However, the household income in developing country such as Vietnam is usually not accurately reported and therefore, the household expenditure is used to proxy for household income.
- *Residence*: This is *the region* where the households locate and it can somehow affect the child's schooling.

Table 4.1: Variables and their definitions

Variable	Definition
Sex	This variable is a binary variable, which takes value of 1 if the child is male and of 0 if the child is female.
Age	Child's age. This variable value ranges from 9 to 16
Primary	This variable takes value 1 if the child is studying in the primary education level. Otherwise it takes value 0 (zero)
Work time	Total hours per year a child devoting to work, regardless whether he/she is paid or not
Head's education	The education level of household's head. Household head's and spouse's education is categorized into five groups as: (i) no schooling; (ii) just finished the primary education; (iii) enrolled and/or finished lower secondary school; (iv) enrolled and/or finished upper secondary education; (v) enrolled and finished higher education.
Spouse's education	The education level of spouse of the household's head. This variable takes value of 0, 1, 2, 3, 4 and 5 if she/he has no schooling; just finished the primary education; enrolled and/or finished lower secondary school; enrolled and/or finished upper secondary education; enrolled and/or finished higher education, respectively
No of siblings	Number of siblings that the studied child has.
Log (p.c. expenditure)	The log of household's per capita expenditure per year
Log (cost of schooling)	The log of direct cost of schooling for children at a given age. For those who dropped out of school, the direct cost of schooling is proxied by the mean direct cost of schooling of children at the same age and living in the same region.
Red River Delta	This is a binary variable. It takes value 1 if the child living in the red river delta, otherwise it takes value 0
Northern Mountain	This is a binary variable. It takes value 1 if the child living in the Northern Mountainous area, otherwise it takes value 0
North Central Coast	This is a binary variable. It takes value 1 if the child living in the Northern Central Coast area, otherwise it takes value 0
South Central Coast	This is a binary variable. It takes value 1 if the child living in the Southern Central Coast area, otherwise it takes value 0
Central Highland	This is a binary variable. It takes value 1 if the child living in the Central Highland area, otherwise it takes value 0
South East	This is a binary variable. It takes value 1 if the child living in the South East area, otherwise it takes value 0
Mekong River Delta	This is a binary variable. It takes value 1 if the child living in the Mekong river delta area, otherwise it takes value 0

Note: Some statistics of the variables used for estimations are presented in Appendix 2

4.2. Estimation results

The results of the probit model estimations for determinants of schooling dropout probability in 1993, 1998 and 2002 are presented in the Table 4.2. The regressions are quite acceptable as the independent variables as a group can explain rather well the variation of the schooling dropout probability.

Table 4.2. Marginal effect of the determinants of schooling dropout probability
(1993, 1998, and 2002)

	1993		1998		2002	
	dF/dx	P>z	dF/dx	P>z	DF/dx	P>z
Sex	-0.0659	0.000	-0.0057	0.207	-0.0247	0.151
Age	0.0512	0.000	0.0139	0.000	0.0030	0.004
Primary	0.1192	0.000	0.1232	0.000	0.0437	0.000
Work time	0.0001	0.000	0.0001	0.000	0.0001	0.000
Head's education	-0.0547	0.000	-0.0069	0.005	-0.0140	0.000
Spouse's education	-0.0474	0.000	-0.0116	0.003	-0.0128	0.000
No of siblings	0.0087	0.083	-0.0009	0.596	0.0028	0.004
Log (p.c. expenditure)	-0.1455	0.000	-0.0576	0.000	-0.0542	0.000
Log (cost of schooling)	0.2186	0.000	0.0597	0.000	0.0694	0.000
Red River Delta	0.3202	0.001	0.0037	0.812	0.0114	0.082
Northern Mountain	0.1671	0.057	0.0311	0.131	0.0185	0.008
North Central Coast	0.2095	0.027	-0.0156	0.130	-0.0017	0.795
South Central Coast	-0.0403	0.461	0.0171	0.359	0.0090	0.234
Central High Land				Reference		
South East	0.0671	0.367	0.0085	0.595	0.0078	0.252
Mekong River Delta	0.0997	0.180	0.0301	0.116	0.0758	0.000
Pseudo R2	0.6461		0.6662		0.5476	
Observations	2220		2983		14362	
Log Likelihood	-454.62		-405.22		-2347.1	

Source: Authors' estimation based on VLSS 1992/93, VLSS 1997/98 and VLSS 2001/02

Other things being equal, boys are less likely to drop out of school than girls. However, this fact is only significant in 1993. Overtime the decline in probability of dropout was more pronounced for girls than boys and the gender effect became not statistically significant. This estimation result is consistent with our observation of the actual changes in boy's and girl's dropout rates during 1993-2002 (Figure 3.1 in Section 3).

Child's age still plays a significant role in household's decisions regarding education investment, but its effect on the probability of dropout overtime has decreased considerably. As child becomes one year older, the probability of dropout increases by 5.1% in 1993, by 1.4% in 1998, and by only 0.3% in 2002. Also, the children studying in the primary schools are more likely to drop out of school than otherwise. This tendency is supported by the fact that during 1992-2002, a considerable number of the children dropped out of schools have had only primary education or lower.

Nguyen Vu Binh (2001) found that in 1998 more than 30% of children living in rural areas participated in economic activities and/or domestic work. However, as suggested by Admassie (2002), the main question concerning child labour may not be why children work but how much time they spend on work each day. Table 4.2 shows that child's working time status is a highly significant determinant of the probability of dropout. But once again, the marginal effect is very small. Indeed, if a child devotes his/her time to work by additional 100 hours per year¹⁹, the probability of his/her dropout increases only by 1.4%, 0.5% and 0.7% in 1993, 1998 and 2002, respectively.

The regression results support the well-defined negative relationship between parents' education and child's probability of school dropout. The higher educational level of household head or his/her spouse is more likely to reduce the probability of schooling dropout of their children. For example, as the education of household head increases by one level, the schooling dropout probability of children reduces by 5.5%, 0.7% and 1.4% in 1993, 1998 and 2002, respectively. The interesting thing is that while reducing overtime, the effects of the education of the household head and his/her spouse on dropout probability of their children have been rather equal.

Having more siblings may increase the schooling dropout probability. In 1993 and 2002, having one more sib increased the schooling dropout probability by 0.9% and 0.3% respectively. Both these effects are statistically significant. However, for the year of 1998, this explanatory variable is not a significant determinant of the schooling dropout (and has a wrong sign of coefficient). Once again, the marginal effect of the variable "No of siblings" is also small.

The probability of dropout depends significantly on the current household's living standard proxied by the household per capital expenditure. The probability decreases as the household's per capita expenditure increases. The schooling dropout probability reduced by 14.6% in 1993, 5.8% in 1998, and 5.4% in 2002 as the household's per capita expenditure increased by 1%. Although the effect of household per capital expenditure has been declining, its magnitude is still high.

In order to see the gender difference in the household's living standards affects on the schooling dropout probability, we run the probit model separately for boys and girls (see Appendix 3). The estimations show that girls have benefited from their household's per capita expenditure increase more than boys did. In 1993, as the household's per capita expenditure increased by 1%, the schooling dropout probability of a girl increased by 29%, while that of a boy increased by only 6.1%. The similar situations can also be seen in 1998 and 2002, but the "benefit" girls and boys could get from an increase in per capita expenditure was more equal.

The direct cost of schooling has also similar significant and large, but opposite impact on the schooling dropout probability of children in general and of boys and girls in particular

¹⁹ Remember that the average number of hours per year a child devoted to work in 1993, 1998 and 2002 is 884, 625, and 479 respectively (see Table 3.6).

(Table 4.2 and Appendix 3). However, the effect of 1%-decline in the direct cost of schooling on the reduction of the dropout probability is higher than that of 1%-increase in the their household's per capita expenditure.

Regional-specific economic and social conditions could also bear important implications for decision about educational retention or dropout. Table 4.2 reveals that other things being equal, the schooling dropout probability of children varies differently among the regions and its significance also changes. This estimation outcome seems to be consistent with the rather complex dropout situation by region we observed in Section 3.

In brief, our estimations have revealed the major determinants of the schooling dropout choice by households, including variables of child's characteristics and household economic situation. In general, the effects of the determinants on the schooling dropout probability are statistically significant, but declining overtime in terms of magnitude. The schooling dropout probability is very sensitive to the changes in the household per capita expenditure and the direct costs of schooling, whereas recently the other determinants have had only minor impacts. In terms of schooling, girls have benefited more than boys did from their household's per capita expenditure increase, while they have suffered more than boys did from an increase in the direct cost of schooling. These differences, however, recently have narrowed substantially. The dropout situation is also regional specific and hence, a comprehensive approach is needed to deal with it (see also Section 3.3).

4.3. Dropout probability projection

In order to project the schooling dropout probability of children in the future up to the year of 2015, we first run the probit model specification used in Section 4.2 using the pooling data from the three VLSS 1992/93, VLSS 1997/98, and VLSS 2001/02. Due to the difference in the sample sizes, each observation in each cross-sectional database is weighted to make those observations become representative for the studied year. All variables of the direct cost of schooling and household's per capita expenditure are converted to the real values by 1994-price. Also, the estimations are applied for all children as well as for boys and girls separately. Table 4.3 presents the estimation results indicating the "average" marginal effects of determinants of schooling dropout probability during 1993-2002. The results are similar to those taken from the regressions using three different cross-sectional data. Especially, we can see the differences, on average, in terms of magnitude of marginal effects of the underlying determinants between the cases of boys and girls. The estimated coefficients of the dummies for the years of 1998 and 2002 (Year 98 and Year 02) also show that other things being equal, the schooling dropout probability has tended to decrease overtime.

Table 4.3: Marginal effect of the determinants of schooling dropout probability
(1993-2002)

Dropout	All Children dF/dx	Boys dF/dx	Girls dF/dx
Sex	-0.0025 (0.440)		
Age	0.0180 (0.000)	0.0147 (0.000)	0.0219 (0.000)
Primary	0.0847 (0.000)	0.0738 (0.000)	0.0960 (0.000)
Work time (hours per week)	0.0041 (0.000)	0.0034 (0.000)	0.0047 (0.000)
Head's education	-0.0172 (0.000)	-0.0169 (0.000)	-0.0168 (0.000)
Spouse's education	-0.0154 (0.000)	-0.0129 (0.000)	-0.0188 (0.000)
No of siblings	0.0016 (0.172)	-0.0010 (0.443)	0.0057 (0.007)
Log(p.c. expenditure)	-0.0813 (0.000)	-0.0584 (0.000)	-0.1064 (0.000)
Log(cost of schooling)	0.0939 (0.000)	0.0744 (0.000)	0.1146 (0.000)
Red River Delta	0.0366 (0.000)	0.0213 (0.025)	0.0561 (0.003)
Northern Mountains	0.0345 (0.001)	0.0093 (0.308)	0.0735 (0.000)
North Central Coast	0.0025 (0.774)	-0.0062 (0.453)	0.0192 (0.295)
South Central Coast	0.0029 (0.747)	-0.0034 (0.697)	0.0127 (0.485)
Central Highland		Reference	
South East	0.0189 (0.037)	0.0123 (0.177)	0.0237 (0.164)
Mekong River Delta	0.0653 (0.000)	0.0384 (0.000)	0.1003 (0.000)
Year 98	-0.0745 (0.000)	-0.0574 (0.000)	-0.0952 (0.000)
Year 02	-0.0479 (0.000)	-0.0257 (0.000)	-0.0790 (0.000)
Observations	19565	10328	9237
Pseudo	0.5939	0.5851	0.6082
Log likelihood	-3478.52	-1731.669	-1708.57

Note: Variables of Year 98 and Year 02 are dummies for 1998 and 2002, respectively.

Source: Author's calculation based on VLSSs 1992/93, VLSS 1997/98, and VLSS 2001/02

Using these results we can project the schooling dropout probability, depending on how the simulation scenarios regarding independent variables are built. The estimation results suggest that the most important is to make appropriate assumptions of the future patterns of the household's per capita expenditure and the direct cost of schooling. Our assumptions of these two variables are as follows:

- *Assumptions of the direct cost of schooling:*

(1) It will increase at the rate equalling to its growth rate we can observed from the VLSSs during 1993 - 2002, i.e. 9.5% per annum; or

(2) it will increase at the rate equalling to the rather ideal inflation rate for Vietnam's economy, i.e. 5% per annum.

- *Assumptions of the household's per capita expenditure:*

(3) It will increase at the rate equalling to its growth rate we can observed from the VLSSs during 1993-2002, i.e. 5.38% per annum; or

(4) it will increase at the rate equalling to the per capita income growth, which in turn is assumed to be as the projected GDP growth minus population growth rate. Regarding the projected GDP per capita, we assume to have two trends: (4a) GDP growth rate will be 7.5% per annum during 2002-2015, which is corresponding to the goals of Vietnam's development strategy; and (4b) GDP growth rate will be high at the rate of 8.0% per annum.

Note that for both cases (3) and (4), we assume that the population growth rate will be 1.3% per annum, which in fact equals its current adequate growth rate.

There are, therefore, six simulation scenarios, which can be used for our projections:

- Scenario 1 is the combination of (1) and (3)
- Scenario 2 is the combination of (1) and (4a)
- Scenario 3 is the combination of (1) and (4b)
- Scenario 4 is the combination of (2) and (3)
- Scenario 5 is the combination of (2) and (4a)
- Scenario 6 is the combination of (2) and (4b)

With the assumption of all other variables being as their mean values²⁰, we then can calculate the schooling dropout probability of children (aged 9-16) in the future up to the year of 2015. Table 4.4 presents the projections of the schooling dropout probability of children in 2010 and 2015.

²⁰ In reality, the patterns of mean values of variables such as work time, number of siblings, parental education levels can change overtime. However, these changes during 1993-2002 are only very minor and the projection outcomes are not different if we take these changes into account.

Table 4.4: Projections of the schooling dropout probability
(in 2010 and in 2015; %)

	2010			2015		
	All	Boys	Girls	All	Boys	Girls
Scenario 1	5.52	5.36	5.70	9.08	8.85	9.34
Scenario 2	4.78	4.64	4.95	7.38	7.18	7.61
Scenario 3	4.38	4.25	4.53	6.57	6.39	6.78
Scenario 4	2.11	2.04	2.19	2.32	2.25	2.41
Scenario 5	1.78	1.72	1.85	1.79	1.72	1.86
Scenario 6	1.60	1.54	1.67	1.44	1.39	1.50

Source: Author's projections

Some observations can be made from Table 4.4. First, the gaps between boys' and girls' dropout rates would likely narrow further compared to that of only 1.6 percentage points we observed in 2002. Thus, in general, we can have a reason to be more optimistic about the elimination of the gender gap in education by the year of 2010.

Also, the schooling dropout rate would likely decline in the future compared to that of 12.4% in 2002. However, *for Scenarios 1, 2, and 3*, where the growth rate of the cost of schooling is higher than that of the household's per capita expenditure, the dropout rate would first decrease and increase again after 2010. Moreover, the dropout rate would be significant in 2015. The relationship between the NER as an indicator targeted and the dropout rate is complex and beyond this study. However, we can make a tentative judgement based on some observations.

In Section 3, we have observed that given the pace of changes regarding the NER during 1998-2002 the national targets of the NERs for children at the age of primary and lower secondary education by 2005 (97% and 80% from 90.1% and 72.1% in 2002 respectively), seems to be difficult to be achieved. Moreover, we know that recently more than 50% of dropout children have been withdrawn from education system at the primary education, but most of them were at the age of 14 or older. Taking into account this information, the dropout rate and the NERs in 2002 as references, there is a chance of 50/50 for Vietnam to achieve the national targets of the primary and lower secondary NERs in 2010 (99% and 90%). But it seems that Vietnam could not achieve the MDG on the universal completion of primary education in 2015 and the achievements recorded by 2010 would be deteriorated.

For *Scenarios 4, 5, and 6*, where the pace of changes in the cost of schooling is lower than that of the household's per capita expenditure, the projections seem to provide a rather bright picture with a sharp reduction of the dropout rate and a good chance for achieving the national education targets in 2010. However, the successes in the future up to 2010

could be hardly maintained in 2015 if the household's per capita expenditure would not grow at the rate higher than that of the cost of schooling by 1.2 percentage points. (see Scenario 5).

5. CONCLUSION

The Doimoi process and especially the market-oriented reforms since 1989 has marked a turning point in the history of Vietnam's economic development and witnessed the continuation of Vietnam's great achievements in education. The NERs for children at the age of primary, lower secondary, and upper secondary education increased from 86.7%, 30.1%, and 7.2% in 1993 to 90.1%, 72.1%, and 41.8% in 2002. The schooling dropout rate of children (aged 9-16) also dropped considerably, from 27.7% in 1993 to 12.4% in 2002. The decline in school dropout rate was much pronounced for girls than for boys and as a result, the gap between boys' and girls' dropout rates became not significant and was only 1.6 percentage points in 2002. However, the pace of positive changes has been slowing down during the period 1998-2002. Moreover, in terms of NER, the gaps between Kinh/Chinese majority and ethnic minorities and between rural and urban areas, though declining, are still significant.

By signing in the Millennium Declaration, the GOV has committed itself to achieving the universal completion of primary education by 2015 and the elimination of the gender disparity to all levels of education no later than 2015. Vietnam's development goals directly based on the MDGs are to increase the NER in primary and lower secondary schools to 97% and 80% by 2005 and to 99% and 90% by 2010 respectively. The GOV has also committed itself to eliminating the gender gap in primary and secondary education and the gap with ethnic minorities by 2005 and by 2010 respectively.

In order to achieve the educational development goals, it is very important to understand the dropout trend and its causes. This study attempts to identify the underlying determinants of the schooling dropout in Vietnam and to project its trend in the future up to 2015.

Our qualitative and quantitative analyses reveal that there are many factors, at the micro, meso, and macro levels, contributing to the households' decision of dropout of their children.

The econometric estimations suggest a number of the major determinants of households' schooling dropout choices, including the child's characteristics and household economic situation. Other things being equal, boys are less likely to drop out of school than girls do, but overtime the gender effect became not important for the households' choice of their children dropout. In general, child age, his/her working time, and the current situation regarding his/her primary education have positive impacts on the schooling dropout probability, while number of siblings and especially "good" education environment in household encourage children to stay in school. These determinants are statistically significant, but declining substantially overtime in terms of magnitude. The schooling dropout probability is very significantly sensitive to the changes in the household per

capita expenditure and the direct costs of schooling. In terms of schooling, girls have benefited more than boys did from their household's per capita expenditure increase, while they have suffered more than boys did from an increase in the direct cost of schooling. These differences, however, recently have narrowed considerably. The dropout situation is also regional specific, but complex and hence, a comprehensive approach is needed to deal with it.

Moreover, the qualitative considerations show that at present the low quality of education is serious problem and this may increase the possibility of children's schooling dropout. The parents' perception of and the community's attitude to education values have also impact on the schooling dropout of children. The last but not least, the dropout situation is very much dependent on the public funding for education. At present, given the budget constrains, the criteria for public resource allocation can not reduce the excessive financial burden for the poorer and is still biased against the poor regions.

Our projection of the schooling dropout probability of children in the future up to the year of 2015 is based on two key assumptions of the household's per capita expenditure and the direct cost of schooling. The projection outcomes are very much depending on how these factors will change. Regarding the scenarios, where the growth rate of the cost of schooling is much higher (for example by 1.2 percentage points) than that of the household's per capita expenditure, the dropout rate would first decrease and increase again after 2010. The tentative assessments suggest that in these cases, there is a chance for Vietnam to achieve the national targets of the primary and lower secondary NERs in 2010. However, Vietnam could very hardly to achieve the MDG on the universal completion of primary education in 2015 and moreover, the achievements recorded by 2010 would be somehow deteriorated. Regarding the scenarios, where the pace of changes in the cost of schooling is lower than that of the household's per capita expenditure, the projections seem to provide a rather bright picture in terms of achieving the national education targets in 2010 and the MDG on education in 2015. The projections also confirm further our optimism about the possibility of eliminating the gender gap in education by the year of 2010.

Some policy implications can be withdrawn from our analyses. First, as the dropout situation is very much dependent on household expenditure, sustaining high economic growth is very crucial for reducing schooling dropout of children in the coming time. As recommended by several studies, this calls for further implementation of the structural reforms such as the reforms of SOE sector and banking system, the increase of the public investment efficiency, the improvement of business environment, and development of private sector, etc. All these measures will create more equal opportunities and expand more income-generating activities for people. In other words, these measures can make economic growth be more pro-poor.

Second, it is necessary to deal with the problems of the cost of schooling since it seems to be an excessive burden for low income households and its rate of changes has been high over the last ten years. As a result, it has caused many families to have to withdraw their children from school. There are two ways to deal with the problems related to the high cost

of schooling borne by households. The first is to increase the education budget of total expenditure to a more appropriate level (the GOV's target is 20% by 2010 from the current rate of about 12%). But much more important is to have a more appropriate mechanism of public resource allocation, which should take into account not only the population/number of students, but also other factors such as the proportion of illiterates, the share of ethnic minorities and the poor in population.

Third, since dropouts are concentrated in some specific group of people and in some specific region, developing targeting programs which incorporate poverty reduction and education improvement is crucial to keep children in the schools. The role of community in terms of strengthening the families' perception of education and making the limited public resources for education to be used more efficiently should be strengthened. In addition, developing the social safety nets against the short-term shocks to the poor households could help them to continue keeping their children to stay in school.

This study, of course, can not avoid some limitations. The complexity of the relationship between the NER as an indicator targeted and the dropout rate needs to be more insightfully examined. It is also more interesting if the role of macroindicators such as public spending on education can be incorporated in our quantitative analysis of the schooling dropout choices by households.

References

1. Admassie (2002). "Allocation of Children's Time Endowment Between Schooling and Work", *ZEF Discussion Paper on Development Policy* No 44, Berlin
2. Bhushan, I., Bloom. E., Nguyen Hai Huu, and Nguyen Minh Thang (2001). *Human Capital of the Poor in Vietnam*, Asia Development Bank, Manila, Philippines.
3. Canagarajah, S and H. Coulombe (1997). "Child Labour and Schooling in Ghana", *World bank Working Paper* No 1844, The World Bank.
4. Cockburn, J. (1999). "The Determinants of Child Labor Supply in Rural Ethiopia", Paper submitted in application for transfer from probationary research to D.Phil. Status, Nuffield College, Oxford University, UK
5. Datcher, L. (1982). "Effects of Community and Family Background on Achievement", *Review of Economic Statistics*, 64(1).
6. Duncan, T. (1994). "Gender Differences in Household Resource Allocations", *Living Standards Measurement Working Paper Series* No. 79, World Bank, Washington D.C.
7. Glick, P., and D. E. Sahn (2000). "Schooling of Girls and Boys in a West Africa Country : The Effects of Parental Education, Income, and Household Structure", *Economics of Education Review* 19(2000).
8. GSO (General Statistical Office) (various issues), *Statistical Yearbook*, Statistical Publishing House, Hanoi.
9. Haveman, R. & B. Wolfe (1995). "The Determinants of Children's Attainments: A Review of Methods and Findings", *Journal of Economic Literature*, Vol. XXXIII, December.
10. Jacoby, H.G. and E. Skoufias (1997). "Risk, Financial Markets, Human Capital in a Developing Country", *Review of Economic Studies* 64.
11. Le Bach Duong (2000), "Education and Human Development in Vietnam", A background paper for National Human Development Report, Institute of Sociology, National Center for Social Sciences and Humanities, Hanoi, April.
12. Le Dang Doanh, Vo Tri Thanh, Pham Lan Huong, Dinh Hien Minh, and Nguyen Quang Thang (2002), "Explaining Growth in Viet Nam", EADN Global Research Project
13. Leclercq, F. (2001). "Patterns and Determinants of Elementary School Enrolment in Rural North India", *Working paper*, TEAM-CNRS, Universite de Paris 1, Paris, France
14. Llord, C. B, and A. Blanc(1996). "Children's Schooling in Sub-Saharan Africa: The Role of Fathers, Mothers, and Others", *Population and Development Review* 22 (2), June.
15. NCSSH (National Centre of Social Science & Humanity) (2001). *National Human Development Report 2001: Doimoi and Human Development in Vietnam*, National Political Publishing House, Hanoi, November.
16. Nguyen Thi Minh Tam *et al.* (1998). "Phenomenon of Young Girl Dropouts in Rural Areas of the Red River Delta – Socio - Economic Causes and Solutions", Vietnam Netherlands Research Programme, Hanoi
17. Nguyen Vu Binh (2001). "Child Labour in Vietnam", MA thesis, unpublished, NEU-ISS, the National Economic University, Hanoi
18. Oxfam GB(2000). "Baseline Survey Report on Primary Education in Long Vinh Commune", Duyen Hai District, Tra Vinh province, Hanoi
19. SC (The Steering Committee of CPRGS) (2003). *Vietnam: Growth and Reduction of Poverty*, Hanoi, November.

20. UNDP (2003), *Human Development Report 2003*, Oxford University Press, New York – Oxford.
21. UNVN (United Nations in Vietnam) (2003). *Millennium Development Goals: Closing the Millennium Gaps*, Hanoi, November.
22. Vo Thanh Son *et al.* (2001). “School Enrolments and Drop-outs”, in D. Haughton *et al* (eds), *Living Standards during an Economic Boom*, Statistical Publishing House, Hanoi.
23. Vo Tri Thanh (2004), "Viet Nam's Recent Economic Reform and Development: Achievement, Paradoxes and Challenges", in Phillip Taylor (ed.), *Social Inequality and the Challenges to Reform in Vietnam*, ANU (forthcoming).
24. Vu Quoc Ngu (2004). “Economic Development and Social Differentiation in Vietnam”, in Phillip Taylor (ed.), *Social Inequality and the Challenges to Reform in Vietnam*, ANU (forthcoming).
25. World Bank (1999), *Vietnam Development Report 2000: Attacking Poverty*, Joint Report of the Government – Donor-NGO Working Group, Hanoi, December
26. World Bank and other donors (2003). *Vietnam Development Report: Poverty*, Hanoi, December.

Appendix 1: Vietnam Living Standard Surveys

This study uses extensively two data sets from Living Standard Survey conducted in 1992/1993, 1997/1998 and 2001/02. These were comprehensive surveys of household living standards in Vietnam. General Statistics Office took responsibility to conduct these surveys with the financial support of SIDA (Sweden) and the UNDP and technical support of the World Bank (for the two first surveys) and the Government budget (for the third survey).

In the VLSS 1992/93 survey, 4800 households living in 240 rural villages and 60 urban blocks have been selected randomly. The applied sampling procedure ensured that the probability of being selected of every household in the country was equal. The total sample size was 23,839 individuals.

The 1997/1998 survey was a follow-up to the original survey with the intention to form a panel data including both the 1992/1993 VLSS and 1995 Multipurpose household survey respondents. The second VLSS comprised of 6,002 households. Of which 4305 households participated in the first VLSS. Information collected from these 4,305 households in 1992/1993 and 1997/1998 has made up a panel data. This panel data allowed a greater understanding of the dynamics of households in Vietnam, which is usually missing from most surveys in the developing world.

The 2001/02 survey was conducted solely by the General Statistics Office of Vietnam. However, the questionnaires used in this survey were modified from the two previous surveys. Some parts of the questionnaire were trimmed while some others were kept similar to those in the 1992/93 and 1997/98 surveys. The survey covered 75000 randomly selected households. Those households were divided into 2 groups. The first group consists of 30,000 households. And the second group includes 45,000 households. The households in the first group were asked with more detailed question relating to household income while those in the second groups were not asked about their household income. By the time of writing this report, the GSO did not yet finish the cleaning of the raw database of both groups. The database used for our study covers only 30,000 households in the first group.

Appendix 2: Mean, Standard deviation, Minimum and maximum of some variables

Variable	1993				1998			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Sex	0.521	0.500	0	1	0.532	0.499	0	1
Age	12.310	2.356	9	16	12.714	2.294	9	16
Work time	885	838	0	5684	620	799	0	9832
Primary	0.658	0.474	0	1	0.444	0.497	0	1
No of siblings	3.721	1.597	1	11	3.325	1.454	1	10
Head's education	1.706	0.859	0	4	1.855	0.902	0	4
Spouse's education	1.785	0.760	0	4	1.462	0.993	0	4
Log(cost of schooling	4.639	1.033	0	7.313	5.872	0.983	0	8.517
Log(p.c. expenditure)	7.004	0.565	5.331	9.419	7.819	0.584	5.969	10.411

Variable	2002				Pooled Data			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Sex	0.529	0.499	0	1	0.528	0.499	0	1
Age	12.517	2.274	9	16	12.528	2.289	9	16
Work time	449	676	0	4745	10	14	0	189
Primary	0.476	0.499	0	1	0.489	0.500	0	1
No of siblings	2.956	1.302	1	12	3.094	1.384	1	12
Head's education	1.869	0.883	0	4	1.856	0.881	0	4
Spouse's education	1.568	0.987	0	4	1.583	0.966	0	4
Log(cost of schooling	5.721	0.898	0.693	9.741	5.218	0.955	0	9.277
Log(p.c. expenditure)	7.878	0.560	6.043	10.770	7.370	0.579	5.331	10.307

Source: Authors' estimation based on VLSS 1992/93, VLSS 1997/98 and VLSS 2001/02

Appendix 3: Marginal effects of determinants of the schooling dropout probability

(By girl and by boy)

Dropout	1993		1998		2002	
	Girls	Boys	Girls	Boys	Girls	Boys
	dF/dx	dF/dx	dF/dx	dF/dx	dF/dx	dF/dx
Child's age	0.0903 (0.000)	0.0287 (0.000)	0.0164 (0.000)	0.0088 (0.000)	0.0043 (0.001)	0.0044 (0.000)
Work time	0.0002 (0.000)	0.0001 (0.000)	0.0001 (0.000)	0.00003 (0.000)	0.0001 (0.000)	0.0001 (0.000)
Primary	0.1822 (0.000)	0.0782 (0.000)	0.1356 (0.000)	0.0967 (0.000)	0.0478 (0.000)	0.0383 (0.000)
No of siblings	0.0204 (0.008)	0.0029 (0.482)	0.0050 (0.074)	-0.0040 (0.010)	0.0026 (0.085)	0.0027 (0.027)
Head's education	-0.0818 (0.000)	-0.0358 (0.000)	-0.0094 (0.026)	-0.0042 (0.052)	-0.0104 (0.000)	-0.0165 (0.000)
Spouse's education	-0.1046 (0.004)	-0.0220 (0.022)	-0.0200 (0.010)	-0.0042 (0.167)	-0.0133 (0.000)	-0.0120 (0.000)
Log (p.c. expenditure)	-0.2851 (0.000)	-0.0605 (0.000)	-0.0615 (0.000)	-0.0409 (0.000)	-0.0655 (0.000)	-0.0432 (0.000)
Log (cost of schooling)	0.3583 (0.000)	0.1251 (0.000)	0.0703 (0.000)	0.0394 (0.000)	0.0744 (0.000)	0.0628 (0.000)
Red River Delta	0.3313 (0.029)	0.3463 (0.015)	-0.0026 (0.919)	0.0018 (0.887)	0.0302 (0.011)	-0.0006 (0.934)
Northern Mountain	0.2682 (0.088)	0.1178 (0.245)	0.0395 (0.268)	0.0157 (0.367)	0.0463 (0.000)	-0.0004 (0.952)
North Central Coast	0.2537 (0.102)	0.2010 (0.109)	-0.0189 (0.318)	-0.0107 (0.152)	0.0091 (0.436)	-0.0071 (0.328)
South Central Coast	-0.0884 (0.381)	-0.0079 (0.899)	0.0403 (0.291)	0.0024 (0.856)	0.0212 (0.122)	0.0005 (0.952)
Central Highland	Reference					
South East	0.0207 (0.866)	0.0942 (0.333)	0.0101 (0.717)	0.0020 (0.874)	0.0106 (0.352)	0.0050 (0.929)
Mekong River Delta	0.1003 (0.428)	0.0988 (0.284)	0.0771 (0.060)	0.0033 (0.790)	0.1007 (0.00)	0.0561 (0.000)
Observations	1061	1159	1406	1577	6770	7592
Pseudo R2	0.6597	0.6350	0.6694	0.6835	0.5547	0.5478
Log Likelihood	-225.147	-219.626	-203.848	-187.991	-1128.683	-1199.041

Source: Authors' estimation based on VLSS 1992/93, VLSS 1997/98 and VLSS 2001/02