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VIET NAM

HIGH QUALITY EDUCATION FOR ALL BY 2020

JUNE 2011

VOLUME II: ANALYTICAL REPORT

VOLUME III: APPENDIX

Human Development Department
East Asia and pacific Region
The World Bank

VIETNAM

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VOLUME II: ANALYTICAL REPORT

THE BELGIAN DEVELOPMENT COOPERATION .be

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ABBREVIATIONS AND ACRONYMS

AR	Attendance Rate
CCTs	Conditional Cash Transfers
CSF	Campus Support Fund
FDS	Full Day Schooling
FII	Fundamental Input Index
FSQL	Fundamental School Quality Levels
FTE	Full Time Equivalent
FTI	Fast Track Initiative
GDP	Gross Domestic Product
GER	Gross Enrollment Rate
LSE	Lower Secondary Education
MOET	Ministry of Education and Training
MTEF	Medium Term Expenditure Framework
NER	Net Enrollment Rate
NVA	Non Value Added
PDTP	Primary Education Development Project
PEDC	Primary Education for Disadvantaged Children Project
PRSC	Poverty Reduction Strategy Credit
PSD	Primary School Dataset
PTA	Parents' Teachers' Association
REML	Random Effects Maximum Likelihood
SEQAP	School Education Quality Assurance Program
TBS-EFA	Targeted Budget Support - Education for All
USE	Upper Secondary Education
VA	Value Added
VHLSS	Vietnam Household Living Standards Survey
VLSS	Vietnam Living Standards Survey
WB	World Bank
WTO	World Trade Organization

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CHAPTER 1: INTRODUCTION

In recent years, Vietnam has experienced impressive poverty reduction performance based on a strong macroeconomic foundation. Vietnam has experienced nearly unparalleled economic growth and change over the past 20 years. During that time, GDP in Vietnam has grown about 7 percent annually and the latest socio-economic plan for 2011-2015 calls for a growth rate of 7-8 percent. Overall economic trends are still very positive, despite the recent global financial crisis; in fact, Vietnam has recovered from the crisis faster than almost any other country and recorded a growth rate of 5.3 percent in 2009. The country's recent record of poverty reduction is nothing short of spectacular – the poverty rate has declined from nearly 60 percent in 1993 to about less than 14 percent in 2008. However, the positive trends in overall growth and poverty reduction don't tell the whole story, and it is not the case that all sectors of society are moving forward at an equal pace. Urban household expenditures double that of rural households, poverty continues to have a strong spatial dimension, and progress in poverty reduction continues to be overall slower for Vietnam's ethnic minorities.[1]

Concerns about equity and inclusion are not unusual in developing countries where the economy is expanding rapidly. Not surprisingly, one of the consequences is growing pressure on the education system. For many Vietnamese, the surest way to higher status and incomes is through education. There is also a strong social demand for education and training, not to mention the demands of a knowledge-based economy that is growing under the influence of globalization and the recent accession to World Trade Organization (WTO) in particular.

Vietnam has already made great strides to address some of these increasing pressures. The government has expressed a strong commitment to achieving universal basic education as a foundation for social development and economic growth. This commitment is reflected in the impressive improvements in education attainment since the early 1990s. According to household survey data, between 1992 and 2008 the percentage of the population aged 25-55 without any education level completed decreased from 23 percent to less than 1 percent. These improvements have been concentrated in primary and secondary education, although access to university has also steadily increased during this period (see Table 1.1). Additionally, rural and lower income populations have benefited the most from the increase in primary and lower secondary attainment.

Primary enrollments are now nearly universal,[2] and the gross enrollment rate in lower and overall secondary is reaching, respectively, about 80 and 70 percent according to the most recent data,[3] placing Vietnam in a very favorable position vis-à-vis countries with similar income per-capita. The expansion in secondary education since 1992 has been especially notable. Beyond enrollment or attendance rates, the completion rate of primary, lower secondary and upper secondary has also increased substantially since 1992. As a result, school life expectancy[4] in Vietnam had already reached 10.5 completed years in 2004. This indicates that the educational attainment of the 25 to 55 years old in 2020 will be yet much higher than it is now.

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1 Glewwe, Agrawal & Dollar, 2004; World Bank, 2006; Swinkels & Turk, 2006.

2 Specific values differ depending on the methodology, but always rank between 95 and 100%.

3 UIS, 2010.

4 Index calculated by the UIS, which measures the number of years that a child aged 4 years can expect to spend within the primary to tertiary levels.

Table 1.1. Educational Attainment (population aged 25-55)

	1992	1998	2004	2006	2008
None	22.71	0.02	1.75	0.95	0.66
Primary	27.29	39.70	41.67	33.46	32.39
LSec	29.58	31.70	31.34	34.42	33.41
USec	7.22	20.20	12.76	11.87	12.41
Vocational	10.27	6.37	9.34	14.07	12.83
Undergraduate	2.88	1.94	3.05	5.07	8.08
Masters	0.01	0.04	0.07	0.16	0.19
Doctorate	0.04	0.02	0.02	0.01	0.04

Source: Nores, 2008a.

Relative to other countries in East Asia and the world, Vietnam is also performing fairly well. Tables 1.2-1.3 of gross enrollment ratios and attainment completion/incompletion show that Vietnam is performing above the international average at all educational levels except tertiary education. Within East Asia, Vietnam is also performing better than other low-income countries and at similar levels to some middle-income countries.

Table 1.2. 2001 East Asia Gross Enrollment Ratio

	Pre-primary	Primary	Lower secondary	Upper secondary	Secondary	Tertiary
International Average	35	99	75	46	61	20
High-income countries						
Japan	85	100	102	102	102	49
Korea, Rep.	77	102	99	90	94	83
Middle-income countries						
Malaysia	52	97	90	46	65	25
Thailand	89	94	71	55	63	41
China	38	112	85	37	63	10
Indonesia	26	115	75	42	58	15
Philippines	29	110	79	64	75	30
Mongolia	31	103	79	57	72	34
Low-income countries						
Vietnam	**41**	**104**	**80**	**47**	**67**	**10**
Lao PDR	7	108	47	25	36	3
Cambodia	7	110	28	11	20	2

Source: UNESCO Institute for Statistics.

Table 1.3. 2010 East Asia Percentage of population (age 15+) by educational attainment, age 25+

	No education	Incomp. primary	Comp. primary	Incomp. secondary	Comp. secondary	Incomp. tertiary	Comp. tertiary
High-income countries							
Japan	0	19	14	45	30	36	24
Singapore	8	31	17	42	16	19	12
Hong Kong SAR (China)	14	17	14	53	35	16	7
Korea, Rep.	4	11	10	48	38	37	17
Middle-income countries							
Malaysia	10	20	13	56	34	14	5
Thailand	13	58	27	20	10	9	9
China	8	29	18	57	40	6	4
Indonesia	21	52	30	25	19	3	2
Philippines	5	30	18	35	20	30	22
Mongolia	3	14	8	70	40	13	8
Low-income countries							
Vietnam	6	68	39	22	11	5	3
Lao PDR	34	36	21	25	6	5	3
Cambodia	2	83	48	15	8	1	1

Source: World Development Indicators.

In addition to ramping up participation and completion rates across all levels, the government has put a renewed emphasis on the quality of primary education by introducing new curricula and textbooks, implementing a program of teacher professional development to support the use of the new curriculum and improve teacher quality, and introducing key minimum quality standards for schools in terms of teaching staff, teaching materials, infrastructure and school management (Fundamental School Quality Levels, or FSQL). Recent Ministry of Education and Training (MOET) data indicate that FSQL have been growing by about 11 percent from 2004 to 2007.[5] Additionally, this growth has been faster for the poorest districts since 2004 (15% versus 11% at the national level), indicating that the quality gap, at least measured through this important input, is being addressed.

Vietnam has clearly made impressive gains in expanding educational opportunities over a relatively short period of time. These improvements—especially in terms of participation—represent a significant public policy accomplishment, and are a direct result of a focused and sustained effort by the Vietnamese government and international partners.

Nevertheless, more work remains to consolidate these gains and build a truly first-rate educational system. Two areas will require the most attention. First, there is the problem of ***persistent or even increasing inequalities in educational attainment***. The poorest households and ethnic minorities have been the main beneficiaries of increasing access to primary and lower secondary education over the 1992-2008 time period. Nevertheless, when taking into account other education levels, overall inequalities in educational attainment have in fact increased.

5 See 2007 FSQL District Audit.

It is important to restate that inequality is increasing because of different *rates of improvement,* not because things are getting worse for some. This divergence is partly explained by two factors. Household survey data from 1992-2008 reveal generally persistent, or even increasing, gaps in secondary attendance and completion rates between poor and wealthy, rural and urban areas, and Kinh and Chinese versus ethnic minorities. When it comes to this critical level of education, the poorest sectors of society are falling behind, rather than catching up with, their more advantaged neighbors.

Also, while the country has moved steadily towards universal primary coverage, in 2006-07 there was still a gap of about 20 percentage points between the primary completion rate of the richest and poorest quintile, and 10 percentage points between the average national survival rate and the survival rate of the poorest districts.[6] These gaps highlight the challenge of meeting the universal primary completion target once the poorest and most isolated sectors of society enter school.

These trends increase the potential for a vicious cycle that generates more and more inequality. Slowly moving primary completion rates can exacerbate inequality in secondary education attendance and completion. This in turn has consequences for access to higher education and, ultimately, labor market success. It is therefore imperative that policymakers address these critical "pressure points" in the grade attainment sequence.

The second and interrelated problem facing Vietnam's education system is one of ***insufficient school quality***. There is some attenuation of the gains in participation and completion when school quality is low. Simply stated, the payoffs to universal primary and secondary completion are limited if students are not obtaining the knowledge and skills they need for post-secondary schooling, or the changing needs of a growing economy. Furthermore, low quality schooling plays a role in explaining the persistence of primary and secondary school dropout for disadvantaged population groups.

The evidence on school quality in Vietnam comes mainly from the primary level. Although school inputs and teacher training levels are improving, the resources available to schools remain much below the desired level.[7] Vietnamese students also lag behind others in terms of opportunity to learn. On average instructional time averages 513 hours per year in primary and about 16.7 hours of teacher teaching per week.

Test score results make it possible to track systemic performance while also providing an indirect indication of school quality. In Vietnam, the bulk of the evidence on quality and performance comes from two large-scale applications of standardized tests in grade five.[8] The results show substantial improvement during the 2001-2007 period. Particularly in mathematics, the evidence suggests that primary schools are generally preparing their students for the post-primary curriculum. However, this progress is mainly reflected in terms of minimum (or basic) competency levels, and does not mean that Vietnamese students are scoring very high, or have demonstrated extensive higher-order cognitive skills. Also, the results for Vietnamese reading are less positive, and there are very large gaps between urban-rural, poor-wealthy and ethnic minorities-majorities.

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6 2007 MOET data.

7 See Fundamental Input Index, or FII. This is a composite index which combines individual indicators on teaching staff, teaching materials, infrastructure and school management into an overall score. This will be returned to below.

8 World Bank, 2002; Griffin & Cuc, 2009.

So once again the evidence is generally positive, especially considering the positive trend in overall averages. But as is the case with school attendance and attainment, much work remains to improve the overall performance of the average student, and especially to reduce the persistently large gaps that exist between individual groups of Vietnamese children.

Overall, Vietnam is at a crossroads separating a lower and middle-income country. First generation reforms aimed at guaranteeing access for all to basic education and minimum quality standards have been successfully completed. This in turn has created the basis for second generation reforms aimed at supporting universal primary completion, increased secondary attainment and completion of the most vulnerable groups, higher overall quality, and equity of learning outcomes as opposed to equity of inputs.

The Present Study: A Brief Overview

The overarching purpose of this study is to provide a detailed descriptive and analytical diagnostic of educational attainment and quality in Vietnam. This includes an analysis of changes that are taking place over time as well as the key factors that affect critical outcomes, such as grade attainment and learning outcomes. This emphasis on participation and quality reflects the growing concerns about equity in Vietnam, and the study examines ways in which these elements affect each other. Of particular interest throughout the discussion are disadvantaged groups and the factors that hinder their education performance, and where urgent action is needed before disparities become unmanageable.

A series of background papers were commissioned to take advantage of the exceptionally rich data that are currently available in Vietnam. The papers are grouped together by topic, and are augmented (where possible) by existing research on education in Vietnam. This "triangulation" of evidence across diverse data sources greatly facilitates the task of providing a solid diagnostic on educational attainment and achievement, and their determinants, together with a menu of policy options. The background papers include a mix of diagnostic, modeling, and policy related discussions. They are instrumental not only for providing timely inputs for key education policy decisions, but also in helping set or further develop the priorities and the monitoring and evaluation framework of existing, new, and recently completed World Bank operations. The policy papers also make a special effort to summarize—in an understandable and user-friendly way—the main findings of the analysis, and propose concrete policy options. The task of the present review is to distill this information into a useable format that can help inform a wide range of stakeholders working in education in Vietnam. The richness of the data—combined with high level technical analysis—gives an unprecedented overview of the education sector in Vietnam.

The research questions are presented in more detail in the next chapter. The empirical methodology is presented in the individual papers, and includes simple descriptive analysis together with more sophisticated modeling. Annex A provides a summary of the databases. The data include two comprehensive learning outcome studies (grade 5 reading and mathematics assessment study in 2001 and 2007), with both test results and key pupil, household and school determinants; a series of Vietnam Household Living Standards Survey (VHLSS) (1992, 1998, 2002, 2004, 2006 and 2008), some of them complemented with school surveys; an additional dataset with achievement in 2007, for a share of the households included in the VHLSS 2006, and with additional school survey data; and a comprehensive primary school database covering community, schools, classrooms and teachers' characteristics of all the country's primary schools from 2003 to 2007/08 (FSQL District Audit). Details on the samples, instruments, variables included, etc, are also included in Annex A.

The study proceeds as follows. Chapter 2 provides a more detailed Conceptual and Analytical Framework that sets the stage for the empirical review and analysis. Chapter 3 provides a brief institutional and demographic overview of the Vietnamese Context. Chapter 4 provides an Outcome Diagnostic that summarizes trends and differences between groups for two critical outcomes (school attendance and academic achievement). Chapter 5 reviews the distribution of School Access and Quality Features in an effort to document the constraints to equitable outcomes. The focus shifts to Variables That Matter in Chapters 6 and 7 where the results from the statistical analysis of the determinants of school attendance (Chapter 6) and learning outcomes (Chapter 7) are synthesized. The predictors of interest include family background measures as well as school and teacher characteristics, in addition to specific policy levers and interventions. Finally, a separate overview/policy report undertakes a synthesis of the main findings, and derives their critical policy implications for Vietnam.

This work comes at an opportune time both for Vietnam's education sector and for the work of the World Bank, for a number of reasons. First, *it will feed into a set of critical education policy decisions that the government has to soon undertake.* After some initial drafts, Vietnam is currently still developing its new Education Strategic Plan 2008-2020, which will set the priorities of the education sector over the next 12 years. The overall vision of the plan is to further expand the opportunities for universal high quality education, and to improve the quality and effectiveness of each level of the education, training and professional programs, and research and creative activities. The proposed study fits very well within this vision, and would provide highly valuables inputs for its development and implementation.

Vietnam is also in the process of developing minimum quality standards for secondary education. The attainment and learning outcomes analysis for secondary education will provide valuable inputs for the definition of these standards. Finally, the country is in the process of developing and implementing a Medium Term Expenditure Framework for education (MTEF) as a tool for planning the resources needed by the education sector. This requires identifying the key variables and reforms that should be the focus of the education policy to help identify the needs for future resources and help develop a results-based expenditure planning framework.

The second reason for the importance of this study is that *this study has already and will continue to feed into the design and assessment of education projects and programs.* The World Bank has a new operation in basic education which just became effective, the School Education Quality Assurance Program (SEQAP), which is focused on addressing the two central challenges of teacher quality and instructional time in Vietnam. The background papers for the study have already provided valuable inputs for the design of the operation, and the study itself will provide new inputs for the implementation, monitoring and evaluation framework of this new operation. The diagnostic papers on access to education and comparative learning outcomes have also provided valuable inputs for the further development of the monitoring and evaluation frameworks of the (now completed) Targeted Budget Support – Education for All (TBS-EFA) program, the on-going Primary Education for Disadvantaged Children (PEDC) project, and the evaluation of the just completed Primary Education Development Project (PDTP). It is expected that the results of the study will provide useful guidance for the design of the new primary education Fast Track Initiative (FTI) under preparation, by identifying effective access and quality-enhancing measures in primary education which could be further supported. Finally, the study could also inform subsequent policy triggers and actions for the on-going Poverty Reduction Strategy Credit (PRSC).

CHAPTER 2: CONCEPTUAL AND ANALYTICAL FRAMEWORK

2.1. Conceptual Overview of Student Attendance and Achievement

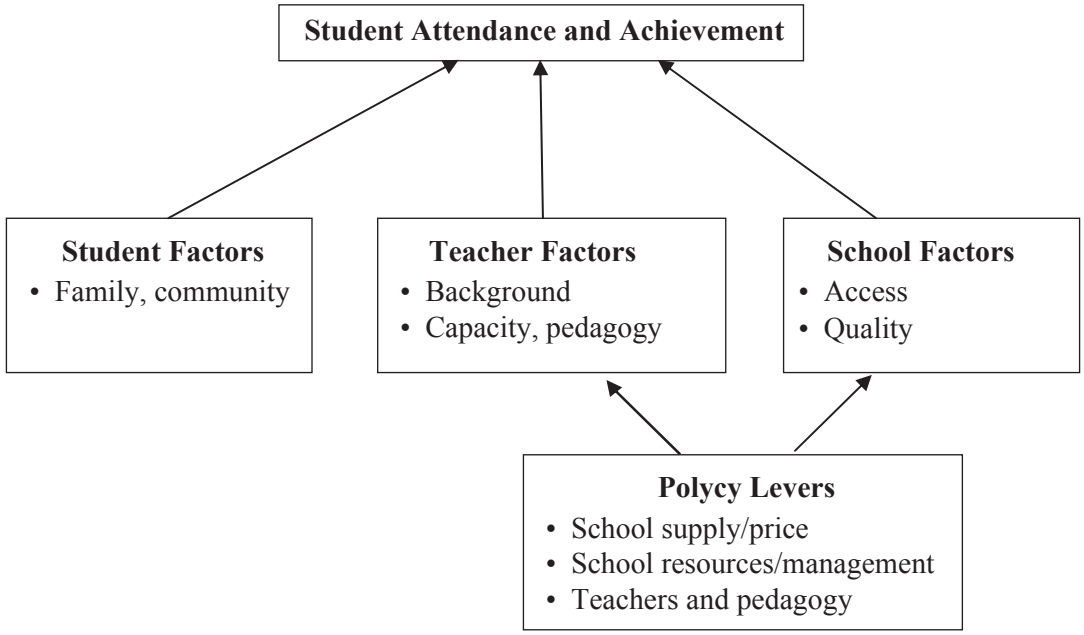
Despite considerable accomplishments in a relatively short period of time, Vietnam, like many developing countries, faces a problem with persistent inequalities in grade attainment. Limited access, high costs, and poor preparation in earlier years of schooling are common reasons that make disadvantaged children vulnerable to primary and secondary school dropout, not enrolling in secondary school, and other inequalities in grade attainment. Each of these problems has consequences for development and equity in Vietnam.

Policy (and research) discussions of school quality tend to focus on student achievement outcomes. This emphasis on achievement is limited given the possibility that school features affect school attendance decisions. Nevertheless, there is a massive research base linking school, teacher and classroom features with test scores. And this is accentuated by the fact that student achievement is not only critical by itself but also because it conditions school attendance.

Given these goals of improving student attendance and achievement, the policy imperative is therefore to understand more about the underlying causes, and look for sustainable and cost-effective solutions for better outcomes. Education production functions have been a common tool of empirical research to understand the magnitude and direction for which a set of educational inputs are related to a given outcome. Building on this tool, this report uses multivariate regression analysis to examine the student, teacher, and school factors associated with student attendance and achievement (figure 2.1). Within these factors, this report highlights five key groups of variables related to both outcomes: 1) student factors related to family background and community resources; 2) teacher background such as education and experience; 3) teacher characteristics related to capacity and actual pedagogical choices; 4) school factors related to access in the supply of schooling and fees/contributions; and 5) school factors related to the quality of its resources and management.

While some factors influence one outcome more than the other, there is much overlap across factors and outcomes. This suggests that attendance and achievement are not mutually exclusive goals, but rather complementary goals for which efforts to improve even one of these groups can often improve both outcomes. This report highlights the student background characteristics that are important predictors of student performance. However, since these factors such as income and ethnicity are often less malleable, the role of government in policy reform is most effective at influencing teacher and school factors. As such, the main focus of this report is the teacher and school factors that are most tenable for Vietnam to implement education policy.

Figure 2.1: Conceptual Framework of Student Attendance and Achievement



Student Factors

For disadvantaged children, their higher costs of schooling can deter them from attending school, while their family background characteristics can constrain them from performing well. The most common explanation for school dropout (or non-enrollment) is the "poverty explanation".[9] Even assuming that there are high *future returns* to sending a child to school, the *present costs* of doing so may be perceived as too high. For example, poor families cannot always afford the out-of-pocket expenses associated with schooling, such as materials and enrolment fees. Their children may also play an important role in the household economy, and when the child's time is valuable to the household, school attendance has an additional "opportunity cost."

Interest in the relative importance of family background versus school features can be traced back to the earliest large-sample studies of student achievement, including the Coleman Report in the United States.[10] The report found that students' family background including socioeconomic status is an important predictor of educational outcomes. As an example of social capital that occurs outside of schools, the added benefit of these educational support resources and interactions from the family—along with support from the community and between students (peer effect)—combine to play a substantial role in determining student achievement.

Thus, this report attempts to capture the student factors that may influence student attendance and achievement. These factors include the student's age, gender, ethnicity, household wealth and consumption, and parental education. Although student factors are an important contributor to student learning, many of these factors such as household income, gender, and ethnicity are beyond the control of policymakers. Instead, policies for improving teachers and schools are more feasible, and as a result, are the primary focus of this report.

9 UNICEF, 2008; Marshall, 2009.

10 Coleman, et al. 1966.

Teacher Factors

While there is not much evidence on the role of teacher quality on student attendance, there has been much research on the relationship between teacher quality and student achievement. As such, this report examines the role of teacher background, capacity, and pedagogy as measures of teacher quality on student achievement, and to a lesser degree, on student attendance. Empirical analyses have historically emphasized teacher training and qualifications. Although important, these teacher background characteristics like experience, education, and training do not show consistently strong effects on student achievement.

The more significant teacher characteristics are likely to come from actual measures of capacity and pedagogical choices. A review of the different elements of teachers likely to be related to student achievement points to several characteristics.[11] Teacher capacity includes specific domains of knowledge that are critical for good teaching. Teachers must first be familiar with the subject matter they are responsible for.[12]

Teachers also draw on knowledge about how to teach. These pedagogical skills are acquired in pre-service methods courses and in-service professional development, through experiential learning that comes from trial and error in their own classroom, and through mentor effects from watching other teachers or working closely with other school personnel (e.g., teachers and directors). There is also the specialized knowledge that is a product of both pedagogical and content knowledge domains. This concept of "pedagogical content knowledge" (PCK) is receiving more and more attention in the empirical literature.[13]

Process indicators that accurately reflect actual *pedagogical choices* in the classroom are likely to have the most direct impact on student learning. These are difficult to measure, but this report attempts to measure the process indicators using teachers' frequency in assigning homework, planning, providing feedback to students, and teaching using group work and notes.

School Factors

The previous discussion on school attendance has assumed that there are substantial returns to schooling. However, if children are not learning in the local school, or if parents perceive little chance of continuing on to the next level of schooling, then pulling children out of school may be a rational decision. This in turn highlights the importance of understanding school supply not just as a function of physical access to school. It also refers to the *quality* of school and the *availability* of all levels of schooling, beginning with pre-schools and extending through secondary school. Even more than simply attending school, students are also more likely to perform better in high-quality schools. Thus, the school factors associated with student attendance and achievement can be divided into those factors that influence access to and quality of schooling. While access to schooling largely affects student attendance, quality of schooling affects both student attendance and achievement.

This report examines the role of the supply of schooling and fees/contributions in providing students with access to schooling. It measures school supply in terms of the physical proximity of schools at different levels,[14] class size,[15] the presence of satellite schools and main campuses,

11 Marshall & Sorto, 2009.

12 Boero, Dapueto, & Parenty, 1996.

13 Lee Shulman, 1986; Hill et al., 2005; Baumert et al., 2009; Marshall & Sorto, 2009.

14 Jamison & Lockheed 1987; Lavy 1996.

15 Case & Deaton 1999.

and the presence of preschools. It also analyzes the impact of school fees and contributions on student enrollment.

The school's resources and management can also influence the overall quality of the school. Poor quality of schooling can negatively impact student learning in terms of both attendance and achievement. As a result, this report examines student attendance and achievement given several resources: class sessions, books and learning guides,[16] laboratory, classroom conditions,[17] school health, full day schooling, among others. A substantial body of evidence demonstrates the potential for better school management such as school supervision and support regimes to impact the work of teachers in the classroom.[18] Thus, this report also examines the roles of head teacher experience, head teachers in observing their teachers, parental involvement, and school climate as measured by problems between students or with staff.[19]

Policy Levers

Deficiencies in teacher and school factors place the government in an important position to enact policy that can raise student attendance and achievement. This study suggests three areas of policy reform to address these concerns: 1) school supply/price of schooling, 2) school resources/management, and 3) teachers and pedagogy. Policies to improve school supply/price of schooling address satellite schools, fee policies and monetary transfers, early childhood, and school complementary services. Policies to improve school resources address measures of school quality and inputs, full day schooling, and class size; and policies to improve school management focus on principal behavior and community involvement. Finally, policies to improve teachers and pedagogy address teacher and head teacher background characteristics, teacher capacity and pedagogical practices, and teacher certification. Some measures have implications for public funding, - its priorities and/or efficiency-, and others are more closely related to the management of public institutions. In some cases, implications are more for the central government; in others more for provinces and districts, or even schools and principals. In all cases, implications for public education policy are profound.

2.2. Research Questions and Data

As detailed in the Introduction, this study is motivated primarily by concerns related to persistent inequalities in attainment and low levels of school quality in Vietnam. The previous paragraphs provided a conceptual background for using data to address these questions, and identified a range of potential variables to be examined. This section builds on this work and provides the research questions that guide this study.

Increasing education opportunities for disadvantaged groups in Vietnam

The main analytical questions for this first part of the study include:

- What are the determinants of school attendance and grade completion?
- What is the relative weight of family and non-family factors?
- What is the role of liquidity constraints versus longer-term family endowment factors?
- What is the role of school supply and quality in determining completion and attendance?

16 Edwards, Fuller & Parandekar 1996.

17 Glewwe & Jacoby 1994; Bedi & Marshall 2002; Ilon & Moock 1991.

18 Anderson, 2008.

19 Lloyd et al. 2003.

- Which policies would be more effective in attracting and keeping more poor students in school?
- Would policies that reduce the price of schooling for poor people be effective?
  - Or would awareness campaigns and focus on early childhood be more effective?
  - Or should there be renewed priority on school improvements for poor groups?
- How do the determinants of these outcomes vary by level (i.e. primary dropout versus secondary dropout)?

Improving the quality of education for all in Vietnam, and especially the disadvantaged

The main analytical questions for this second part of the study include:

- What are the learning outcomes of primary school leavers in 2007, overall and by population groups (by income level, ethnic group, location)?
- How do they compare with the learning outcomes of the primary school leavers in 2001?
- What is the role of household factors in explaining learning outcomes?
- What are the most significant school, teacher and classroom factors associated with student achievement?
  - How have these variables changed between 2001 and 2007?
- What are the school factors more conducive to higher learning for the disadvantaged groups?
- What are the main barriers to learning and more equal learning in Vietnam?
- What are the best options for policy? Should the focus be on elevating teacher qualifications and capacity? What are the other paths worth exploring?

In order to address these questions, the next chapter begins with a background discussion of the Vietnamese context. Chapter 4 provides a diagnostic of attendance and achievement in Vietnam. Chapter 5 documents trends in school access and quality indicators. Finally, Chapters 6 and 7 identify the important variables in determining attendance (Chapter 6) and achievement (Chapter 7). The policy implications of the findings are then presented in Volume I – the overview/policy report.

CHAPTER 3: BACKGROUND

3.1. Vietnam Education System

The Vietnamese education system is structured into five general levels: nurseries (3 years of age) and kindergartens (3-5) more common in urban areas; primary, grades 1-5; lower secondary education (LSE), grades 6-9 with an examination in grade 9; and upper secondary education (USE), grades 10-12 with entrance and exit exams. An alternative to the upper secondary track is to go from the lower secondary track into a vocational or technical training school where training varies from 6 months to 3 years in length. Similar options exist as alternatives to college upon graduation from upper secondary education. In 2009, there were 15,610 primary and secondary schools in Vietnam.

The central government is responsible for policymaking and the supervision of education programs and policies. Day-to-day administration of primary and secondary education is carried out at the district/commune level or provincial level, respectively. Funding responsibility is shared: the central government provides for teacher and administration salaries and funds for scholarships, and local governments provide the remaining funds (salary supplements, infrastructure, etc.). In reality, local funding has translated to funding by parents.[20]

Until 1989 education in Vietnam was free, with schools and teachers fully funded by the government, no user fees existed, and textbooks were supplied to students.[21] In September 1989, user fees were introduced in a scale increasing with education levels. Fees are collected by the school and used for infrastructure maintenance, supplies, equipment and salary supplements. Parents are also required to pay for children's textbooks. Fee exemptions are present and amount to 100 percent for handicapped, boarder students in minority areas, children of deceased or seriously wounded soldiers and children in remote areas; and up to 50 percent for children of less seriously wounded soldiers, children of government workers disabled on the job, ethnic minority students and children certified as poor. Certifications are extended by the village or the neighborhood school committee. Since 1993 school fees are no longer charged for 4th and 5th grade and by now a full tuition fee waiver is applied for the whole primary cycle.

Relative to its low income level, Vietnam has achieved remarkable success in terms of its basic education outcomes. While its GDP per capita in 2009 was US$1,113, less than one seventh the average of East Asia and Pacific countries and one fourth the average of middle income countries, it has similar literacy rates to these two groups of countries[22]. The primary school completion rate for Vietnam is about 90%, even slightly higher than those for the above-mentioned groups of countries; gross enrolment rates in Vietnam are about 100%, 76% and 16% at the primary, secondary and tertiary levels, respectively, in 2006.[23]

Government support for education in Vietnam has increased in recent years. The share of education in the national budget grew from 7% in 1986[24] to around 20% in 2008.[25] Vietnam

20 Glewwe & Jacoby, 1998.

21 Glewwe & Jacoby, 1998.

22 See Dang, 2009 for details.

23 World Bank, 2008. The school enrolment rate at the tertiary level is for 2005.

24 Pham & Sloper, 1995.

25 GSO, 2009.

was spending about 5.3 percent of its GDP on education in 2008.[26] This share is high relative to the East Asian average of about 3.5 percent. Per pupil expenditure in 2008 was also high at around 20 and 17 percent of GDP per capita in primary and secondary education in Vietnam, respectively, compared with the East Asian average of about 14 percent for both levels.[27]

The vast majority of Vietnam's schools are public (government operated) schools. The most privatized area of Vietnam's education system is at the tertiary level, yet even at this level the public system accounts for about 86% of the schools and 89% of the students.[28]

3.2. Previous Research

There is already some existing evidence on the determinants of education attainment, attendance and completion in Vietnam. Most of the available evidence however is on the effects of poverty on educational attainment, with some insights on the effects of longer term factors. For instance, poverty has shown to be correlated with starting age, the number of years it takes a child to go through schooling, educational attainment and test scores.[29] Poverty is also strongly correlated with ethnicity.[30] Previous studies have shown that members of minorities have not benefited as much as the Kinh and Chinese from growth and expanded education coverage. Partly, the higher incidence of poverty and lower education coverage are related to minorities having larger households,[31] more children, lower education rates, lower endowments, higher rates of malnutrition, and more problems with reproductive health[32], pointing to the importance of longer term school readiness factors.

The most complete analysis of the determinants of school progress and achievement so far was completed by Glewwe in 2004. Using the 1998 VHLSS survey, complemented by a rural school survey and simple math and reading tests, he estimated primary and lower secondary completion models as well as and math and reading scores regressions for rural households. He shows that the most significant determinants of primary completion are child's age (negative), parents' education (positive), ethnic minority (negative), teachers' qualifications (positive) and school supplies (positive); and the ones for lower secondary completion are the father's education, household expenditure per capita, school supply, classroom quality and teacher experience (all positive). These results hint at the relevance of longer term household/community factors, while also indicating the possibility of credit constraints in lower secondary, and the significant effect of some education quality variables.

For student achievement the existing evidence needs to be updated and better tailored to the needs of disadvantaged groups. The 2001 reading and mathematics assessment study on Vietnam provides the best evidence on this topic so far; these results together with the recently completed 2007 study are summarized below.[33] An important finding of the 2001 study is that most of the variance in students' scores is due to differences among schools, rather than differences between

26 UIS, 2010.

27 UIS, 2010.

28 GSO, 2007.

29 Behrman & Knowles, 1999.

30 Glewwe, Agrawal & Dollar, 2004; Swinkels & Turk, 2006.

31 Truong, Knodel & Friedman, 1998.

32 Swinkels, 2006.

33 World Bank, 2002.

students (inter-school variation explains between 58 and 66% of the score variance), in contrast to what is often found in other countries. This finding points to the importance of school factors in determining achievement and disparity in achievement. The most important school factors in the 2001 study included teacher subject knowledge and training, school resources and full-day schooling.

3.3. Population Characteristics

This section provides a very brief overview of some of the main demographic and socioeconomic features of Vietnam. The purpose is to introduce features of Vietnamese society that will figure prominently when undertaking descriptive and correlational analysis of educational outcomes (returned to below). It also helps put these educational outcomes into a larger policy context for moving forward.

Overall Population

The most recent census estimates Vietnam's population at over 84 million (2006), compared with about 75 million in the 1990s. However, population trends in Vietnam show an aging with younger age groups (children) decreasing relative to overall population (see **Error! Reference nguồn not found.**), mainly due to a decrease in fertility rates[34] by two thirds in the last decade. This implies that increased demand for upper secondary and higher education due to population trends and increased attainment should not be exacerbated by fertility increases. It also suggests a demographic "window of opportunity" as a relatively large cohort of older people, who are also more educated than previous generations, work in an economy that will support public services for a relatively smaller numbers of young people. This is no guarantee for success. But it is important to note that Vietnam is no longer experiencing the population pressure on its education system that results from high rates of population growth.

Table 3.1. Population Distribution

Age Groups	1992	1998	2004	2006
0-5	14.48	10.38	8.15	7.41
6-11	15.89	15.09	12.02	10.14
12-17	14.07	16.92	15.86	15.16
18-24	12.48	12.97	14.18	13.89
25-34	15.14	12.76	13.38	12.69
35-44	10.56	13.12	14.21	14.66
45-54	6.18	7.51	10.92	12.46
55-64	5.77	5.26	5.02	6.21
65+	5.43	5.99	6.25	7.38
Total	**100**	**100**	**100**	**100**

Source: Nores, 2008a.

Table 3.2 summarizes selected characteristics of the adult population (aged 25-55) by gender, rural and urban location, and ethnic group. The ratio of females to males is practically one-to-one. While most of the population resides in rural areas (72 percent in 2008) urbanization has increased in the last decades. The predominant ethnic group is the Kinh (ethnic Vietnamese) amounting to 86 percent of the population (over 70 million). However, 54 ethnic groups are

34 Globio, 2007.

recognized. The largest minorities are the Chinese (about 1 million according to the latest census), Tay and Thai populations.

Table 3.2. Population: Distribution across selected characteristics

	1992	1998	2004	2006	2008
Gender					
Male	48.24	48.62	49.54	49.01	48.96
Female	51.76	51.38	50.46	50.99	51.04
Rural					
Rural	80.01	78.59	74.84	76.46	72.36
Urban	19.99	21.41	25.16	23.54	27.64
Ethnic Group					
Kinh	84.50	82.02	83.99	85.47	86.01
Tay	2.03	1.81	2.76	2.59	2.61
Thai	0.99	1.23	2.17	1.72	1.64
Chinese	2.46	2.27	0.97	1.05	0.71
Khmer	2.06	2.31	1.36	1.41	1.27
Muong	1.96	2.49	1.68	1.67	1.66
Nung	1.62	1.90	1.11	1.03	0.93
Hmong	0.67	0.85	1.01	0.89	1.09
Dao	0.25	0.42	0.57	0.47	0.52
Other	3.44	4.70	4.38	3.70	3.56

Source: Nores, 2008a.

Poverty

As noted before Vietnam has made a lot of progress in reducing overall poverty in the last 20 years. There are many ways of measuring poverty based on income, consumption, household possessions, and other metrics. The household survey data used in this report break down household incomes (or consumption) into quintiles, ranging from the poorest twenty percent (Quintile 1, or Q1) to the wealthiest 20 percent (Quintile 5, or Q5). Quintiles cannot be compared across years, so this measure is somewhat limited for monitoring progress. But they are useful for demonstrating relationships between certain variables.

These variables are of particular interest in this section and (especially) the following chapters when the kinds of variables that predict differences in educational outcomes like grade attainment and test scores are brought in. Not surprisingly, poverty has a very strong relationship with education level of the head of household.[35]

There is also a strong spatial dimension related to both urban-rural residence and region.[36] Some regions (Northern Mountains and the Red River Delta) have managed dramatic reductions of poverty, while others have had generally good progress (North and South Central Coasts and the Mekong Delta). But other regions have experienced less improvement and continue to lag behind (namely Central Highlands and the Northwest).[37]

35 World Bank, 2003.

36 Behrman & Knowles, 1999.

37 World Bank, 2003; Edmonds, 2002.

Poverty rates are also higher among specific ethnic groups.[38] Previous studies have shown that members of minorities have not benefitted as much as the Kinh and Chinese from growth and expanded educational coverage. Partly, the higher incidence of poverty is related to minorities having larger households,[39] more children, lower education rates, lower endowments, malnutrition, fertility rates and reproductive health[40]. Ethnic minorities currently account for about 40 percent of the poor despite representing only 14 percent of the total population.

Ethnic groups and minority status

Table 3.3 presents quintile distributions for Kinh and Chinese versus all ethnic minorities as a group across VLSS years. Kinh and Chinese are more evenly distributed across quintiles (normal distributions), while ethnic minorities are predominantly poor. Over time, there is an increasing incidence of relative poverty among ethnic minorities (lower quintile) going from 40 percent in 1992 to 53 percent in 1998 and 60 percent in 2006 (within group). Together with a slight improvement in the incidence of poverty for the Kinh and Chinese groups, this translates into ethnic impoverishment and increased income inequality.[41]

Table 3.3. Quintile distribution for Kinh and Chinese versus ethnic minorities, across years

Year/ Ethnicity	1992		1998		2004		2006	
Quintile	Kinh + Chinese	Minorities	Kinh + Chinese	Minorities	Kinh + Chinese	Minorities	Kinh + Chinese	Minorities
Q1	16.2	44.5	17.6	52.5	15.3	65.8	13.8	59.3
Q2	19.1	25.6	19.9	28.2	20.8	19.1	19.7	21.9
Q3	20.3	17.9	20.8	11.0	21.7	8.3	21.5	10.4
Q4	21.6	9.3	20.7	6.9	21.1	5.0	22.1	6.4
Q1	22.9	2.7	21.0	1.4	21.2	1.9	22.8	2.0
Tổng	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Nores, 2008a.

In addition, the population distribution[42] for minorities shows a younger structure, with a higher percentage of school-aged children (33 percent). This younger age structure, compounded with higher poverty rates, inequality, and lower educational attainment, makes ethnic minorities more vulnerable.

Regional differences

Although the majority of the population in Vietnam is rural, regions vary widely in urbanization. Table 3.4 presents the percentage of rural versus urban population across the different regions and VLSS years. In 1992, the proportion of rural population varied from 100 percent rural in the Central Highlands to 60 percent rural in the Southeast. By 2008 the general trend was towards more urbanization, although the percentage of rural residents actually increased in a couple of regions (Northwest and S.C. Coast). Over time, the Central Highlands has increased

38 Glewwe, 2004; Swinkels, 2006.

39 Truong, 1998.

40 Swinkels, 2006.

41 See also Swinkels & Turk, 2006.

42 See Nores, 2008a.

its percentage of urban population by 29 percentage points, the Southeast 14 percentage points and most other regions by roughly 6-10 percentage points.

Table 3.4. Rural versus urban distributions across regions and years

Year/Rural Region	1992		1998		2004		2006		2008		
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Total
R. River Delta	83.8	16.2	74.5	25.5	78.3	21.7	75.2	24.8	74.4	25.6	100
Northeast	87.6	12.4	91.7	8.3	83.9	16.1	80.3	19.7	79.8	20.2	100
Northwest	78.5	21.5	89.9	10.1	90.4	9.6	86.2	13.8	87.1	12.9	100
N. C. Coast	91.4	8.6	91.1	8.9	87.6	12.4	86.4	13.6	85.5	14.5	100
S. C. Coast	69.7	30.3	67.6	32.4	71.6	28.4	69.4	30.6	70.2	29.8	100
C. Highlands	100.0	-	100.0	-	74.7	25.3	70.4	29.6	71.3	28.8	100
Southeast	60.0	40.0	54.5	45.5	46.2	53.8	47.9	52.1	45.9	54.1	100
Mekong Delta	82.0	18.0	82.9	17.1	80.5	19.5	79.2	20.8	78.6	21.4	100

Source: Nores, 2008a.

Income disparities between regions are stark. Table B1 in Appendix B shows quintile distributions across regions and years. Poverty and wealth are highly concentrated and this has not changed with time. The Northwest and the Central Highlands have high poverty rates and increasing impoverishment over time, with a slight decrease in the latest years. In 1992 in the Northwest 33 percent of the population was poor and this increased to 53 percent, 66 and 57 percent by 1998, 2004 and 2006, respectively. In the Central Highlands, the percentage of poor has gone from 26 percent to 45 percent, 40 percent, and 33 percent respectively. Also, while in 1992 22 percent of the population in the Central Highlands belonged to the highest quintile, by 2006 less than 13 percent did so. In contrast, in the Southeast the percentage of the population in the highest quintile has increased from 38 percent to 46 percent between 1992 and 1998 and remained stable since then. Poverty indicators for 2006 evidence a slight decrease in inequalities across regions from 2004.

Like the poor, minorities are also concentrated and this appears to be increasing over time. Table 3.5 displays the distribution of Kinh and Chinese versus ethnic minorities across regions for VLSS survey years. The Red River Delta and coast regions are predominantly populated by the Kinh and Chinese. In the Northwest the percentage of ethnic minorities in 1992 was 61 percent, and by 2008 this had increased to 80 percent. In the Northeast the percentage of ethnic minorities also increased from 25 percent to 42 percent.

Table 3.5. Kinh and Chinese versus ethnic minorities' distributions across regions and years

Year/Ethnicity	1992		1998		2004		2006		2008	
Vùng miền	Kinh + Chinese	Minor.	Kinh + Chinese	Minor.	Kinh + Chinese	Minor.	Kinh + Chinese	Minor.	Kinh + Chinese	Minor.
R. River Delta	97,3	2,7	96,5	3,5	99,2	0,8	99,1	0,9	99,3	0,7
Northeast	74,7	25,3	57,8	42,2	53,6	46,4	58,5	41,5	57,4	42,6
Northwest	39,5	60,5	26,6	73,4	14,2	85,8	18,8	81,2	16,8	83,2
N. C. Coast	97,0	3,0	96,8	3,2	87,6	12,4	89,7	10,3	89,8	10,2
S. C. Coast	92,6	7,4	87,2	12,8	93,7	6,3	94,2	5,8	92,7	7,3
C. Highlands	65,9	34,1	57,8	42,3	61,1	38,9	66,2	33,8	67,5	32,5
Southeast	80,4	19,6	91,9	8,1	95,9	4,1	95,9	4,1	96,8	3,2
Mekong Delta	87,9	12,1	90,1	9,9	93,7	6,3	93,3	6,7	93,9	6,1

Source: Nores, 2008a.

Urban versus rural

Table 3.6 presents the portion of rural versus urban population within income quintiles. Although the Vietnamese population is largely rural, large disparities exist among the lowest and highest quintiles. Only half of the upper quintile was urban in 1992, and this increased to 63 percent by 1998 and around 70 percent by 2006. However, the strong urban trend is not observed among the poor or middle classes. Because rural status is not static and quintiles might be endogenous to location, it would seem that there is a higher rate of return to urban status at least for the two upper quintiles.

Table 3.6 Rural/Urban distribution across income quintiles and years

Year/Rural Quintile	1992		1998		2004		2006		Total
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	
Q1	93.9	6.1	96.0	4.0	95.3	4.8	93.7	6.3	100
Q2	93.3	6.7	92.4	7.6	90.6	9.4	90.9	9.1	100
Q3	85.9	14.1	87.1	12.9	83.8	16.2	82.8	17.3	100
Q4	77.4	22.6	72.4	27.6	69.3	30.7	67.2	32.8	100
Q5	50.1	49.9	37.1	62.9	27.9	72.1	31.9	68.1	100

Source: Nores, 2008a.

Income inequality

Among the poor, younger cohorts are larger than they are for the rest of the quintiles. This translates into high child poverty rates due to higher fertility rates among the poor, reproducing poverty across time. These trends are observed in Table 3.7 which displays the population distribution across age groups within income quintiles. Over time, the aging of the population is observed across all income groups, but less for the poor, which in turn tends to concentrate poverty among the young.

Table 3.7. Age-group distribution across quintiles, 1992 and 2006

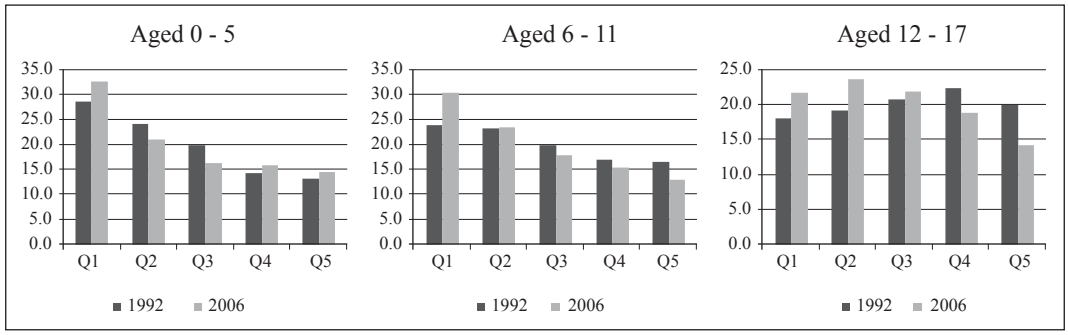
Year/Quintile Age Groups	1992					2006				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
0-5	20.8	17.6	14.4	10.4	9.4	11.8	7.5	5.9	5.7	5.3
6-11	19.0	18.5	15.8	13.4	12.9	14.9	11.5	8.8	7.6	6.4
12-17	12.7	13.6	14.6	15.7	13.8	16.1	17.4	16.1	13.9	10.5
18-24	9.3	10.8	13.3	15.0	14.0	11.4	12.4	14.0	15.8	14.9
25-34	15.6	15.9	14.6	13.9	15.7	13.7	11.8	12.6	12.6	13.3
35-44	9.7	9.9	10.0	10.2	13.0	13.5	16.2	14.9	14.8	14.4
45-54	4.5	5.1	6.2	7.6	7.6	7.4	10.3	13.0	15.1	18.3
55-64	3.7	4.3	5.8	7.6	7.5	4.5	4.8	6.7	7.3	9.1
65+	4.8	4.5	5.4	6.1	6.3	6.9	8.0	8.1	7.2	7.9
Tổng	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Nores, 2008a.

Figure 3.1 shows the population distribution across income quintiles within the younger cohorts. For 1992 and 2006 the figures evidence more acute poverty among the school age population. By 2006, 33 percent of children aged 0-5, 30 percent of children aged 6-11 and 22 percent of children aged 12-17 were in the first quintile (higher than any other age group). The ratio of the

lower to higher quintile for these three age groups is 2.23, 2.33 and 1.53 respectively (somewhat lower than for 2004). That is, among the children aged 6-11 (primary school) there are seven low-income children per three high-income children.

Figure 3.1 Population distribution across age cohorts and within income quintiles



Source: Nores, 2008a.

CHAPTER 4: THE OUTCOME DIAGNOSTIC: SCHOOL ATTENDANCE AND ACHIEVEMENT

This chapter provides a descriptive diagnostic of the two critical outcome indicators of educational progress: 1) school attendance (as encompassing all attendance-related outcomes), and 2) student achievement. The data cover both the current status of education in Vietnam together with historical trends. Within each dimension the emphasis is on the progress that has been made together with the challenges that remain, mainly in terms of addressing "gaps" in the various outcomes between key groups (by SES, ethnicity, region, etc.). Overall, in spite of significant progress, there is still significant scope to improve student achievement and an urgency to close gaps in attendance and achievement.

4.1. School Attendance Outcome Diagnostic

The overview of attendance-related outcomes draws heavily from reviews of the Vietnam Living Standards Survey (VLSS) years 1992-1993, 1998-1999, 2004, 2006 and 2008.[43] These are representative household surveys carried out across all regions. Principal sampling units are communes (wards) followed by villages, and the sample is representative for urban as well as rural areas and regions. Through the years, sample sizes and regional characteristics have changed (e.g. from seven to eight regions[44]), but the samples maintain inter-year comparability through the use of weights. These data provide information on household income, education, living standards, health, ethnicity, and other related characteristics (see Appendix A). The outcomes include measures of educational access and progress, including attendance rates, net enrollment rates, overage rates, completion rates and grade attainment rates, which, to simplify, are referred as a whole as school attendance indicators. While all outcome indicators were recently updated to 2008, the unavailability of reliable information on income quintiles at this stage made it unfortunately impossible to update outcomes by quintile to 2008.

Attendance Rates

The question used in the present analysis is "Are you currently enrolled in school?". For example, for primary, attendance rates are defined as:

$$\text{Definition AR (primary)} = \frac{\text{No.children aged 6-10 in school}}{\text{No.children aged 6-10}}$$

Attendance rates (AR)[45] estimated here differ from previous applications (e.g. Dollar, 1998)

43 Nores, 2008a.

44 The eight regions are: Red River Delta, Northeast, Northwest, North Central Coast, South Central Coast, Central Highlands, Southeast and the Mekong Delta. Previous analysis with VLSS data have been done on the basis of seven regions: Red River Delta, Northern Uplands, North Central Coast, Central Coast, Central Highlands, Southeast and the Mekong Delta.

45 The AR indicator differs a bit from net and gross enrollment rates (NER and GER) in that NER < GER and NER<=100. No such statement can be made about AR since the indicator refers to an age cohort, not to a level of schooling. However, given the age that children should be in primary school (6-10) there is a relationship between the three measures: NER<AR<GER. The denominator is the same in all three measures and differences of the three are in the numerator. NER<AR since some of the children aged 6-10 may not be in primary school by kindergarten and therefore counted in AR but

because the earlier survey question was worded «Have you ever attended or are currently attending school» to estimate attendance rates. This indicator inflates enrollment rates in secondary education (since it counts individuals that have attended lower education levels but are not attending school anymore). This question was dropped in later questionnaires[46].

Table 4.1 shows attendance rates for selected population indicators such as rural versus urban populations, income quintiles, gender, ethnicity and regions[47]. All subpopulation groups show growth in attendance rates in the 1992-2008 period. Currently, attendance rates are 95 percent in primary education, 92 percent in lower secondary education and 69 percent in upper secondary education. The overall trends show that within this 16 year period, Vietnam experienced much growth in student attendance. Primary and lower secondary attendance increased by 12 percent and 28 percent, respectively, reaching near universal levels. Vietnam's most impressive gains have been in upper secondary, where attendance has increased by 164 percent. Finally, the previous gender gap favoring males in student attendance has also greatly disappeared.

However, a breakdown of attendance shows disparities within other groups. Overall, all groups have shown tremendous growth in attendance, particularly in upper secondary. But within groups, students in urban areas, in the top income quintile, of ethnic majority, and Red River Delta and Coast regions consistently perform better than their counterparts. For example, upper secondary attendance rates are 65 percent for rural students, but 79 percent for urban students. The lower income quintile also reports attendance rates below the national average: 84 percent for lower secondary education and 48 percent for upper secondary education (in 2006). This means that at the upper secondary level, the upper quintile has an attendance rate of 1.8 times the lower quintile.

The gap between Kinh and Chinese and ethnic minorities is present at all education levels and is larger at upper education levels. Minorities have attendance rates of 89 percent for primary education, 85 percent for lower secondary education and 52 percent for upper secondary education (as of 2008). But this trend is actually decreasing in upper secondary (64 percent in 2004 to 52 percent in 2008). Regional variance in attendance rates is also significant, with primary attendance as low as 87 percent in the Northwest. At the lower secondary level, the gap is slightly larger, with attendance rates of 88 percent in the Northwest, 88 percent in the Central Highlands in contrast to 94-96 percent in the Red River Delta and the Northeast. At the upper secondary level the gaps are larger. Attendance rates are 57 percent in the Northwest, 54 percent in the Mekong Delta, versus 70 percent or higher in the Red River Delta, North and South Central Coast, and Southeast.

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not in NER. But AR<GER because late enrolment implies that many children in primary school are aged>10, therefore picked by the numerator of GER (more children are picked due to overage than are dropped due to being in kindergarten). This order applies for primary education only. See White (2005, pp. 398-99).

46 The question was included in 1998 but dropped in later years. In 1992, many individuals who answered this question did not answer "are you currently enrolled in school". Although the n for individuals that answered yes to current attendance is not different among two survey questions, the n for individuals that answered no to ever attending is quite larger than for current attendance at the primary age. This means that attendance rates using the question for current attendance for the cohort overestimates the rate at the primary level in 1992. Consequently, for 1992, we preferred using the question of past or current attendance for the primary level estimations.

47 Attendance rates where estimated for ages 6-10, 11-14 and 15-18 for primary, lower secondary and upper secondary, correspondingly. For sensitivity analysis, the same estimations where done with ages 7-11, 12-15 and 16-19 to take into account the possibility of late enrollment. Attendance rates decreased around 10 percent for all levels, but trends and gaps did not vary significantly.

Table 4.1. Attendance rates by selected population indicators

	Primary						Lower Secondary						Upper Secondary					
	'92	**'98**	**'04**	**'06**	**'08**	**Change**	**'92**	**'98**	**'04**	**'06**	**'08**	**Change**	**'92**	**'98**	**'04**	**'06**	**'08**	**Change**
All Vietnam	84.9	91.6	93.8	95.5	95.2	12%	71.6	84.9	90.5	91.4	91.5	28%	25.8	53.7	66.1	68.6	68.1	164%
Rural	82.8	91.4	93.2	94.8	94.5	14%	69.6	83.4	90.0	90.5	90.7	30%	20.7	48.4	63.8	65.7	64.7	213%
Urban	96.0	93.2	96.1	97.7	97.3	1%	81.3	92.8	92.8	94.9	94.2	16%	46.6	75.1	75.2	78.3	79.1	70%
Quintiles																		
Q1	69.3	83.6	88.0	92.1	--	33%	56.0	74.8	82.9	83.5	--	49%	10.0	31.3	48.0	47.5	--	375%
Q2	86.1	93.7	95.5	95.6	--	11%	67.9	83.6	90.2	91.4	--	35%	16.6	46.5	59.4	63.4	--	282%
Q3	88.2	95.9	97.3	96.9	--	10%	73.8	89.7	94.7	93.6	--	27%	21.4	46.5	71.6	73.7	--	244%
Q4	93.1	97.1	96.2	98.1	--	5%	75.9	87.3	94.1	96.4	--	27%	30.3	61.4	75.5	74.7	--	147%
Q5	94.8	96.7	98.6	98.3	--	4%	85.9	96.4	96.2	97.4	--	13%	48.2	84.6	84.4	86.0	--	78%
Gender																		
Males	84.6	92.8	93.9	94.9	95.8	13%	77.5	88.5	91.0	90.8	91.1	18%	33.2	59.0	68.7	66.9	64.1	93%
Females	85.3	90.5	93.6	96.1	94.5	11%	65.8	81.1	90.1	92.0	91.9	40%	18.8	48.6	63.2	70.4	72.5	286%
Ethnicity																		
Kinh & Chinese	89.6	94.7	96.2	97.1	96.4	8%	73.2	85.2	91.8	92.7	92.8	27%	27.4	54.8	66.5	70.3	70.9	159%
Minorities	60.7	81.3	83.8	88.2	89.3	47%	61.0	83.7	84.6	85.2	84.6	39%	15.8	49.3	63.8	57.9	51.8	228%
Regions																		
R.R. Delta	94.4	97.9	99.4	98.5	99.0	5%	80.9	93.6	97.2	96.6	96.1	19%	33.0	71.3	71.0	76.9	76.3	131%
Northeast	82.3	94.8	93.0	95.5	95.9	17%	70.2	85.1	94.7	96.6	94.3	34%	19.7	54.3	73.5	73.8	61.7	213%
Northwest	87.3	100.0	85.4	88.8	87.0	0%	66.7	93.8	80.4	86.0	87.8	32%	33.3	57.4	55.4	65.4	57.2	72%
N.C. Coast	90.8	99.2	94.7	96.9	97.1	7%	79.6	94.1	92.6	91.0	95.1	19%	22.0	70.6	73.4	72.7	75.5	243%
S.C. Coast	86.9	88.7	97.5	96.4	97.5	12%	76.0	84.5	93.9	94.2	95.2	25%	36.6	65.6	72.1	74.1	72.3	98%
C. Highlands	75.6	73.1	88.0	94.6	93.5	24%	79.3	81.7	87.6	91.9	88.3	11%	15.0	50.2	67.8	66.1	68.4	356%
Southeast	84.7	90.7	93.4	94.9	94.8	12%	70.5	85.9	88.7	89.1	89.7	27%	30.6	53.7	66.2	66.8	71.6	134%
M. Delta	76.1	85.0	91.9	93.2	91.2	20%	62.2	73.3	83.0	85.0	82.7	33%	19.0	35.2	51.6	53.5	54.3	186%

Source: Nores, 2008a.

Overall, primary attendance rates have increased much less in comparison to lower and upper secondary attendance rates, with consistent growth in all levels. Upper secondary has experienced almost a threefold increase between 1992 and 2008. Likewise, most of the growth has occurred in rural areas (where most of the population resides) with growth in enrollment rates in lower secondary of 20 percentage points while upper secondary attendance rates have more than tripled.

Table 4.2 reports gaps in attendance rates across years. The gap between rural and urban attendance has decreased significantly for secondary education, from 12 to 4 percentage points between 1992 and 2008 for lower secondary education and from 26 to 14 percentage points for upper secondary education.

Between income quintiles, attendance rate disparities have also shrunk for primary and lower secondary, and remained for upper secondary education (Table 4.2). A decrease in the gap occurs between the upper quintiles, while the gaps between the middle of the distribution and the poor tripled, indicating that the very poor are largely lagging behind in upper secondary attendance. Along a similar line, while gaps in attendance rates between Kinh and Chinese and ethnic minorities have decreased in primary education, they have in fact increased in upper secondary education (while stagnating in lower secondary).

Table 4.2. Gaps in attendance rates by selected population indicators (percentage points)

	Primary					Lower Secondary					Upper Secondary				
	'92	**'98**	**'04**	**'06**	**'08**	**'92**	**'98**	**'04**	**'06**	**'08**	**'92**	**'98**	**'04**	**'06**	**'08**
Urban-Rural	13.2	1.9	2.9	2.9	2.8	11.7	9.4	2.8	4.4	3.5	25.9	26.7	11.4	12.7	14.4
Q3-Q1	18.8	12.3	9.2	4.9	--	17.8	15.0	11.8	10.1	--	11.4	15.2	23.6	26.2	--
Q5-Q3	6.6	0.8	1.4	1.4	--	12.1	6.6	1.5	3.8	--	26.8	38.1	12.8	12.2	--
Q5-Q1	25.4	13.1	10.6	6.3	--	29.9	21.6	13.4	13.8	--	38.2	53.3	36.4	38.5	--
Female-Male	0.8	-2.3	-0.3	1.3	-1.3	-11.7	-7.4	-0.8	1.3	0.9	-14.4	-10.4	-5.4	3.6	8.3
Minorities	-28.9	-13.4	-12.4	-8.9	-7.1	-12.2	-1.5	-7.2	-7.5	-8.2	-11.6	-5.4	-2.7	-12.5	-19.2
Difference with National Average															
R.R. Delta	9.5	6.3	5.6	3.0	3.8	9.3	8.8	6.7	5.2	4.6	7.2	17.6	4.9	8.3	8.2
Northeast	-2.6	3.2	-0.8	0.0	0.8	-1.4	0.3	4.2	5.1	2.8	-6.1	0.6	7.4	5.3	-6.4
Northwest	2.3	8.4	-8.3	-6.7	-8.2	-4.9	8.9	-10.2	-5.5	-3.7	7.5	3.7	-10.7	-3.2	-10.9
N.C. Coast	5.9	7.6	0.9	1.4	1.9	8.0	9.3	2.1	-0.4	3.6	-3.9	16.9	7.3	4.1	7.5
S.C. Coast	2.0	-2.9	3.7	0.9	2.3	4.4	-0.3	3.4	2.7	3.7	10.7	11.9	6.0	5.5	4.2
C. Highlands	-9.3	-18.5	-5.7	-0.9	-1.7	7.7	-3.2	-2.9	0.5	-3.2	-10.8	-3.5	1.7	-2.5	0.3
Southeast	-0.3	-0.9	-0.3	-0.6	-0.4	-1.1	1.1	-1.8	-2.4	-1.8	4.8	-0.1	0.1	-1.7	3.5
M. Delta	-8.8	-6.6	-1.9	-2.3	-3.9	-9.4	-11.6	-7.6	-6.4	-8.8	-6.8	-18.5	-14.5	-15.1	-13.8

Source: Nores, 2008a.

Among regions, the Mekong Delta is consistently below the national average, and this difference is increasing, the Northwest has lagged behind in the recent years, and the Red River Delta as well as the South Central Coast are consistently above the national average although their advantaged has decreased somewhat. The Southeast and the Central Highlands have narrowed their difference to the national average, which is consistent with the increase in the national rate over time.

Net Enrollment Rates

In contrast to attendance rates, which account for all children enrolled regardless of their age, net enrollment rates measure enrollment in the corresponding education level:

$$\text{Definition NER (primary)} = \frac{\text{No.children aged 6-10 enrolled in primary}}{\text{No.children aged 6-10}}$$

Net enrollment rates (presented in Table 4.3) adjust attendance rates for attendance at the corresponding education levels, differing more from attendance rates in the levels where overage enrollment is most significant. Although AR and NER do not differ much at the primary level (around 5 percent), the NERs are around 33 percent lower at the lower secondary level in the 1990s, although this was reduced to a difference of about 15 percent by 2006-2008 (showing improved performance in efficiency). At the upper secondary level, the difference of almost 30 percentage points in the late 1990s was almost halved by 2008.

The difference between NER and AR indicators are substantially larger for rural areas, lower income groups, and ethnic minorities. This implies larger inefficiencies for these populations, which are observable even in primary school. These inefficiencies come from grade failure and repetition, as well as delayed initial enrollment. All subpopulation groups show growth in net enrollment rates in the 1992-2008 period. Currently, net enrollment rates amount to 88 percent in primary education, 78 percent in lower secondary education and 50 percent in upper secondary education. The national average masks rural versus urban differences. Upper secondary net enrollment rates are 47 percent and 63 percent respectively.

In 2006 the lower income quintile reports net enrollment rates well below the national average of 64 percent for lower secondary education and 23 percent for upper secondary education (one third the rate of the upper quintile). Minorities have net enrollment rates of 82 percent for primary education, 67 percent for lower secondary education and 27 percent for upper secondary education (in 2008).

Table 4.3. Net enrollment rates by selected population indicators

	Primary				Lower Secondary				Upper Secondary			
	'92	**'98**	**'04**	**'06**	**'08**	**'04**	**'06**	**'08**	**'98**	**'04**	**'06**	**'08**
All Vietnam	85.8	87.7	87.9	87.7	51.6	71.1	77.1	78.1	22.9	43.5	51.4	50.3
Rural	85.1	87.4	87.3	87.3	46.5	69.1	75.6	83.5	16.1	39.9	47.4	62.5
Urban	90.0	89.0	90.0	89.1	79.0	79.0	82.4	76.4	50.4	57.7	64.7	46.5
Quintiles												
Q1	76.7	82.4	85.5	--	29.9	56.2	64.3	--	4.2	16.2	23.1	--
Q2	89.0	90.0	87.7	--	46.5	69.8	75.9	--	12.5	39.6	45.0	--
Q3	88.5	91.3	89.6	--	56.0	78.0	82.3	--	16.4	47.5	57.2	--
Q4	93.2	89.4	89.3	--	60.3	79.3	83.8	--	29.5	57.7	60.5	--
Q5	92.1	91.0	89.9	--	84.8	83.2	87.9	--	58.3	68.1	74.3	--
Males	86.5	87.4	88.2	88.2	50.7	71.1	76.6	77.7	23.3	42.7	49.0	45.9
Females	85.1	88.0	87.6	87.2	52.4	71.2	77.5	78.4	22.5	44.4	54.0	55.3
Kinh & Chinese	89.4	89.9	89.5	89.0	57.3	75.3	80.4	80.0	26.9	47.5	55.3	54.3
Minorities	73.7	79.0	80.4	81.9	29.7	50.5	60.5	67.4	5.5	22.4	28.0	27.4

Regions												
R.R. Delta	93.1	90.5	90.5	90.7	77.4	79.6	85.4	84.1	45.4	57.0	67.6	61.0
Northeast	88.9	87.2	89.9	87.1	44.2	76.3	83.4	82.7	15.9	44.4	51.1	41.6
Northwest	91.2	81.0	77.4	77.9	49.3	45.2	54.9	66.4	10.2	12.8	32.1	29.0
N.C. Coast	91.1	88.2	90.2	89.9	58.3	76.1	78.8	79.5	26.2	52.3	57.0	53.8
S.C. Coast	82.1	92.2	87.4	87.6	57.2	78.4	76.4	81.3	31.2	54.7	54.3	55.7
C. Highlands	67.0	82.6	86.7	86.7	35.3	60.4	70.7	73.8	5.0	35.8	41.7	48.4
Southeast	85.0	87.2	86.3	88.2	61.0	71.9	78.8	78.9	27.7	46.7	53.3	55.1
M. Delta	81.0	87.6	86.6	85.8	34.7	61.3	69.4	68.0	14.5	26.3	33.9	39.8

Source: Nores, 2008a.

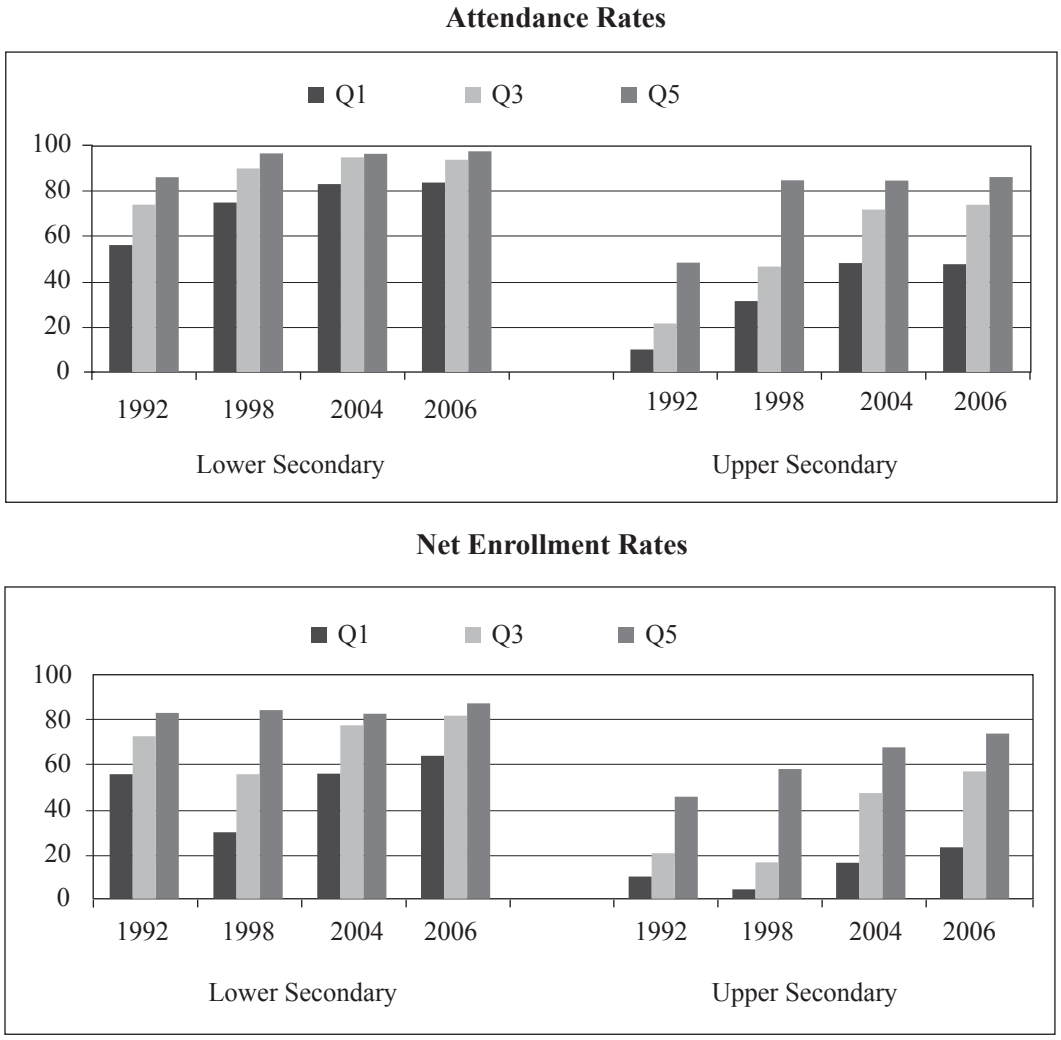
Gaps in net enrollment rates are shown in table 4.4. As of 2006, the differences between the upper and lower quintile in NER at the upper secondary level amounted to 51 percentage points, and most of this difference was due to gap between the middle and the lower quintile (34 percentage points). Upper secondary gaps have been stable over time. Inequalities in NER have been reduced at the primary level, but less so at the lower secondary level. The difference between the Kinh and the Chinese and ethnic minorities for NER is twice that for AR. Figure 4.1 illustrates how, in spite of improvements, the poorest sectors continue to lag behind over time in both AR and NER indicators.

Table 4.4. Gaps in net enrollment rates by selected population indicators (percentage points)

	Primary				**Lower Secondary**				**Upper Secondary**			
	'98	**'04**	**'06**	**'08**	**'98**	**'04**	**'06**	**'08**	**'98**	**'04**	**'06**	**'08**
Urban-Rural	4.8	1.6	2.7	1.7	32.5	9.9	6.8	-7.1	34.3	17.8	17.3	-16.0
Q3-Q1	11.8	8.8	4.1	--	26.1	21.8	18.0	--	12.1	31.4	34.1	--
Q5-Q3	*3.6*	*-0.2*	*0.2*	--	*28.8*	*5.2*	*5.6*	--	*42.0*	*20.5*	*17.0*	--
Q5-Q1	15.4	8.6	4.3	--	54.9	27.0	23.6	--	54.1	51.9	51.1	--
Female-Male	-1.4	0.6	-0.6	-1.0	1.7	0.1	0.9	0.7	-0.8	1.7	5.1	9.4
Minorities	-15.7	-10.9	-9.1	-7.1	-27.6	-24.8	-19.9	-12.6	-21.5	-25.1	-27.3	-26.9
Difference with National Average												
R.R. Delta	7.3	2.8	2.6	2.9	25.9	8.5	8.4	6.0	22.4	13.5	16.2	10.7
Northeast	3.0	-0.5	2.1	-0.6	-7.3	5.2	6.3	4.6	-7.0	0.9	-0.3	-8.7
Northwest	5.4	-6.8	-10.5	-9.8	-2.3	-25.9	-22.2	-11.6	-12.7	-30.7	-19.3	-21.4
N.C. Coast	5.3	0.5	2.3	2.1	6.8	5.0	1.8	1.4	3.2	8.8	5.6	3.4
S.C. Coast	-3.7	4.4	-0.5	-0.1	5.7	7.3	-0.7	3.2	8.3	11.2	2.9	5.4
C. Highlands	-18.9	-5.1	-1.2	-1.1	-16.3	-10.7	-6.4	-4.3	-17.9	-7.7	-9.7	-1.9
Southeast	-0.8	-0.5	-1.5	0.5	9.4	0.8	1.7	0.8	4.8	3.2	1.9	4.7
M. Delta	-4.8	-0.1	-1.3	-1.9	-16.9	-9.8	-7.7	-10.1	-8.4	-17.3	-17.4	-10.5

Source: Nores, 2008a.

Figure 4.1. AR and NER for lower and upper secondary by income quintile



Source: Nores, 2008a.

Attendance Rates and Net Enrollment Rates for selected cross-populations

The gender parity observed at the national level is for the most part sustained within major ethnic categorizations. Table 4.5 presents cross-tabulations of attendance and net enrollment rates for gender and ethnicity. However, there are important differences within gender across ethnic groups in the performance over time for attendance rates in upper secondary education, and within males across ethnic groups in the performance over time for attendance rates in lower secondary education, with, notably, a substantial drop in attendance rates for minority males between 2004 and 2008 observed. This could be due to migration patterns, or higher opportunity costs for minority adolescent males.

Table 4.5. Attendance and net enrollment rates by gender and ethnicity

	Primary				Lower Secondary				Upper Secondary			
	'98	**'04**	**'06**	**'08**	**'98**	**'04**	**'06**	**'08**	**'98**	**'04**	**'06**	**'08**
Attendance Rates												
Male												
Kinh & Chinese	*95.5*	*96.2*	*96.4*	*96.8*	*88.1*	*91.8*	*91.9*	*92.7*	*59.9*	*68.4*	*68.4*	*66.5*
Minority	83.1	84.6	88.6	91.1	90.0	87.0	85.2	81.5	54.7	70.3	57.7	51.3
Female												
Kinh & Chinese	93.8	96.3	97.8	95.9	82.2	91.7	93.4	92.9	49.6	64.5	72.6	75.8
Minority	79.5	83.1	87.7	87.3	76.5	81.7	85.2	87.2	44.4	56.7	58.1	52.4
Net Enrollment Rates												
Male												
Kinh & Chinese	90.4	89.5	89.7	89.1	56.7	75.4	79.9	79.9	27.9	46.2	52.8	49.3
Minority	73.0	78.6	81.6	84.0	29.2	51.7	60.6	64.7	2.3	24.1	25.7	27.2
Female												
Kinh & Chinese	88.3	90.3	89.3	88.8	57.8	75.3	80.9	80.2	26.0	48.8	58.1	59.8
Minority	74.4	79.3	78.8	79.6	30.4	49.1	60.4	67.4	8.4	20.5	30.5	27.7

Source: Nores, 2008a.

Cross tabulations of attendance and net enrollment rates by rural/urban residence and ethnicity (Table 4.6) show disparities by ethnicity in primary and lower secondary, and even larger differences by ethnicity and location in upper secondary education. By 2008, an urban Kinh or Chinese child was 1.6 times more likely to be attending upper secondary than a rural, ethnic minority child; and an urban Kinh or Chinese upper secondary-age child was 2.2 times more likely to be attending upper secondary than a rural, ethnic minority child of the same age. Similarly than for minority males, at the secondary level there has been a drop in attendance rates (and also in net enrollment rate at upper secondary level) for ethnic minority children in urban areas, maybe because of growing opportunity costs.

Table 4.6. Attendance and net enrollment rates by rural/urban location and ethnicity

	Primary				Lower Secondary				Upper Secondary			
	'98	**'04**	**'06**	**'08**	**'98**	**'04**	**'06**	**'08**	**'98**	**'04**	**'06**	**'08**
Attendance Rates												
Rural												
Kinh & Chinese	*95.0*	*96.2*	*96.7*	*96.0*	*83.4*	*91.4*	*91.9*	*92.2*	*48.2*	*63.8*	*67.4*	*67.6*
Minority	81.3	83.5	88.3	89.1	83.6	84.3	84.8	84.5	49.1	63.6	57.1	51.6
Urban												
Kinh & Chinese	93.5	96.3	98.2	97.4	92.7	93.0	95.1	94.4	75.3	75.4	78.9	80.0
Minority	69.2	91.9	85.7	93.8	100.0	89.1	91.2	86.5	61.9	69.3	67.3	53.7
Net Enrollment Rates												
Rural												
Kinh & Chinese	89.2	90.2	89.3	88.9	52.0	74.1	79.6	78.6	19.5	44.1	51.7	51.0
Minority	73.7	78.4	80.3	81.7	29.4	49.5	59.8	67.0	4.6	22.0	26.8	26.6
Urban												
Kinh & Chinese	90.2	88.9	90.3	89.1	79.1	79.5	83.0	83.7	50.3	58.6	65.7	63.4
Minority	69.2	91.9	83.0	88.5	71.5	68.6	71.2	76.0	56.3	30.8	43.8	40.0

Nguồn: Nores, 2008a.

Across quintiles and gender, it is interesting to note that gender parity predominates along the income distribution (presented in Table 4.7). However, through time, there is evidence of a slight drop in attendance rates, not observed in net enrollment rates, for males in lower and upper secondary education. This drop is more evident for males in the first quintile in upper secondary. Once again this might indicate higher opportunity costs (rates of return) across the board inducing slight decreases in attendance for these adolescents.

Table 4.7. Attendance and net enrollment rates by income quintile and gender

	Primary			Lower Secondary			Upper Secondary		
	1998	**2004**	**2006**	**1998**	**2004**	**2006**	**1998**	**2004**	**2006**
Attendance Rates									
1st Quintile									
Male	*86.7*	*88.6*	*90.9*	*80.0*	*83.4*	*80.9*	*38.9*	*57.4*	*44.9*
Female	80.5	87.5	93.1	70.1	82.3	84.4	25.1	39.2	47.3
3rd Quintile									
Male	96.5	97.8	96.6	93.1	95.3	93.7	56.0	72.6	70.4
Female	95.3	96.7	97.7	86.0	94.1	94.9	46.4	70.3	78.2
5th Quintile									
Male	95.7	98.5	97.6	98.3	97.7	97.0	86.2	84.3	82.0
Female	97.8	98.8	98.9	94.4	94.5	98.7	82.8	84.6	86.6
Net Enrollment Rates									
1st Quintile									
Male	77.7	82.7	85.1	27.7	55.1	61.0	3.8	17.7	19.1
Female	75.6	82.2	84.5	31.8	57.4	64.4	4.5	14.8	24.4
3rd Quintile									
Male	89.8	90.8	88.5	56.8	78.6	82.4	17.2	45.2	52.4
Female	87.2	91.8	89.4	55.1	77.3	82.1	15.6	50.6	60.1
5th Quintile									
Male	90.0	89.2	89.9	84.7	85.1	86.1	59.2	63.3	69.3
Female	94.4	92.5	90.0	84.9	81.0	88.1	57.3	73.2	74.3

Nguồn: Nores, 2008a.

Overage enrollment

Overage is defined as the percentage of children enrolled in the grade who are older than the official age for that grade. Educational improvements in terms of overage are quite impressive, with current rates between 6 and 10 percent. Table 4.8 reports overage rates by grade and year. For primary and lower secondary education levels these rates have been reduced by a fifth to a third, depending on the grade, while reductions are much smaller at the upper secondary level. For primary the grades overage rates in 2008 are around 5-6 percent of the enrolled students. This is somewhat higher in lower and upper secondary (about 6-8 percent).

Table 4.8. Overage rates across grades and years

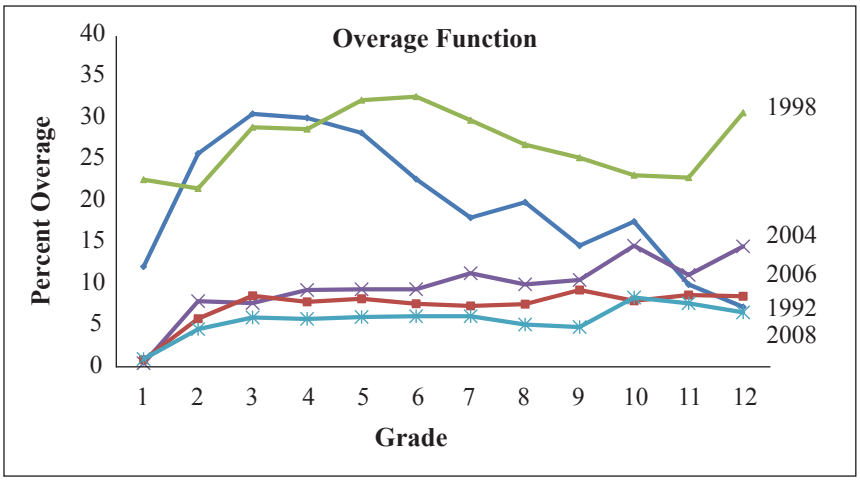
Grade	1992		1998		2004		2006		2008	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
1	127	12.0	174	22.5	4	0.4	8	0.77	10	0.86
2	214	25.7	169	21.5	60	7.8	41	5.73	25	4.48
3	232	30.5	229	28.8	59	7.6	49	8.49	34	5.88
4	204	30.0	222	28.6	83	9.2	52	7.76	34	5.71
5	163	28.2	228	32.1	90	9.3	67	8.13	35	5.94
6	98	22.6	215	32.5	87	9.3	58	7.53	37	6.03
7	57	17.9	187	29.7	108	11.2	63	7.27	44	6.03
8	53	19.8	150	26.7	101	9.9	64	7.48	37	5.03
9	32	14.6	126	25.2	102	10.4	84	9.19	38	4.72
10	26	17.5	80	23.1	127	14.5	65	7.88	64	8.29
11	7	9.9	56	22.8	76	11.0	57	8.58	47	7.59
12	5	7.1	63	30.6	101	14.5	64	8.43	44	6.50

Notes: Weighted estimations do not differ significantly from these results.

Source: Nores, 2008a.

Figure 4.2 depicts the overage function across grades and for different years. As education quality and access has improved, over-age has been reduced at the lower levels and slowly been pushed to the higher grades (with attendance having increased in these levels) before eventually being reduced for all grades and levels. However, despite these improvements, more than 7% of the students in each grade (except 1st grade) are currently overage.

Figure 4.2. Overage function by year across grades



Source: Nores, 2008a.

Overage rate comparisons across subpopulation indicators at the primary level (reported in Table 4.9) demonstrate similar trends with participation and dropout rates. Primary inequality has decreased between rural and urban areas, and has decreased at the upper end of the income distribution. Inequalities for minorities have remained practically the same, with a slight increase observed, and over-age has improved systematically and largely for urban and Kinh and Chinese populations.

Table 4.9. Over-age rates for by education level and population indicators

	Primary					Lower Secondary					Upper Secondary				
	'92	**'98**	**'04**	**'06**	**'08**	**'92**	**'98**	**'04**	**'06**	**'08**	**'92**	**'98**	**'04**	**'06**	**'08**
Rural	26.7	30.1	7.6	6.6	4.9	23.1	34.1	11.5	9.1	6.3	12.7	31.0	14.7	9.2	8.8
Urban	11.2	10.7	1.9	2.2	1.0	8.3	14.1	5.0	2.9	2.5	13.6	16.0	9.8	5.5	3.5
Q1	32.4	41.4	13.6	11.7	--	21.5	38.4	21.4	15.4	--	14.3	53.8	27.2	17.8	--
Q2	27.7	31.1	4.5	4.2	--	31.0	33.7	8.9	7.3	--	20.0	34.6	14.7	7.2	--
Q3	21.9	22.8	3.2	2.5	--	21.3	36.3	7.7	5.2	--	17.5	29.1	13.6	8.1	--
Q4	21.3	20.8	2.0	1.8	--	18.2	29.8	5.3	5.2	--	12.2	27.5	11.1	6.8	--
Q5	14.1	7.4	1.0	0.9	--	12.5	13.9	2.1	1.1	--	11.6	17.5	6.8	4.4	--
K&Ch	20.7	20.6	2.9	2.8	2.0	17.4	25.6	5.7	4.5	2.9	13.0	23.4	9.9	5.5	5.6
Minority	49.5	55.7	18.5	15.0	10.7	52.9	60.2	29.3	20.8	15.3	16.7	52.4	35.9	23.2	18.8
Males	25.5	30.6	6.8	6.1	3.9	25.1	33.0	12.3	9.0	6.7	17.3	33.0	16.3	10.7	9.8
Females	22.5	22.0	6.2	5.3	4.0	12.6	24.2	7.9	6.8	4.1	6.3	15.7	10.0	5.7	5.3
Total	**24.5**	**29.9**	**16.2**	**5.7**	**4.0**	**19.7**	**32.0**	**24.1**	**7.9**	**5.4**	**12.9**	**26.9**	**30.2**	**8.3**	**7.5**

Source: Nores, 2008a

Additional overage comparisons by region, age and ethnicity are presented in Appendix B Figures B1-B3.

Completion Rates

Completion rates are estimated for primary (11 to 12 year olds), lower secondary (15 to 16 year olds) and upper secondary (18 to 19 year olds) education. They summarize previous experiences (and policies) and are defined as[48]:

$$\text{completion rate} = \frac{\text{number completed level succesfully}}{\text{number of school-age population of completion age}}$$

The overall trends in completion rates provide dramatic evidence of the massive expansion of educational opportunity that has taken place in Vietnam in the last 20 years. Primary level completion rates in rural areas have gone from 39.6 to 88 percent between 1992 and 2008 (Table 4.10). As a result there have been very large reductions in the differences between urban and rural rates. The completion rate gap between the first and third quintile has been fairly consistent at about 20 percentage points. But the overall gap between the upper and lower quintiles decreased from 38 percentage points in the early 1990s to around 20 percentage points by 2006. Primary completion rates are 73 percent for the poorest children, versus roughly 95 percent for the upper quintile, indicating still significant room for improvement.

48 Completion rates are calculated using indicators of highest grade completion and completion of the level. Therefore these only take into account the completion of general secondary education levels and do not account for vocational education.

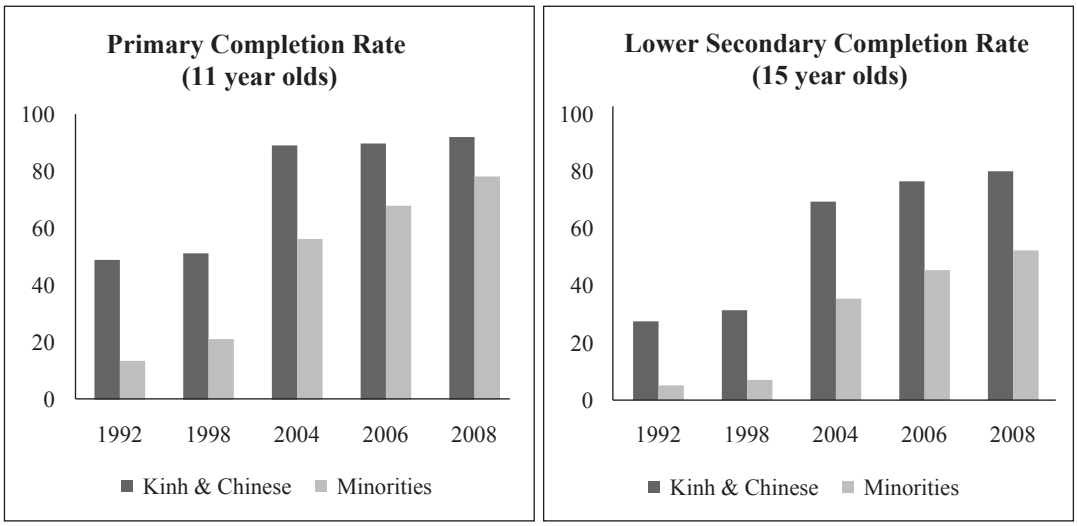
Table 4.10. Completion rates for primary education by population indicators

Primary	1992	1998	2004	2006	2008
Rural	39.6	41.7	81.5	84.4	88.3
Urban	67.9	71.0	90.6	90.9	94.2
Q1	28.5	28.4	69.6	73.0	---
Q2	32.6	40.7	82.6	86.9	---
Q3	48.1	48.0	91.2	91.5	---
Q4	48.4	55.5	90.3	92.1	---
Q5	67.0	75.8	94.3	94.6	---
K&Ch	49.0	51.3	89.0	89.7	92.0
Minority	13.6	21.2	56.3	67.9	78.2
Males	41.3	41.2	82.4	84.4	89.8
Females	47.8	50.9	84.1	87.1	89.8
Total	**45.0**	**45.9**	**83.2**	**85.8**	**89.8**

Source: Nores, 2008a

Gender completion gaps are not substantial at the primary level. The gap between the Kinh and Chinese and ethnic minorities has decreased quite significantly over time, yet this still translates into less than four of every five children from an ethnic minority completing primary versus almost five out of five Kinh or Chinese (Figure 4.3).

Figure 4.3. Completion Rates across population groups and years



Source: Nores, 2008a.

Completion rates at the lower secondary level (summarized in Table 4.11) have also increased considerably: a threefold increase is observed at the national level. Once again the large increases

49 For 1998, highest grade attained and highest degree attained was not available. Therefore, completion rates were calculated using several variables, including current grade enrolled, highest grade attained before quitting each level, and graduated from each level with or without diploma. This might make the indicator differ slightly.

for individual groups stand out: Lower secondary completion in rural areas has increased from 19.6 to 73.5 percent, while for quintile 1 the corresponding change (through 2006) is nearly 40 percent (from 7.2 to 45.6 percent). Nevertheless, despite these impressive gains at the bottom, the lower sections of the income distribution and ethnic minorities remain far behind their wealthy and Kinh/Chinese counterparts (see Figure 4.3). This inequality is largely explained by disadvantaged populations lagging behind in enrollment at the upper levels, and having higher rates of repetition and dropout within this level. About one in every two poor children (46 percent) complete lower secondary education at the corresponding completion age, versus two in three (77 percent) middle income children and four in five (89 percent) upper income children. A little more than half as many children from ethnic minorities complete lower secondary education as the Kinh and Chinese (in 2008).

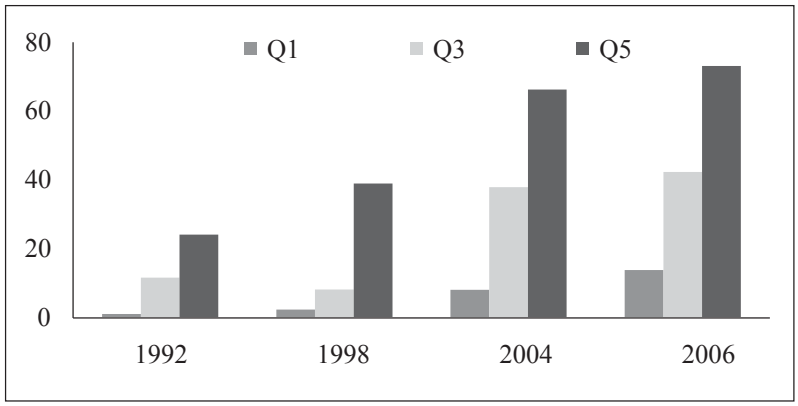
Table 4.11. Completion rates for lower and upper secondary education by population indicators

	Lower Secondary					Upper Secondary				
	1992	**1998**	**2004**	**2006**	**2008**	**1992**	**1998**	**2004**	**2006**	**2008**
Rural	19.6	23.3	61.0	69.6	73.5	8.6	8.8	28.5	39.1	45.3
Urban	47.0	46.5	75.6	80.7	83.3	24.5	31.0	57.7	63.2	68.8
Q1	7.2	11.4	35.5	45.6	--	0.9	2.2	7.9	13.7	--
Q2	11.1	17.0	61.7	69.4	--	6.2	1.2	21.7	34.7	--
Q3	22.0	23.6	73.3	77.0	--	11.5	8.0	37.8	42.2	--
Q4	30.2	36.8	74.9	82.2	--	11.5	16.9	46.6	56.2	--
Q5	49.3	55.6	83.9	89.3	--	24.0	38.9	66.3	73.1	--
K&Ch	27.5	31.4	69.4	76.5	80.0	13.1	15.4	38.8	49.1	56.0
Minority	5.1	7.1	35.5	45.5	52.3	2.9	2.5	13.8	19.1	21.5
Males	24.2	26.8	62.8	70.6	71.6	12.3	14.1	34.3	42.3	47.7
Females	25.5	28.2	65.3	73.5	80.3	11.6	13.0	35.4	47.2	54.8
Total	**25.0**	**27.5**	**64.0**	**72.0**	**75.8**	**12.0**	**13.5**	**34.9**	**44.6**	**51.1**

Source: Nores, 2008a.

At the upper secondary level (also reported in Table 4.11), between 1992 and 2008, completion rates increased at a similar pace as primary and lower secondary completion rates. However, completion gaps have more than doubled between quintile 1-quintile 5, and minority-non minority. The gaps simply reflect different rates of improvement, as the more disadvantaged groups have made measurable progress but this rate of change has not kept up with other sectors. Completion rates in rural areas are about two-thirds of what they are in urban areas; for the poor they are one seventh of what they are for the rich (see Figure 4.4); for minorities they are one third the rates for the Kinh and Chinese.

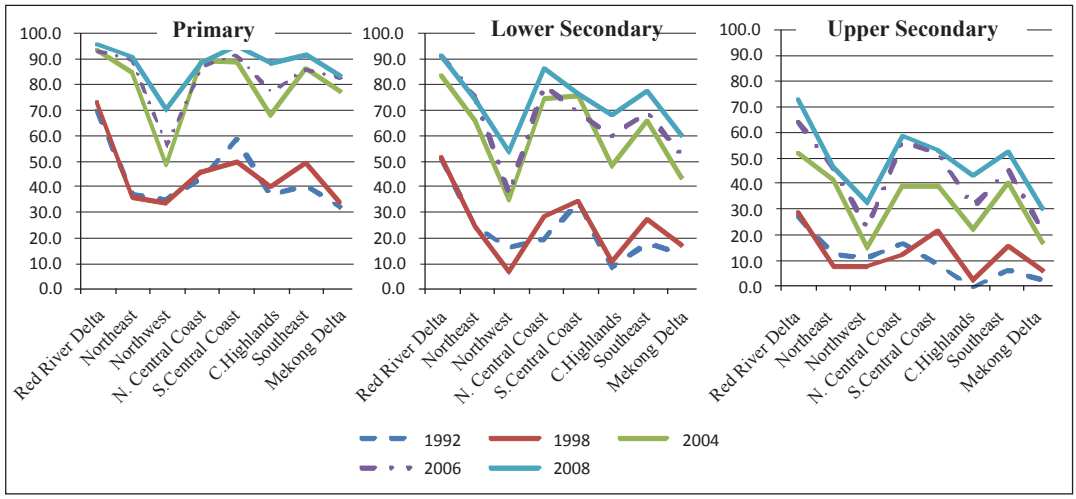
Figure 4.4. Upper secondary completion rates by income quintiles (18 year olds)



Source: Nores, 2008a..

The regional variation in completion rates is depicted in Figure 4.5. Completion rates have increased considerably for all regions across the board, and the highest increase has been attained at the lower secondary level. There is a positive relation with the level of rates in 1992 and the 2008 levels; low attainment regions continue to be low attainment at all educational levels. Moreover, high attainment regions have improved faster, which translates into wider gaps between low and high attainment regions (the figure illustrates higher variances in recent years despite overall increases in rates). Most of the growth has occurred in the latter years, which would be in line with increased attendance rates and flow rates over time (effects in completion rates take longer than effects on attendance to be observed).

Figure 4.5. Completion rates across regions and years



Source: Nores, 2008a.

Some additional completion rate summaries are included in Appendix B (Tables B2-B4) that break down the gaps between sub-groups using cross-tabulations for things such as urban-rural and ethnicity.

Grade Attainment

The previous sections have provided a very complete summary of educational progress for school aged children (through the age of 21). But there is still the most summative outcome to consider: actual grade attainment. Summaries of attainment are complicated by the "censoring" that takes

place, especially for young people. This refers to the problem where a person's attainment is measured in the survey before they are actually done studying. To avoid this problem attainment is often measured for adults that are at an age when few people are likely to continue their schooling. That introduces a lag where the current attainment is for people who left the system in an earlier era. Nevertheless, it does provide yet another indicator for considering the expansion of educational opportunities and making comparisons across different groups.

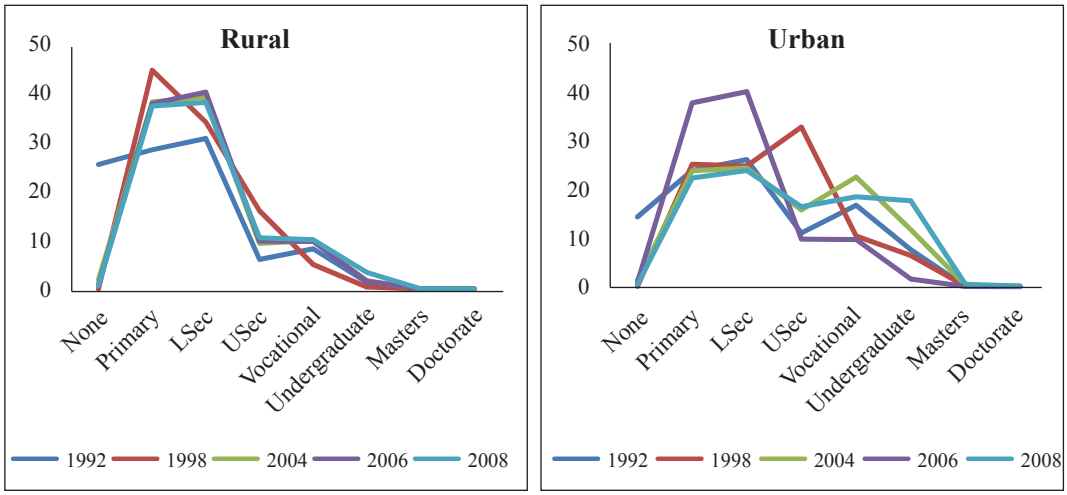
Table 4.12 disaggregates educational attainment by rural or urban location for adults aged 25-55. Not surprisingly, there have been substantial improvements in educational attainment across the board (all distributions have closed the percentage without any education and have moved to the right). In rural areas the increase in educational attainment has been concentrated at the primary and secondary levels, and in urban areas it is concentrated at the vocational and undergraduate levels (see Figure 4.6). These differences in educational attainment over time translate into increasing inequality when taking into account that the urban population amounts to 20 percent of the total population and that there is intergenerational reproduction of these types of inequalities.

Table 4.12. Education distribution across rural/urban and years

Year/Rural	1992		1998		2004		2006		2008	
Education	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**
None	25.4	14.3	-	0.1	2.0	1.3	1.0	0.9	0.7	0.5
Primary	28.4	23.9	44.6	25.2	38.1	23.9	37.8	24.4	37.3	22.4
LSec	30.7	26.2	34.0	24.8	39.1	24.4	40.1	22.5	38.0	23.9
USec	6.0	11.0	16.0	32.8	9.3	15.8	9.8	16.3	10.4	16.4
Vocational	8.2	16.8	5.0	10.4	9.9	22.6	9.7	23.2	10.1	18.5
Undergraduate	1.4	7.6	0.4	6.4	1.7	11.7	1.6	12.4	3.4	17.7
Masters	-	0.1	-	0.1	-	0.4	0.1	0.4	0.1	0.5
Doctorate	-	0.1	-	0.1	-	0.0	-	0.0	-	0.1
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Nores, 2008a.

Figure 4.6. Education distribution across rural/urban and years



Source: Nores, 2008a.

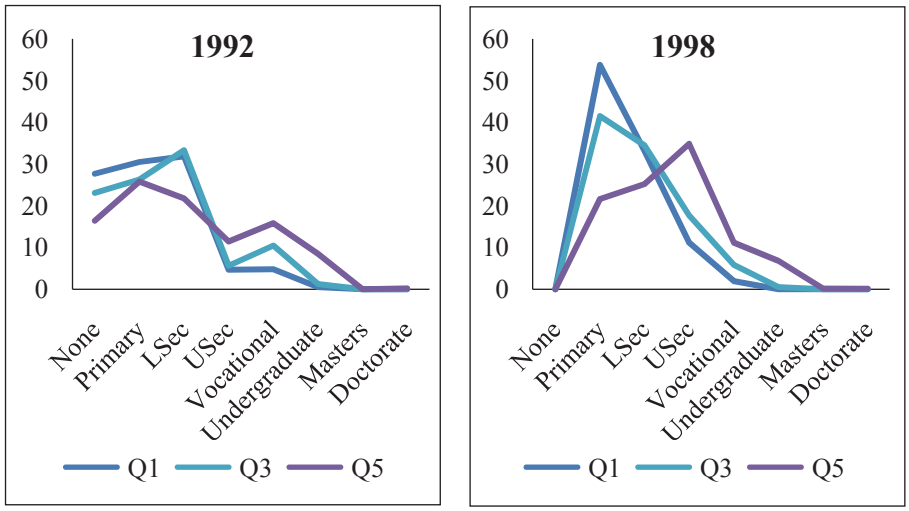
Educational attainment has increased for all income quintiles (Table 4.13). Similar to what was observed for rural versus urban areas, the differences across income quintiles are most pronounced for the levels where growth is occurring the fastest. This means that for the first and second quintile (and the third to a lesser degree) most of the growth is in primary and secondary attainment, while in the upper quintiles growth was concentrated at the vocational and undergraduate level. In 2004 and 2006, less than 6 percent of either of the lower quintiles had attained these degrees, versus 22-24 percent of the fourth quintile and over 40 percent of the upper quintile. As observed in Figure 4.7, the distributions of the upper quintiles have moved significantly towards higher educational attainment, while basic education is being achieved with the lower quintiles. That is, the upper quintile shows higher improvements in attainment levels. Over time, the percentage of the adult population with upper secondary education and above has doubled in the lower quintile (11 to 22 percent), tripled in the middle quintile (12 to 35 percent) and quadrupled in the upper quintile (13 go 58 percent).

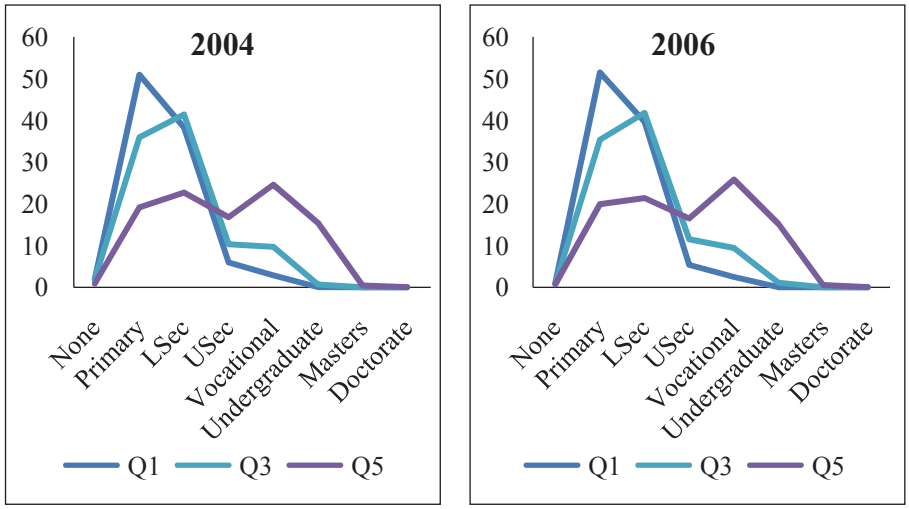
Table 4.13. Education distribution across quintiles, 1992 and 2004

Year/Quintile			**1992**					**2006**		
None	**27.7**	**25.3**	**23.1**	**23.3**	**16.4**	**1.0**	**1.0**	**0.9**	**1.2**	**0.7**
Primary	30.5	27.7	26.3	26.9	25.8	51.5	40.9	35.3	31.2	19.9
LSec	31.9	35.2	33.3	28.0	21.8	39.7	43.2	41.8	32.9	21.4
USec	4.7	5.2	5.6	7.7	11.4	5.4	8.8	11.5	13.0	16.5
Vocational	4.8	6.2	10.5	11.8	15.9	2.5	5.6	9.4	18.1	25.8
Undergraduate	0.5	0.3	1.2	2.2	8.5	-	0.4	1.1	3.6	15.2
Masters	-	-	-	0.1	-	-	0.0	-	0.0	0.5
Doctorate	-	-	-	-	0.2	-	-	-	-	0.0
Total	100	100	100	100	100	100	100	100	100	100
Tổng	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Nores, 2008a

Figure 4.7. Education distribution across quintiles and years



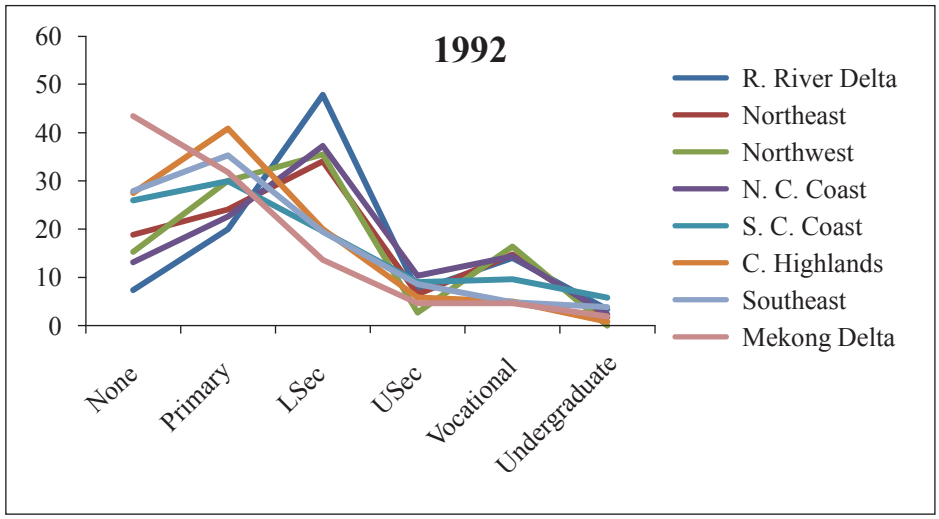


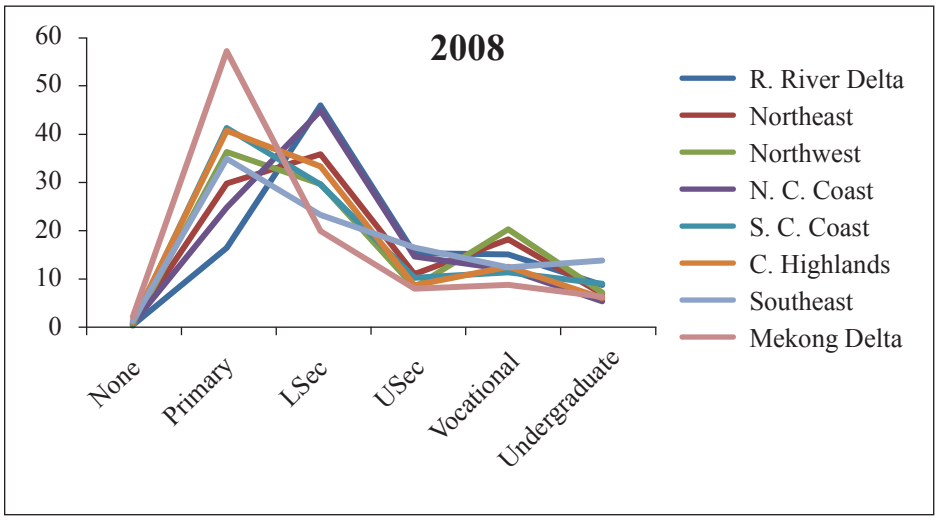
Source: Nores, 2008a.

Lastly, educational attainment shows considerable differences across regions. Figure 4.8 depicts educational attainment distributions for each region in 1992 and 2008. Currently, while most regions have largely eliminated the incidence of people without any degrees (except the Mekong Delta, with 5 percent of its population between 24 and 55 years of age not having finished any level of education), there are important disparities in terms of primary and secondary attainment. Primary attainment varies between 18 and 56 percent, lower secondary educational attainment between 20 and 49 percent, upper secondary educational attainment between 6 and 16 percent and vocational attainment between 9 and 18 percent.

Undergraduate attainment is only as high as 12 percent in the Southeast. Overall, attainment distributions are higher (further to the right) for the North Central Coast, the Red River Delta and the Northeast. The Mekong Delta is still highly skewed towards primary attainment only, with secondary and college degree attainments and the Southeast on higher education levels. Over time, the Red River Delta has remained quite static, while other regions have largely increased primary attainment (Mekong Delta, Northwest, South Central Coast), secondary attainment levels (North and South Central Coast and Central Highlands), vocational level (Southeast), undergraduate level and graduate level (Southeast).

Figure 4.8. Educational attainment distributions across regions and years





Source: Nores, 2008a.

School Attendance: Summary

Educational opportunities are expanding in Vietnam, and the results in the last two decades are impressive. Dramatic improvements in attendance and completion rates at the primary level mean that Vietnam is getting close to achieving universal primary education, and more and more children are completing the primary cycle in a shorter period of time. The expansion of access at the secondary level is another significant trend in recent years. These developments bode well for the future as Vietnam attempts to build on these gains by expanding access into secondary education and beyond.

Nevertheless, across attendance, progress and output indicators there are still some issues with *persistent inequality*, despite the impressive progress that has been made. In particular, the gaps between the very poor and middle sectors of the income distribution, as well as between ethnic groups, appear to have changed little in lower secondary education and worsen in upper secondary. Trends in upper secondary are driven by differing rates of improvement in attendance, overage and completion as historically disadvantaged groups struggle to keep up with the rate of change in the rest of the population. Gaps for graduation rates (output) capture the cumulative impact of these problems, and as a result are larger than the other indicators.

In primary education, inequality has decreased between the lower and middle quintiles, but the decrease has been faster between the middle and upper sectors. Gaps in completion rates remain larger in part due to the slower movement of this indicator and in part due to the higher tendency of children from the lower quintiles to drop-out. It is likely that if children can progress at higher rates into secondary education, and particularly upper secondary, these flow rates might worsen initially in the upper grades as a consequence of lower selectivity of the group composition. Inequalities have decreased across ethnic groups but remain significant for completion rates. Overall, the biggest challenge in primary education is how to make sure the lower quintiles and ethnic minorities fill the completion gap. A difficult challenge for all countries once a 75-80% completion rate has been achieved and the problem is how to get the last 25-20% of children completing. As the deceleration in the increase of the primary completion rate of the poorest between 2004 and 2006 indicates (and preliminary estimates for 2008 confirm this deceleration), Vietnam may need to re-double its effort or even experiment with some new measures (more on that in next chapters).

In secondary education, attendance rates have increased for all types of children. However, as mentioned above, inequality in all attendance related indicators has in fact increased between the middle and lower quintiles and ethnic groups for upper secondary education, while showing few improvements in lower secondary. The biggest challenge at this level is therefore how to ensure increasingly faster enrollment of the poorest and ethnic minority groups in secondary education, while making sure they are also in the position of successfully completing the cycle. Achieving higher equity of access and completion in secondary education will require a well selected policy mix.

Regional disparities remain despite progress in all of the regions. Low performing regions continue to lag behind and high performing regions have increased their distance from the mean, especially in graduation rates. The Mekong Delta, Central Highlands and Northwest have the lowest rates of school attendance. On the other hand, the urban-rural gap has decreased in time, although rural areas still lag behind in upper secondary attendance and secondary completion rates (both lower and upper secondary).

Finally, the ultimate outcome measure of school attendance—grade attainment among adults—shows rapid improvement in a very short period. Among adults aged 25-55 roughly 20 percent had not completed any education in 1992. But by 2008 this figure was below one percent. At current trends the profiles of future adult cohorts will likely look even better than the current profile for the wealthiest quintile of adults. In 2006 this group of wealthy adults had roughly 45 percent at or below the lower secondary school attainment level. But in that same year nearly half of 18-19 year olds had *completed* upper secondary (Table 4.11). These kinds of improvements in educational attainment—subject to concerns about persistent inequalities—have the potential for far-reaching impacts in Vietnamese society.

4.2. Student Achievement Outcome Diagnostic[50]

Unlike school attendance information which is collected periodically through multi-purpose household surveys, student achievement data sources are fairly limited. This report relies mainly on the previously referred to grade five studies from 2001 and 2007. By applying tests at the end of grade five these studies provide crucial information about the production of achievement in primary school. However, there are no counterpart datasets for lower or upper secondary, which means that it is not possible to consider the full range of system performance.

The grade five studies are augmented by smaller studies that use tests that share some items and characteristics. The advantage with these additional sources of information is that they are applied to a wider range of individuals, including students who are in different grades (although there are some concerns about sample size). These results are briefly summarized at the end of this section, and returned to as part of the analysis of factors that matter in Chapter 6.

The main purpose of this section is to describe the levels of student achievement for grade five leavers in Vietnam, with a comparison over time. These activities are made possible by two important features of the 2001-2007 surveys. First, the test results are categorized into different measures for interpretation, including scaled scores as well as proficiency levels. The latter are particularly useful because they make it possible to describe learning levels in words rather than just in numbers.

50 The presentation in this section borrows heavily from the report prepared by Griffin and Cuc (2009), which includes both a detailed summary of 2007 results as well as comparisons between 2001 and 2007..

Extensive data preparation work have made the 2001 and 2007 results comparable.[51] The degree of comparability is not perfect, and the authors urge some caution in interpreting the scaled scores from 2007 (and by extension the comparisons with 2001). Appendix C includes an overview of this process, which was aided (in Reading) by the inclusion of "anchor items" that were included on both the 2001 and 2007 exams. It also describes some of the problems with the 2007 data. The comparability extends to the proficiency scales, which are unchanged in 2007 and therefore can be compared against the earlier results. This kind of equating across years is an unusual feature of student achievement data in developing countries. It greatly facilitates the task of measuring systemic performance over time, subject to the considerations of changes in school attendance and participation outlined in the previous section.

The 2001 and 2007 reports also include extensive comparisons within year, meaning it is possible to consider achievement differences by gender, ethnicity, location, etc.

Overall Scaled Scores

Since the 2007 test scores were equated into the same scale with the 2001 test scores and were converted to the same scale with a 2001 mean of 500 and a standard deviation of 100,[52] the overall scores on the two subjects can be compared across 2001 and 2007. Table 4.14 presents the overall averages for the two samples, by subject. The results show that average achievement in Reading has increased by about 22 points, which represents 0.22 standard deviations and an increase of 4.5 percent. For Mathematics the "systemic gains" are on an order of 43 points, or nearly one half of a standard deviation and an increase of 8.7 percent.

Table 4.14. The difference in 2001 and 2007 reading and mathematics achievement

	2001		2007		Giá trị TB
Subject	**Mean**	**Sd**	**Mean**	**Sd**	**Mean**
Reading	500	100	522.3	97.1	4.5%
Mathematics	500	100	543.3	120.6	8.7%

Source: Griffin and Cuc, 2009.

In mathematics the 2007 cohort students had three to four more correct items compared to the 2001 cohort. However, mathematics achievement in 2007 varies to a larger extent than that of the 2001 cohort (see larger standard deviation). This may be associated with the variation in time spent on mathematics due to the introduction of full day schooling (FDS) in primary schools in Vietnam; these kinds of questions will be returned to later as part of the summary of factors associated with achievement. For reading, the 2007 cohort improvement translates to getting three more questions correct compared to that of the 2001 cohort. The variation of student achievement is a little bit smaller than that of the 2001 cohort.

The following sections of the achievement breakdown by group also show positive gains as in attendance. From 2001 to 2007, students in Vietnam have consistently performed better in math and reading. While there are disparities within groups—with students in urban areas, in the top income quintile, of ethnic majority, and Red River Delta, Central Coast, and Southeast regions performing better than their counterparts—all groups have nonetheless shown impressive gains in student achievement.

51 Griffin & Cuc, 2009.

52 As explained by Griffin & Cuc, 2009.

How accurate are these results as an indicator of change over time? Since these are samples it is not possible to say that the results measure actual improvement. Nevertheless, given the very large samples that were drawn in 2001 and 2007 (almost 4,000 schools each year) the chances of obtaining results with such large differences by pure sampling error are very negligible. In a later section the validity of the changes is returned to by focusing in on a group of roughly 1,000 schools that took part in both data collections; this makes it possible to consider actual *improvement* in a still more demanding framework.

In addition to sampling concerns, which do not seem to be an issue here, other commonly cited threats to test validity do not seem to be relevant to the Vietnamese context. For example, it is not likely that teachers in Vietnam began focusing their instruction in the post-2001 period based on the results of the 2001 exam ("teaching to the test" or "curriculum narrowing"). The results for the 2001 exam were not considered high stakes, and it is not likely that schools and grade five teachers were aware of the main findings. Also, there may be some improvement in student test taking skills during this period, including a familiarization with multiple choice items. But this does not seem likely to explain the sizeable improvements in scores overall.

The results summarized in Table 4.14 therefore strongly suggest significant improvement in student achievement in Vietnam between 2001 and 2007. What are the sources of this improvement? One factor that has to be mentioned is the socioeconomic context. Poverty reductions in recent years mean that the average household in Vietnam is less likely to be poor. This does not automatically mean that the average grade five student household is less poor in 2007 compared with 2001; the on-going improvements in participation and the increasing numbers of students from historically disadvantaged backgrounds need to be considered. This topic will be returned to below as part of a more focused analysis of the 2001 and 2007 results. Nevertheless, one possibility is simply that students are healthier in 2007, and have more resources in their homes, which in turn is leading to higher levels of achievement.

The more interesting possibility, at least from an education policy standpoint, is that the improvement between 2001 and 2007 is reflective of *systemic improvement* in education. This could result from better teacher training and support, more resources (including time in school), and better school management processes. Relating differences in achievement over time to these kinds of factors is complicated by the inherent difficulties in measuring the impacts of schools and teachers. However, given the importance of this question for policy now and moving forward, this topic is also returned to below in much more detail.

Furthermore, the fact that primary school coverage was increasing during this period, which means more and more disadvantaged students were making it to grade five, gives the overall positive trends an added significance.

What do these scores mean in terms of actual student abilities? One weakness with scaled scores is that they do *not express skills in words*. This is why other measures of performance are introduced in a later part of this section. But before those results are discussed the scaled scores are used for a series of comparisons.

Scaled Score Comparisons

Table 4.15 presents the results by region. Students from Red River Delta outperformed students from other regions in both mathematics and reading. The difference between Red River Delta region and the Northwest region can be as high as 1.5 standard deviations in Mathematics, and

2 standard deviations in reading. Similarly, the difference between Red River Delta and Mekong Delta is 1 standard deviation in mathematics and 0.7 standard deviations in reading.

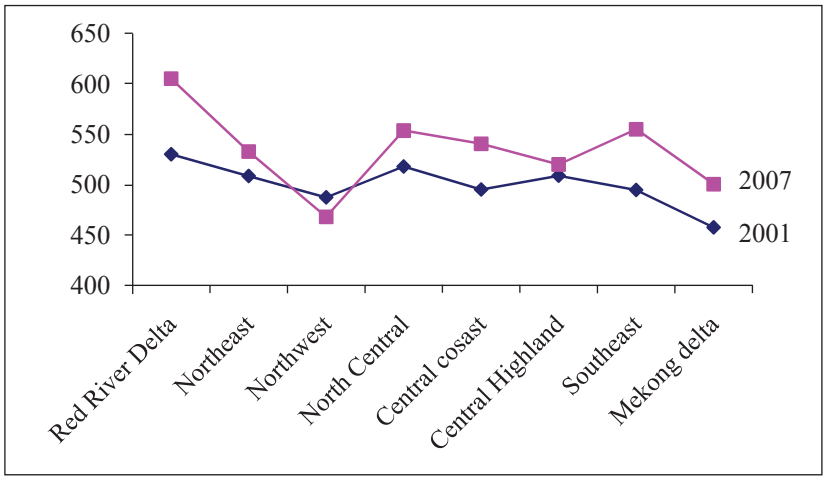
Table 4.15. Student achievement by region

	Mathematics		Reading	
Red River Delta	**602.3**	**2.98**	**561.3**	**2.18**
Northeast	528.9	3.32	512.7	2.61
Northwest	462.7	5.4	473.2	4.55
North Central	549.3	4.41	532	3.34
Central Coast	536.9	4.02	522.4	3.39
Central Highlands	517.4	4.8	509.9	4.01
Southeast	551.7	3.46	533.9	2.69
Mekong Delta	498.2	2.27	489.5	1.71
ĐB sông Cửu Long	498,2	2,27	489,5	1,71

Source: Griffin and Cuc, 2009.

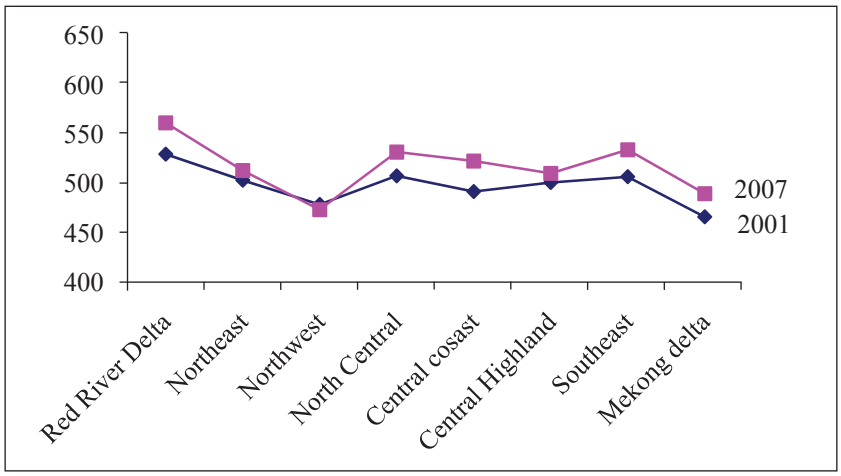
Figures 4.9 (Mathematics) and 4.10 (Reading) map out the changes between 2001 and 2007 by region. The Red River Delta, Central Coast and Southeast regions progressed the most from 2001 to 2007. These can therefore be classified as "value added" regions, meaning that there appears to be systemic improvement in these regions. The Northwest and Central Highland did not reach the "value added" classification. Nevertheless, it is important to note that there were changes taking place in student populations during this period, so these kinds of comparisons between region (and province, see below) do require some caution.

Figure 4.9. Mathematics scores change by region



Source: Griffin and Cuc, 2009.

Figure 4.10. Reading scores change by region



Source: Griffin and Cuc, 2009.

The provincial mean scores in reading and mathematics are presented in Table 4.16. In the column marked "difference" the difference between each province mean and the country mean is presented for each subject. The provinces are presented in descending rank order of the difference. The provinces included in the white parts in the middle of the tables are the provinces where the difference was less than 0.2 standard deviations, or less than 20 point scores. The provinces included in the rows above the white part are the provinces with mean scores higher than the national mean. The provinces included in the rows below the white part are the provinces with mean scores higher than the national mean. The provinces at the top or bottom end of the tables are the ones of interest, as their provincial mean scores were more different from the national mean.

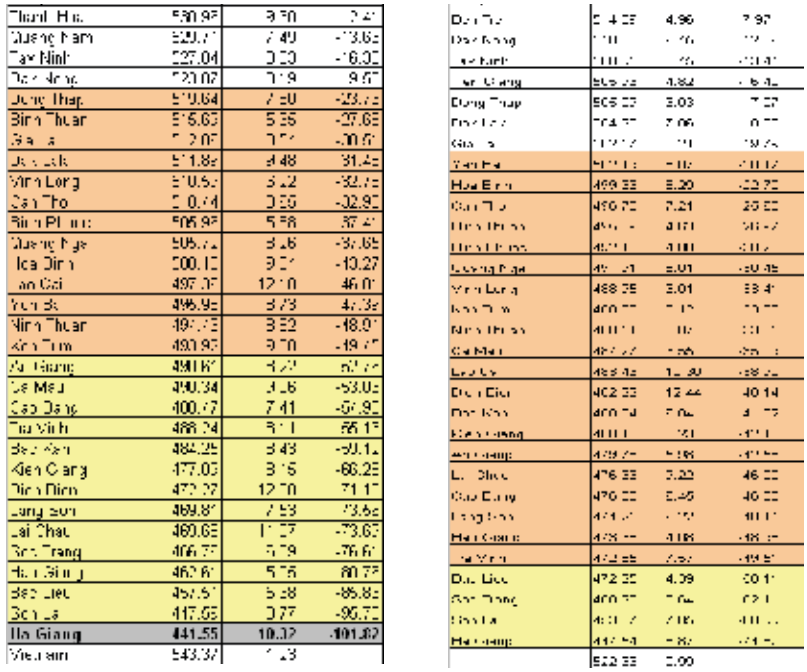
Table 4.16. Mean mathematics and reading scores by province

Mathematics

Province name	Mean	SE	Difference
Bac Ninh	599.94	8.54	116.57
Ha Noi	523.84	3.52	80.47
Phu Tho	522.04	10.47	78.67
Ha Duong	516.72	8.74	73.35
Ha Tinh	512.57	3.70	69.21
Ha Tinh	505.54	9.11	62.17
Vinh Phuc	499.94	8.74	56.57
Ha Nam	496.37	5.53	52.94
Ninh Binh	490.41	3.70	46.94
Thai Binh	490.37	5.46	46.87
Vinh Phuc	490.16	5.28	46.76
Ba Ria Vung Tau	490.01	10.35	46.54
Ha Giang	489.97	7.75	46.57
Ha Tay	489.87	4.53	46.44
Quang Ninh	472.05	5.46	28.72
Hung Yen	471.85	7.77	28.52
Thai Nguyen	471.67	9.54	28.34
Quang Binh	466.05	4.10	22.72
Binh Dinh	463.73	5.28	20.40
Tuyen Quang	462.64	11.70	19.32
Ha Nam	461.37	7.71	18.05
Quang Tri	461.22	3.74	17.85
Hai Giang	460.02	11.79	16.67
Nghe An	456.25	9.28	12.90
Khanh Hoa	452.45	11.52	9.11
Lam Dong	451.62	9.50	8.32
Dong Nai	440.05	7.76	-3.25
Binh Duong	434.72	7.16	-8.58
Ben Tre	432.75	3.17	-10.55
Thua Thien Hue	427.35	7.45	-15.95
Lai Chau	424.39	7.19	-18.91
Tra Vinh	423.27	13.50	-20.03
Long An	422.02	5.26	-21.28

Reading

Province name	Mean	SE	Difference
Bac Ninh	596.31	7.91	75.05
Ha Duong	564.55	5.63	43.29
Ha Noi	[illegible]	[illegible]	[illegible]
Phu Tho	[illegible]	[illegible]	[illegible]
Ha Tinh	558.61	5.47	37.35
Ha Giang	554.55	5.87	33.23
Ninh Binh	[illegible]	[illegible]	[illegible]
Vinh Phuc	[illegible]	[illegible]	[illegible]
Ha Tay	[illegible]	[illegible]	[illegible]
Thai Binh	539.13	3.07	17.83
Quang Ninh	537.52	7.06	16.14
Ba Ria Vung Tau	[illegible]	[illegible]	[illegible]
Hung Yen	[illegible]	[illegible]	[illegible]
Quang Binh	517.45	4.13	-3.94
Binh Dinh	515.51	7.26	-5.88
Tuyen Quang	[illegible]	[illegible]	[illegible]
Ha Nam	[illegible]	[illegible]	[illegible]
Quang Tri	512.24	7.22	-9.15
Ha Tay	[illegible]	[illegible]	[illegible]
Lao Cai	[illegible]	[illegible]	[illegible]
Nghe An	[illegible]	[illegible]	[illegible]
Dong Nai	509.72	5.16	-11.67
Thua Thien Hue	509.51	5.09	-11.88
Nghe An	[illegible]	[illegible]	[illegible]
Khanh Hoa	[illegible]	[illegible]	[illegible]
Lam Dong	[illegible]	[illegible]	[illegible]
Thai Nguyen	501.24	5.00	-20.15
Quang Nam	[illegible]	[illegible]	[illegible]
Dak Lak	[illegible]	[illegible]	[illegible]
Binh Duong	[illegible]	[illegible]	[illegible]
Long An	495.33	5.76	-25.86



Source: Griffin and Cuc, 2009.

In particular, the provinces shaded in red are those with mean scores that are at least 1 standard deviation higher than the country mean. The provinces shaded in blue are have mean scores at least 0.5 standard deviations higher than the country mean (but less than 1 standard deviation). The provinces shaded green are those whose mean score was more than 0.2 standard deviations higher than the country mean, but less than 0.5 standard deviations. The negative performers are denoted by grey (1 standard deviation lower), yellow (0.5 below) and brown (0.2 below).

The provinces with mean scores more than 0.5 standard deviations higher than the country mean in 2007 in reading are Bac Ninh, Hai Duong, Ha Noi, Phu Tho, and in mathematics Bac Ninh, Hai Duong, Ha Noi, Phu Tho, Hai Phong, Ha Tinh, Nam Dinh and Hanam. These provinces were mainly from Red River Delta. The provinces whose mean scores were more than 0.5 standard deviation lower than the country mean in 2007 were mainly from Mekong Delta and the Northwest and Northeast regions.

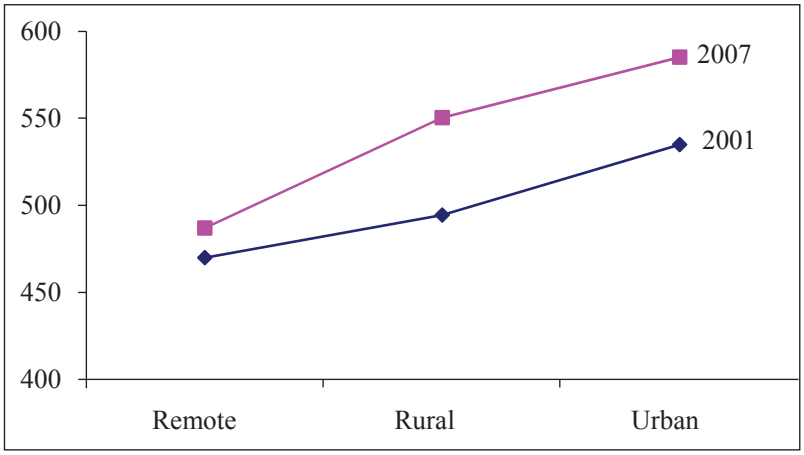
Table 4.17 summarizes the test scores by location of school. As expected student achievement increases from remote to rural to urban schools in both subjects. However Figures 4.11 (Mathematics) and 4.12 (Reading) show that rural students made more progress than students in the other areas. This rate of improvement is particularly positive considering that the gap in primary completion decreased between urban and rural students during this period. The gains in remote areas were smaller than those at the national level while the gains in both rural and urban areas were higher than those at the national level. This means that the gap in student achievement between remote areas and other areas in 2007 was bigger than that in 2001.

Table 4.17. Student achievement by school location

	Mathematics		Reading	
Location	**Mean**	**SE**	**Mean**	**SE**
Remote	486.95	2.37	480.3	1.99
Rural	550.43	1.73	524.8	1.35
Urban	585.18	2.73	558.6	2.13

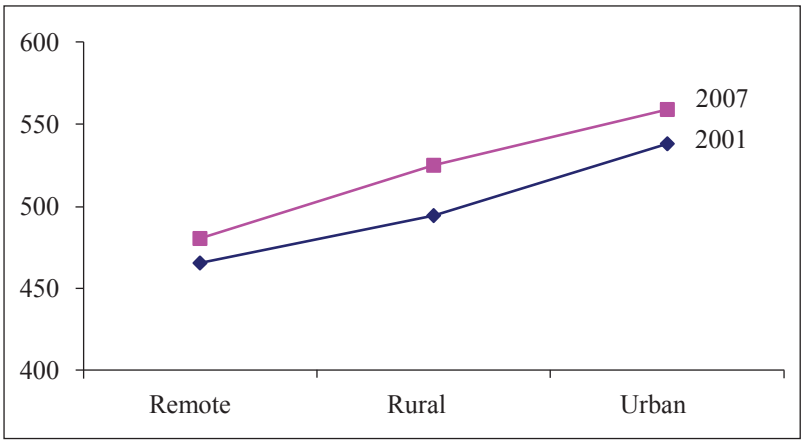
Source: Griffin and Cuc, 2009.

Figure 4.11. Mathematics score change and school location



Source: Griffin and Cuc, 2009.

Figure 4.12. Reading score change and school location



Source: Griffin and Cuc, 2009.

Table 4.18 summarizes achievement by ethnicity. The difference in achievement between Kinh and non-Kinh groups is 88 points in mathematics and 65 points in reading, which is the equivalent to 0.88 and 0.65 standard deviations, respectively. That is, on average Kinh students would have more than seven mathematics items and six reading items correct compared to their non-Kinh peers.

Table 4.18. Student achievement by ethnicity

Ethnicity	Mathematics		Reading	
	Mean	SE	Mean	SE
Kinh	557.3	1.32	534.2	1.04
Non-Kinh	469.5	2.70	469.7	2.13

Source: Griffin and Cuc, 2009.

Table 4.19 continues with the ethnicity comparisons adding school location. The difference between non-Kinh students from remote areas and Kinh students from urban areas in both mathematics and reading is higher than 100 point scores; i.e., higher than 1 standard deviation. That is, there is an interaction between ethnicity and location that results in higher levels of inequality.

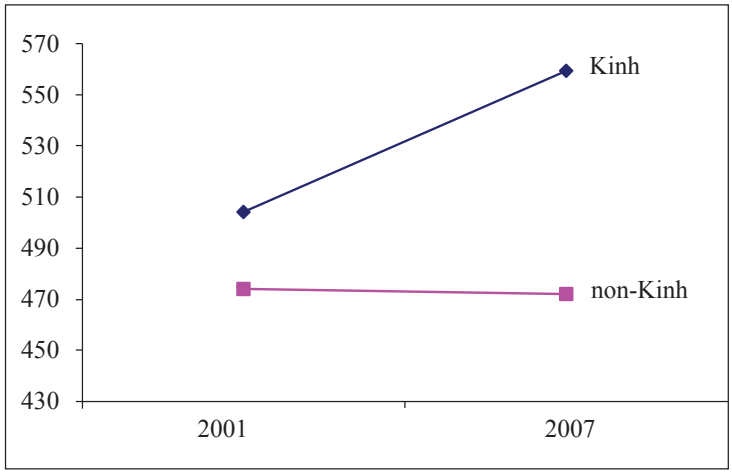
Table 4.19. Student achievement by ethnicity and location

	Reading				Mathematics			
	Kinh		Other		Kinh		Other	
Location	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**
Remote	498.2	2.32	459.1	2.85	511.2	2.72	457.3	3.27
Rural	530.4	1.37	476.8	3.28	558.3	1.74	481.5	4.15
Urban	562.6	2.16	515.4	6.75	589.4	2.72	534.1	11.02
Country	534.2	1.04	469.7	2.12	559.3	1.27	471.8	2.67

Source: Griffin and Cuc, 2009.

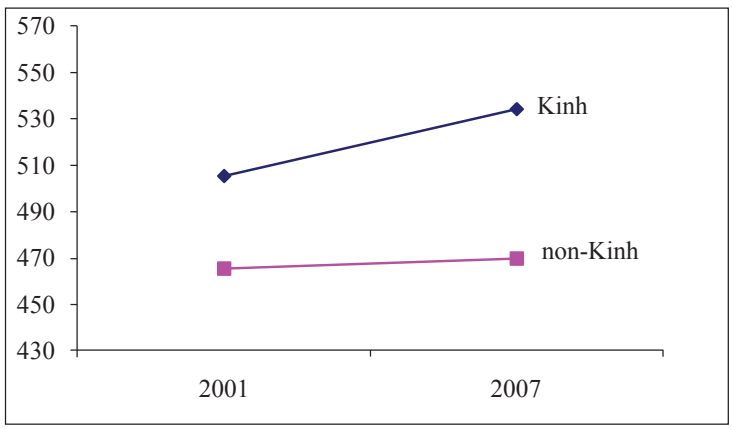
Figures 4.13 and 4.14 present the average gains between 2001 and 2007 by ethnicity. The results show clear improvement between 2001 and 2007 for Kinh students, whereas for non-Kinh students the averages are little changed. These results can probably be to some extent explained by the significant increases in the completion of ethnic minority students leading to smaller cohort selectivity. However also Kinh students have seen their completion rate increasing quite significantly since 1998 – although not as much - and nonetheless have experienced significant improvements in test scores.

Figure 4.13 Mathematics score change by ethnicity



Source: Griffin and Cuc, 2009.

Figure 4.14. Reading score change by ethnicity



Source: Griffin and Cuc, 2009.

Table 4.20 presents achievement by gender. Girls achieved better than boys by about 20 point scores in reading, however there were minor difference between boys and girls in mathematics. These results are consistent with those from 2001.[53] The advantage for girls in reading is generally consistent with international trends. In mathematics it is also not unusual for boys and girls to have similar scores in primary school, although many studies find that boys score higher. But the more pronounced trend is for boys to do better at higher levels of mathematics, which cannot be tested here.

Table 4.20. Student achievement by gender

	Reading		Mathematics	
Gender	**Mean**	**SE**	**Mean**	**SE**
Male	513.14	1.13	541.93	1.37
Female	532.42	1.11	545.53	1.41

Source:Griffin and Cuc, 2009.

Gender differences in each region are presented in Table 4.21. Similar to the findings reported in 2001, there are no substantial differences in mathematics scores between boys and girls in any region. For Reading there are a couple of regions where the differences are greater than 20 points (Red River Delta and Northwest).

Table 4.21. Student achievement by gender and regions

	Reading				Maths			
	Male		Female		Male		Female	
Regions	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**
Red River Delta	550.5	2.45	572.4	2.43	603.5	3.20	607.4	3.16
Northeast	505.2	2.94	522.5	2.78	530.2	3.51	537.6	3.46
Northwest	462.7	4.86	486.6	4.93	461.7	5.36	476.2	5.87
North Central	524.0	3.74	541.3	3.76	554.4	4.38	552.7	5.12
Central Coast	513.7	3.58	532.2	3.73	539.8	4.06	542.9	4.22
Central Highland	500.8	4.34	519.8	4.22	520.9	5.03	520.3	5.13
Southeast	526.3	3.27	542.4	3.01	554.0	3.89	556.3	3.80
Mekong delta	481.1	1.93	498.7	1.91	500.4	2.50	500.5	2.45
Country	**513.2**	**1.13**	**532.4**	**1.10**	**541.9**	**1.37**	**545.5**	**1.41**

Source: Griffin and Cuc, 2009.

Proficiency Levels

The scaled scores are useful for making comparisons between different categories of students. But the single score measure makes it hard to communicate what students can actually do, or where achievement levels are at in the country overall. Another useful feature of the 2001 and 2007 test score databases is the demarcation of proficiency scales for measuring student

53 World Bank, 2002.

performance. These scales provide a more detailed overview of what students can actually do at different levels of performance. Table 4.22 provides an overview of the proficiency scales (created in 2001 but maintained in 2007) that summarize student achievement levels for the 2001-2007 grade five Reading and Mathematics tests, together with percentage summaries and sampling errors at different skill levels.

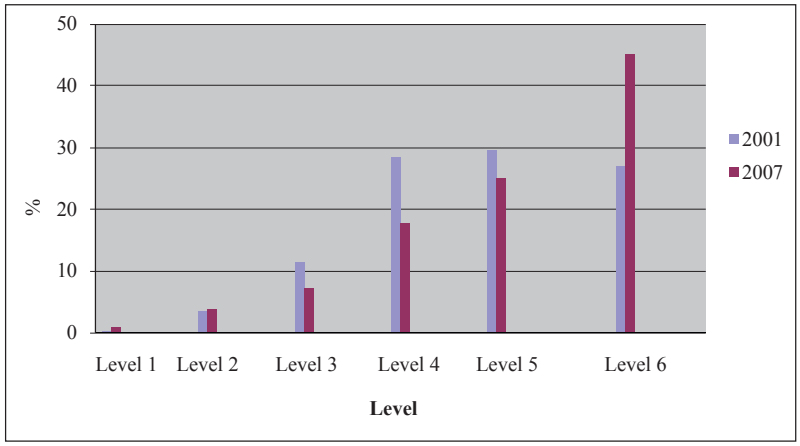
Table 4.22. Percentages and sampling errors of pupils at different skill levels in mathematics and reading at the national levels - comparison of 2001 and 2007 results

		2001		2007	
	Mathematics Skill Levels	**%**	**se**	**%**	**se**
Level 1	Reads, writes and compares natural numbers, fractions and decimals. Uses single operations of +,-,x and : on simple whole numbers; works with simple measures such as time; recognises simple 3D shapes.	0.20	0.02	0.90	0.07
Level 2	Converts fractions with denominator of 10 to decimals. Calculates with whole numbers using one operation (x,-,+ or :) in a one-step word problem; recognises 2D and 3D shapes.	3.50	0.13	3.80	0.13
Level 3	Identifies place value; determines the value of a simple number sentence; understands equivalent fractions; adds and subtracts simple fractions; carries out multiple operations in correct order; converts and estimates common and familiar measurement units in solving problems.	11.50	0.27	7.20	0.16
Level 4	Reads, writes and compares larger numbers; solves problems involving calendars and currency, area and volume; uses charts and tables for estimation; solves inequalities; transformations with 3D figures; knowledge of angles in regular figures; understands simple transformations with 2D and 3D shapes.	28.50	0.37	18.90	0.25
Level 5	Calculates with multiple and varied operations; recognises rules and patterns in number sequences; calculates the perimeter and area of irregular shapes; measurement of irregular objects; recognised transformed figures after reflection; solves problems with multiple operations involving measurement units, percentage and averages.	29.50	0.41	23.90	0.28
Level 6	Problem solving with periods of time, length, area and volume; embedded and dependent number patterns; develops formulae; recognises 3D figures after rotation and reflection and embedded figures and right angles in irregular shapes; use data from graphs	27.00	0.60	45.20	0.46
		2001		**2007**	
	Reading Skill Levels	**%**	**se**	**%**	**se**
Level 1	Matches text at word or sentence level aided by pictures. Restricted to a limited range of vocabulary linked to pictures	4.6	0.17	2.66	0.11
Level 2	Locates text expressed in short repetitive sentences and can deal with text unaided by pictures. Type of text is limited to short sentences and phrases with repetitive patterns.	14.4	0.28	10.62	0.21
Level 3	Reads and understands longer passages. Can search backwards or forwards through text for information. Understands paraphrasing. Expanding vocabulary enables understanding of sentences with some complex structure.	23.1	0.34	18.71	0.25
Level 4	Links information from different parts of the text. Selects and connects text to derive and infer different possible meanings.	20.2	0.27	19.65	0.24
Level 5	Links inferences and identifies an author's intention from information stated in different ways, in different text types and in documents where the message is not explicit.	24.5	0.39	30.25	0.3
Level 6	Combines text with outside knowledge to infer various meanings, including hidden meanings. Identifies an author's purposes, attitudes, values, beliefs, motives, unstated assumptions and arguments.	13.1	0.41	18.11	0.36

Source: Griffin and Cuc, 2009.

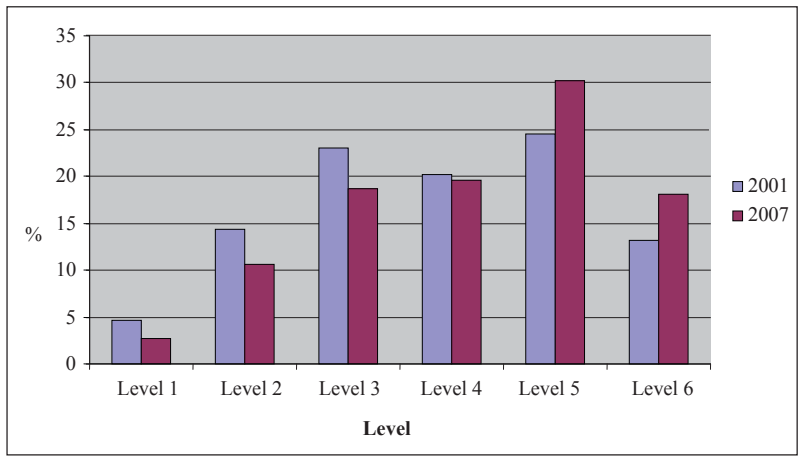
Figures 4.15 and 4.16 provide bar chart summaries of student proficiency levels in 2001 and 2007. The results are generally consistent with the scaled score summaries provided earlier (see Table 4.14). First there is a clear improvement between 2001 and 2007. For mathematics the percentage of pupils at level 6, the highest level measured by the tests, is much higher than those at this level in 2001 (approximately 45 percent versus 25 percent, see Figure 4.15). Similarly for reading in 2007, the percentage of pupils at level 5 and 6, the two highest levels, is much higher than those of 2001 (roughly half versus less than 40 percent, see Figure 4.16).

Figure 4.15. The percentages of students reaching different skill levels in mathematics



Source: Griffin and Cuc, 2009.

Figure 4.16. The proportion of students in 2007 for each of the reading levels in each competency



Source: Griffin and Cuc, 2009.

This improvement comes mainly from bringing students up from the middle levels of the proficiency scale range. For Vietnamese reading there is some notable improvement in terms of reducing the number of low performers. However in mathematics the numbers of students at levels 1, 2 and 3 is relatively unchanged, although these categories overall make up less than 15 percent of the population (this climbs to 35-40 percent in reading).

What kind of skills does the average grade five student in Vietnam have? In Mathematics more than two thirds of the students (in 2007) are at Level 5 or 6. This corresponds to having demonstrated proficiency in a range of areas of mathematics (see Figure 4.15).

However, for reading the percentage of students in the Level 5 and 6 categories is substantially lower (about 48 percent). Here a significant group of students are in Levels 2, 3 and 4, with a very small group remaining at Level 1. Comparing skill levels across subjects is a difficult activity. For both subjects the test items were drawn from the official (or "intended") curriculum, and item writers presumably worked with similar instructions. Despite this kind of standardization of the process, it is possible to have variation in overall test difficulty, especially if there are differences in the degree to which students are actually exposed to this subject matter during the school year ("instructional validity" of exam). Nevertheless, the results suggest that Vietnamese primary school students have made more progress in learning the official mathematics curriculum then they have in the area of reading.

These results from the proficiency scale summaries, together with the overall scaled scores, make it clear that there are still significant challenges in terms of school quality. For reading especially the overall level of achievement is not at an ideal level. These standardized tests do not cover a range of curriculum over different grade levels, but rather are focused on areas that students are supposed to be comfortable with. Reaching 100 percent proficiency in Level 6 is not a realistic standard: no country in the world could meet this target. But there is clearly room for improvement. It is worrisome that in 2007 still about one third of the students are not able to infer meaning from text (below Level 4). And the situations gets worse when the discussion shifts to certain groups of students, and types of schools, as demonstrated in the earlier comparisons based on scaled scores.

Table 4.23 continues the summary of overall skill levels (by subject) for the 2007 results only, this time by region. As was the case in 2001,[54] there are large differences between regions in terms of achievement of levels of skills. At level 6, for instance, the Northwest region has 21.4% of pupils at this level in mathematics and 8.94% in reading. In contrast to this, the Red River Delta has 65.8% and 29.3% respectively. At the lower levels of mathematics, especially levels 1 and 2, the Northwest region has a total of 13% compared with the Red River Delta's 1.4%. A similar ratio of skill level is evident in mathematics where the percentages are 29.05 and 5.7 respectively. It is noted that for mathematics the percentage of pupils at the two lower levels is slightly higher in 2007 than in 2001. The rate of improvement varies from region to region. The percentage of the Northwest region pupils at levels 1 and 2 in 2007 were much higher than those in 2001 (4%). The percentage of the Northwest region pupils at level 6 in 2007 was lower than that in 2001 (8.4%). A similar pattern for the Northwest region was found for reading. These results raise some concerns about school quality and process in the Northwest, but given the changes in the student population during this period it cannot be concluded that quality is actually decreasing. At the very least this kind of "deterioration" merits more intensive follow up.

54 World Bank, 2002.

Table 4.23. Percentages and sampling errors of pupils at different skill levels in mathematics and reading by region

	Mathematics Skill Levels											
	Level 1		Level 2		Level 3		Level 4		Level 5		Level 6	
Region	%	se	%	se	%	se	%	se	%	se	%	se
Red River Delta	0.17	0.06	1.21	0.12	2.67	0.25	9.12	0.24	21.42	0.67	65.36	0.93
Northeast	0.63	0.20	5.62	0.82	8.00	0.42	12.50	0.82	21.46	0.82	51.80	1.08
Northwest	1.10	0.20	11.50	1.04	15.20	0.95	27.45	1.23	21.50	1.21	21.40	1.09
North Central	0.47	0.10	3.62	0.47	6.70	0.64	17.51	0.04	27.79	0.01	43.10	1.64
Central coast	0.29	0.08	3.66	0.42	6.67	0.62	16.70	0.82	25.44	0.84	44.46	1.40
Central Highland	0.44	0.11	5.05	0.67	9.21	0.72	25.54	1.05	24.52	0.82	30.34	1.43
Southeast	0.25	0.00	1.00	0.00	4.00	0.00	15.20	0.74	25.29	0.92	50.29	1.42
Mekong delta	0.01	0.06	6.35	0.00	11.70	0.47	22.51	0.67	27.50	0.67	29.40	0.07
Vietnam	0.36	0.03	3.84	0.12	7.25	0.12	16.49	0.22	24.88	0.27	45.49	0.46
	Reading Skill Levels											
	Level 1		Level 2		Level 3		Level 4		Level 5		Level 6	
Region	%	s	%	se	%	se	%	s	%	s	%	s
Red River Delta	0.83	0.132	4.87	0.357	11.75	0.456	15.55	0.545	35.4	0.657	21.3	0.937
Northeast	4.5	0.35	12.75	0.573	15.31	0.552	17.23	0.534	25.7	0.630	17.32	0.836
Northwest	6.65	0.727	22.5	1.451	24.47	1.122	17.22	0.997	15.76	1.050	9.84	1.046
North Central	2.11	0.394	8.61	0.648	17.34	0.814	18.24	0.776	31.34	0.954	21.76	1.217
Central coast	2.9	0.346	10.6	0.721	15.24	0.773	17.41	0.77	31.27	0.929	17.49	1.178
Central Highland	3.17	0.570	12.38	0.911	22.46	0.973	22.30	0.85	25.30	1.133	14.37	1.275
Southeast	1.47	0.196	7.37	0.751	17.75	0.776	15.75	0.730	27.75	0.941	19.72	1.152
Mekong delta	5.45	0.295	15.57	0.518	24.51	0.545	23.26	0.497	24.72	0.619	6.15	0.493
Vietnam	2.63	0.132	10.23	0.21	15.29	0.25	17.52	0.245	31.31	0.3	13.72	0.356

Source: Griffin and Cuc, 2009.

Tables D1 and D2 in Appendix D present the percentages of pupils at the different skill levels, by province. In addition to regional trends (Table 4.23 above), the differences between provinces within a region is relatively large. One of the important—and unusual—features of the 2001-2007 grade five studies is that the samples are large enough to permit these kinds of inter-provincial comparisons, at least to a relatively high degree of certainty (see 2002 and 2009 reports). The results show that even within the top performing region (the Red River Delta) there are large differences between provinces; for example between Bac Ninh and Thai Binh provinces. These kinds of differences are larger for reading than for mathematics. The province with the highest percentage of pupils at level 6 is Bac Ninh. This is in true in both reading and mathematics. The province with the highest percentage of pupils at level 1 in reading is Soc Trang. For Mathematics it is Ha Giang.

Benchmark Levels of Achievement

In addition to overall summaries of scores and proficiency scale breakdowns over a range of skills, it is important to examine how well pupils were prepared at the end of primary school to enter the community as independent citizens, or to begin their lower secondary education and expect to be independent learners. Two benchmark levels were established in the 2001 study, and these have been replicated for use in 2007. The benchmarks are based on the pupil's ability to cope with reading and mathematics tasks encountered in specific circumstances.

The first benchmark was based on a pupil's ability to use reading and mathematics skills that were deemed necessary to function in Vietnamese society. Those below this benchmark were described as "pre-functional". A second benchmark was based on an estimation of a pupil's ability to cope with the reading and mathematics tasks in the next grade of education, grade 6, which is the first grade of secondary education. The two benchmarks helped to identify three groups of pupils.

As the World Bank's original report states: "Those below the first benchmark would need considerable help to enable them to function and participate fully in Vietnamese society. Those above this benchmark but below the second would need assistance to help them cope with the reading and mathematics involved in secondary education. Pupils above the second benchmark were expected to be able to cope with the reading and mathematics involved in secondary education.[55]

55 World Bank, 2004 p.36 Vol2.

The 2001 cut scores for the two benchmarks were used to calculate the percentages of pupils in each level of the "independency levels". It was also important to see how well this is achieved in different regions and provinces in Vietnam.

Table 4.24 summarizes the student functionality levels in 2001 and 2007. The results show substantial improvement in the percentages of pupils reaching the "independent" benchmark in both subjects. The percentage of pupils identified as reaching this level improved by 10% for reading and 6.7% for mathematics. This means that there are about 60% and 87% of pupils classified as having enough reading and mathematics competence (respectively) for independent learning in secondary education. It also means that about 32% of pupils have been categorized as not being at such a level in reading as to be able to cope independently in grade 6, despite the fact that they had attained functional reading levels.

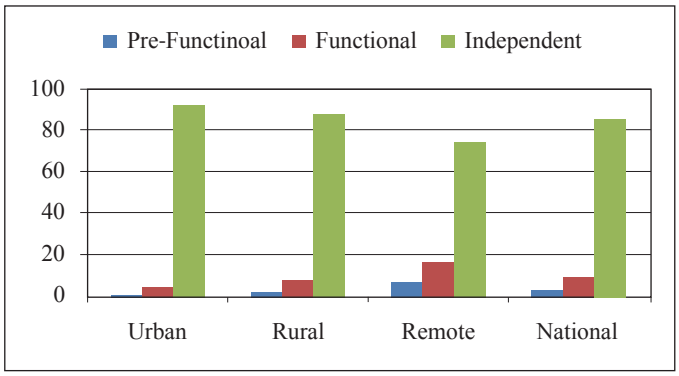
Table 4.24. Student functionality levels in 2001 and 2007

Functionality		Read				Math			
		2001		2007		2001		2007	
		%	SE	%	SE	%	SE	%	SE
Independent	Reached a level of reading and mathematics to enable independent learning in Grade 6	51.3	0.58	61	0.42	79.9	0.41	86.7	0.27
Functional	Reached the level for functional participation in Vietnamese society	38	0.45	32.5	0.35	17.3	0.36	9.8	0.2
Pre functional	Below the level considered to be a minimum for functional purposes in Vietnamese society	10.7	0.3	6.5	0.18	2.8	0.13	3.5	0.12

Source: Griffin and Cuc, 2009.

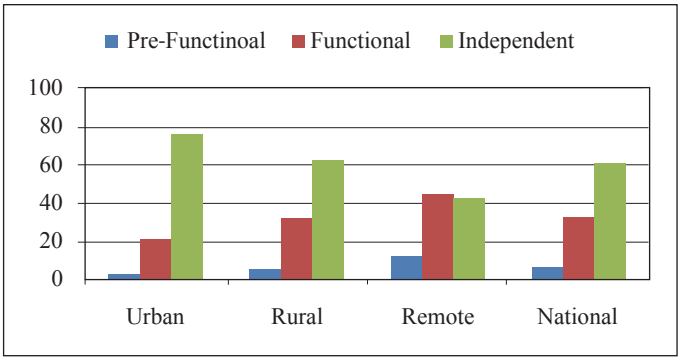
Tables D5 and D6 in Appendix D present the student functionality levels by region and province. The results are generally consistent with earlier results for scaled scores and proficiency scales. Figures 4.17 (Mathematics) and 4.18 (Reading) present the functionality summaries by school location. Not surprisingly, Urban students have the highest levels of independent functionality, followed by Rural. Remote students have the highest percentage of pre-functional, although even in Reading this corresponds to less than 12 percent of the total Remote population. Only about 40 percent of students have reached independent functionality in reading in Remote areas versus 60 percent overall.

Figure 4.17. Student Functionality by School Location, Mathematics 2007



Source: Griffin and Cuc, 2009.

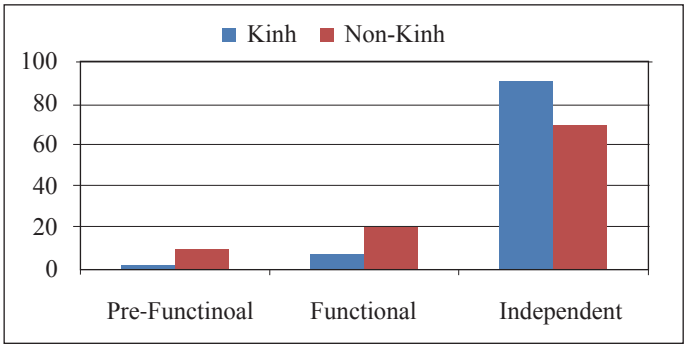
Figure 4.18. Student Functionality by School Location, Reading 2007



Source: Griffin and Cuc, 2009

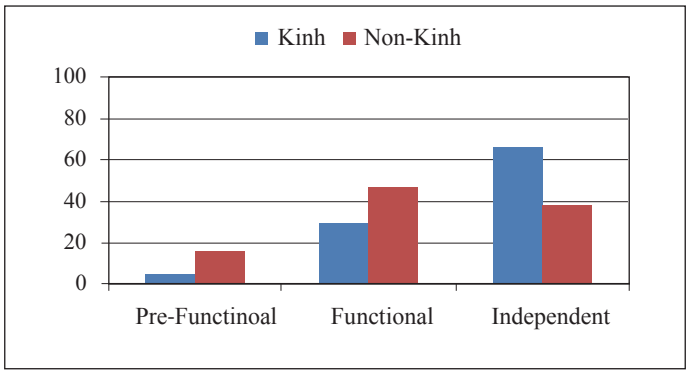
Figures 4.19 (Mathematics) and 4.20 (Reading) continue with functionality summaries by ethnicity. Once again the results confirm large gaps in achievement between Kinh and non-Kinh, with less than 40% of non-Kinh having achieved independent functionality in reading and as much as 15% of non-Kinh only pre-functional in reading. And results are also significantly lower in math.

Figure 4.19. Student Functionality by Ethnicity, Mathematics 2007



Source: Griffin and Cuc, 2009.

Figure 4.20. Student Functionality by Ethnicity, Reading 2007



Source: Griffin and Cuc, 2009.

Student Achievement: Additional Comparisons

Additional data allow us to also make illustrative assessments of learning outcomes relevant to other education levels. A recent report augments the 2006 VHLSS information using a subsample of households that were administered academic tests in reading comprehension (Vietnamese) and mathematics.[56] The tests were based on the same grade 5 survey items used in other studies.[57] Based on consultations with staff in Vietnam's General Statistical Office (GSO), the tests were shortened in order to be administered in a reasonable time to the households selected to participate in the additional data collection. This resulted in "easy" reading comprehension and math tests of 30 questions each, and "hard" tests in both subject areas, with 23 questions on the math test and 25 questions on the reading test.

The easy reading and math tests were administered to youths and adults who were currently in grades 3 through 7, or who had completed 3 to 7 years of schooling. The hard tests were administered to youths and adults either currently in grades 8 or higher (including individuals currently in post secondary education) or who had completed 8 or more years of schooling. Adults age 60 years and older were not asked to participate, and anyone with 2 or fewer years of schooling was also not tested. An important advantage of these tests is that one can create an overall score that is comparable for people who took either test, since both the easy and hard versions of the test contain a few questions (anchor items) which are on both versions of the test.[58]

It was not possible to re-visit all of the 9,189 households that made up the 2006 VHLSS. Resources instead allowed testing in about 1,350 households. The sampling procedure is also described in more detail in the full report.[59] Of the 3,533 individuals who were tested, 987 were still in school in the fall of 2006 (as recorded in the 2006 VHLSS) and 2,546 had finished their schooling. Of the 987 still in school in the fall of 2006, 831 (84.2%) were still in school in the fall of 2007, 74 (7.5%) were not in school, and data were missing on the other 82 (8.3%). Additional information was collected during the re-visits; this is returned to in later sections of the report.

These sample sizes are not large, and the results comparing achievement across grade levels should therefore be treated with some care. Nevertheless, these data are the only current source for achievement results outside of grade five, so even as very basic comparisons they have some value.

Table 4.25 presents mean test scores by the grade that the students had *completed* in 2006, for students who were in school in the 2006-07 school year. It is important to note that these students were in fact in the *next* grade in the 2006-07 school year (for example, a student who completed grade 3 in the summer of 2006 was in grade 4 in the 2006-07 school year), and most of these (about 90%) were *two grades ahead* in 2007-08, the time that they took the test (about 10% were only one grade ahead, presumably because they repeated a grade). This table is presented since inclusion in the testing was based on the grade completed in 2006. As expected, test scores increase with grade, although this is not as evident for the hard reading test.

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56 Dang & Glewwe, 2009.

57 See World Bank, 2004 for details.

58 This conversion was done using regression methods, and is described in more detail in Dang and Glewwe (2009).

59 Dang & Glewwe, 2009.

Table 4.25. Test Scores in 2007-08, by Grade Completed in 2006 (students in school in 2006-07 school year)

Grade Completed	Reading (easy test)	Math (easy test)	Reading (hard test)	Math (hard test)
3	17.9	16.4		
4	19.5	17.9		
5	20.0	18.2		
6	20.4	18.4		
7	23.0	21.1		
8			16.5	11.9
9			17.7	13.4
10			17.0	12.7
11			17.0	14.1
Test Items	30	30	25	23

Source: Dang and Glewwe, 2009.

Notes: Sample size is 504 for the easy tests and 359 for the hard tests. Four students in grade 7 who took the hard tests are excluded. Two students in grade 8 and two students in grade 10 who took the easy tests are excluded. Both easy tests had 30 questions each, while the hard reading test had 25 questions and the hard math test had 23 questions.

One important question is whether these shortened tests yield similar results. Note that the tests were shortened in a way that was intended to keep them at the same level of difficulty (see Appendix A in Dang & Glewwe, 2009, for more discussion). In the 2001 grade five national survey, the easy tests were administered to grade 5 students in mid-April, which is within two months of the end of the school year. In that assessment, the average grade 5 student correctly answered 63.1% of the 60 mathematics questions and 66.0% of the 56 reading questions (four questions in that test were not used in the subsequent analysis, and those questions were also not used for the shortened easy test used here). The students in grade 5 in 2007-08 who took the shortened test had an average score of 16.5 on the math test and thus answered 55% of the 30 questions correctly. The same students answered 18.6% of the 30 reading questions correctly, which implies that 62% were correctly answered. These percentages are slightly lower than the scores on the 2001 assessment, but they may reflect that the 2001 test was given later in the school year. Note, for example, that children in grade 6 had an average score of 18.1 on the math test, which implies that they answered 60% of the answers correctly, which is much closer to the 63.1% figure in the 2001 assessment. It is also possible that the test taking conditions in late 2007 and early 2008 (which more mostly done in people's homes) were not as quiet as in school classrooms (where the grade 5 assessments were conducted in 2001), which could explain the slightly lower test scores.

Table 4.26 presents test score results for students in school in 2007-08 based on their grade in 2007-08, that is on the grade they were in when the test was taken. The patterns are similar to those seen in Table 4.25, and in most cases the children in Table 4.25 are also in Table 4.26, two grades ahead. Indeed, the average test score for a given grade in Table 4.25 is almost always within one point of the average test score for the same test, but two grades higher, in Table 4.26.

Table 4.26. Test Scores in 2007-08, by Current Grade in 2007-08 (students in school in 2007-08 school year)

Grade Completed	Reading (easy test)	Math (easy test)	Reading (hard test)	Math (hard test)
5	18.6	16.5		
6	18.9	18.1		
7	20.7	18.9		
8	21.3	19.1		
9	23.6	22.0		
10			17.5	13.0
11			17.6	13.5
12			18.1	13.9
Test Items	30	30	25	23

Source: Dang and Glewwe, 2009.

Notes: Sample size is 452 for the easy tests and 254 for the hard tests. Twenty students in grade 9 who took the hard tests are excluded. One student in grade 10, two students in grade 11, and one student in grade 12 who took the easy tests are excluded. Both easy tests had 30 questions each, while the hard reading test had 25 questions and the hard math test had 23 questions.

Test scores can also vary by household characteristics for children at the same level of schooling. Table 4.27 shows differences in test scores by urban and rural areas, per capita expenditure quintiles, mother's level of education and ethnic group. Recall that, except for a few exceptions, the easy tests were taken by children who were enrolled in grades 5-9 when they took the test, and the hard tests were taken by children who were in a higher grade when they took the test. Most Vietnamese children stay in school until they reach grade 9 (of children age 18-20, 75% had completed grade 9, and another 4% had completed grade 8 and were likely to have enrolled in grade 9), so the results for the easy tests in Table 4.31 should not suffer from serious sample selection bias (weaker students dropping out of school, which would increase the average scores of students from disadvantaged backgrounds). On the other hand, the results for the hard test are more likely to suffer from that problem and so need to be interpreted more cautiously.

Table 4.27. Test Scores in 2007-08, by Various Household Characteristics (students in school in 2006-07 school year)

Household Characteristic	Reading (easy test)	Math (easy test)	Reading (hard test)	Math (hard test)
Urban	22.2	20.4	17.7	14.5
Rural	19.5	17.8	16.9	13.0
Per capita Expend. Quintiles:				
1	18.0	15.8	15.3	10.9
2	19.5	17.6	17.1	12.6
3	21.3	19.5	16.4	12.2
4	21.5	20.6	17.5	14.4
5	22.3	20.8	18.0	14.9

Mother's Education Level:				
Less than Primary (0-4 yrs.)	18	15.5	16.1	11.7
Finished Primary (5-8 yrs.)	19.2	17.4	17.3	12.9
Finish. Lower Sec. (9-11 yrs.)	20.5	19.3	16.6	13.0
Finished Upper Sec. (12 yrs.)	23.3	20.8	18.3	15.0
Post-Secondary (13+ yrs.)	22.4	21.5	19.2	15.6
Ethnic Group:				
Kinh or Chinese	20.5	18.7	17.3	13.6
Ethnic Minority	16.1	14.2	13.5	10.0
Test Items	30	30	25	23

Source: Dang and Glewwe, 2009.

Notes: The sample sizes for the easy reading and math tests are 505 and 508, respectively, for all groupings except mother's education, which has sample sizes of 436 and 429, respectively. The sample sizes for the hard reading and math tests are 479 and 472, respectively, for all groupings except mother's education, which has sample sizes of 425 and 419, respectively.

The first two lines of Table 4.27 show that urban students perform much better on all the tests than do rural students. This is not surprising, but the size of the difference is worrisome. The gaps on the easy tests are 2.6-2.7 points, which (referring to Table 4.26) correspond to a difference of about three grades. In other words, rural students in grades 5-9 are about three grades behind their urban counterparts. The gaps for the hard tests are smaller, but again they correspond to a gap of at least two grades, although one must be careful given that not all children advance to upper secondary school.

Table 4.27 also examines differences by economic status, as measured by per capita expenditures. Here again the differences are quite large for the easy tests, especially in the lower quintiles. The gaps between the first quintile (the poorest 20% of the population) and the third quintile (the middle 20% of the population) in reading and math scores (on the easy tests) are 3.3 points and 3.7 points, respectively. Again, these differences reflect gap of about 3 years of schooling. The gaps for the harder tests are also quite large, though again they are more difficult to interpret due to possible sample selection problems.

Turning to ethnic groups, there are very large gaps between the ethnic majority (*Kinh* and Chinese) and the various ethnic minority groups. For the easy tests, the gaps are about 4.5 points, which is equivalent to a gap of three to four years of schooling. Very large gaps are also apparent on the hard tests.

Summarizing the results for Table 4.27, for children in approximately the same grade level there are large gaps in learning between urban and rural areas and by economic status, mother's education and ethnic group. Reducing these gaps will not be easy, and indeed they require a better understanding of the underlying causes. These four ways of classifying students are highly correlated, and only regression analysis can separate out the underlying contribution of different household (and school) characteristics to students learning. This additional statistical analysis is described in Chapter 7.

Student Achievement: Summary

Using comparable testing instruments applied in very large national samples of primary schools student achievement improved in mathematics and reading by 43 and 22 score points respectively, or roughly one half and one quarter of a standard deviation. This is a very substantial improvement in just a six year period, all the more as access has been improving, and the evidence strongly

suggests that these changes are reflective of real improvements in student achievement, and are not a statistical artifact or a result of curriculum narrowing or "teaching to the test."

For mathematics the percentage of pupils at level 6, the highest level measured by the tests, is much higher in 2007 than in 2001. For reading, the percentages of pupils at levels 5 and 6, the two highest levels, are also much higher in 2007. There was an improvement in the percentage of pupils that have been identified as reaching independent learning levels in both subjects. The percentages of pupils identified as independent learners improved by 10% for reading and by 6.7% for mathematics. It means that there are about 60% and 87% of pupils classified as having enough reading and mathematics competence for independent learning in secondary education.

Despite the positive trends in overall achievement it is important to note that much scope remains to improve it. In particular, reading results are far from ideal as measured by 40% of students who are still not learning at an independent level and 30% who cannot infer meaning from text. In mathematics results are better but the 2007 percentage of students at the two lowest skill levels (and at the pre-functional level) are slightly higher than those of 2001 indicating some challenges in eradicating very poor results.

The results for equity are at best mixed, although these comparisons need to take into account the improvements in enrollment rates for disadvantaged children at the primary level in the last 10 years (see Section 4.1). A notable positive trend is the decrease in learning gaps between Rural and Urban students between 2001 and 2007. But Remote school students still score roughly one standard deviation below their Urban school counterparts, and between 2001 and 2007 these schools on average realized very small improvements (i.e. the gap increased). Ethnic minorities (non-Kihn) also score substantially lower than Kihn and Chinese children. These gaps are increasing overall between 2001 and 2007. As of 2007 less than 40 percent of minority children were learning at the independent level in reading.

Students from the Northwest region (in particular, Dien Bien, Lai Chau and Son La) where non-Kinh and remote school students are prevalent has much lower achievement gains from 2001 to 2007. This may relate to the widening gaps in socioeconomic development between regions and socioeconomic status between families and individuals during recent years. This may also help explain persistent and acute gaps at higher grades, while participation of vulnerable groups has only been increasing slowly.

Finally, the results from standardized tests merged with household survey data provide some additional clues about learning gaps in Vietnam at different grade levels. Comparisons of urban and rural students suggest that rural students in grades 5-9 are about three grades behind their urban counterparts; the corresponding gap in grades 10-12 is about two grades. The same is true for comparisons between the first quintile (the poorest 20% of the population) and the third quintile (the middle 20% of the population) in reading and math scores, and also between ethnic majority (Kihn and Chinese) and minority groups. Again, these differences reflect a gap of about 3 years of schooling for the grade 5-9 cohorts. Given the increases in participation in lower secondary education for the poorest sectors these apparently widening gaps as students move through primary and lower secondary are perhaps not surprising but remain a cause for concern.

The important point moving forward is that access and participation measures alone are not sufficient for evaluating educational progress. Large learning gaps are present in the Vietnamese school system at the primary level with consequence for both quantity and quality of education. The challenge is therefore to equalize learning opportunities—not just access—at the earliest grades in order to insure that the poorest sectors of society are prepared for the challenges at

each subsequent schooling level. Better preparation will not only insure a much more rewarding schooling experience but also help children stay in and complete school.

4.3. Conclusion

This chapter has highlighted both the recent accomplishments and the current challenges facing the Vietnamese education system. In terms of coverage the results are impressive, as participation and completion rates have exploded since 1992. Almost all children are now completing primary education (eventually), and with each successive year more and more children are entering—and completing—secondary school.

This expansion of opportunity should translate into a more educated workforce which in turn should have positive consequences for Vietnam's economic competitiveness. Also, the higher levels of education for young people—especially girls—will likely have an intergenerational impact in the form of lower birthrates, still higher levels of education, and reduced poverty. In fact, the combination of a relatively highly educated workforce combined with a slowing population of young people creates a demographic "window of opportunity" where subsequent generations of Vietnamese children will be studying in an education system where more resources will be available for them.

However, the full realization of this future potential depends on several issues. First, more work remains to be done to insure equal opportunities for all groups, including historically disadvantaged minority, poor, and rural and, particularly, remote communities. This begins with getting all children through primary school in an efficient manner (i.e. without repeating) and achieving universal primary completion. An even larger challenge moving forward lies at the secondary education level. Much work remains to improve transition rates from primary to secondary as well as completion rates for lower and upper secondary for vulnerable groups.

The improvements in attendance outcomes are important accomplishments, especially considering how far the country has come in a relatively short period. But the challenges facing Vietnamese policymakers go beyond guaranteeing equitable access to education. Long term success depends heavily on the degree to which there is equity (and quality) in the ultimate education outcome: student achievement. The second section of this chapter documented impressive improvements in student achievement at the end of primary school during the 2001-2007. These apparent systemic improvements are all the more impressive given the increase in participation rates during this period. In terms of learning levels the average grade five student has a fairly solid command of the intended mathematics curriculum, or at least enough mathematics to prepare them for grade six. For reading the levels of learning are not as high, although most grade five students perform at a basic level. But in both subjects there are once again substantial gaps by location and ethnicity, and still room to improve the performance of the "average" student in particular in reading, while aiming at shifting all students out of the two lowest skill levels and pre-functional level in mathematics.

In addition to concerns about persistent inequalities and stubbornly lower completion and achievement results for specific groups of children, one major question mark moving forward is the quality of secondary education. Sample-based standardized test applications in Vietnam have been concentrated in primary school. This means much less is known about quality at the increasingly critical secondary level. Part of the quality gap (overall and for particular population sub-groups) has been documented through the household testing exercise which has been used to document performance from grades 6 to 12, but care needs to be taken in interpreting these results due to their illustrative nature. It will therefore be imperative for Vietnam to start applying sample-based standardized testing also at the secondary level.

The need to increase the knowledge base about results and processes in secondary education highlights the larger research needs in the country. The outcome diagnostic approach in this chapter is useful for tracking systemic progress, but we know little about the education context in which this progress took place and even less about the specific mechanisms that are actually responsible for these changes to be able to make any meaningful linkage between systemic improvements in education and/or specific policies and these results. We fill these gaps in the next three chapters.

CHAPTER 5: TRENDS IN SCHOOL SUPPLY AND QUALITY INDICATORS

Creating real educational opportunities for everyone is also dependent on providing quality schools for all. This chapter provides an overview of how critical indicators of school supply and quality have evolved in recent years to start building linkages with education outcomes and set the stage for the analyses of Chapters 6 and 7, which will relate these and other key factors to school attendance and student achievement outcomes.

Starting in the 1990s, Vietnam focused on getting children into schools. The goal of that decade was to get all children aged 6 – 14 to go through primary education. The government sustained an aggressive movement to mobilize and keep children in schools, with the aim of ensuring no children of this age range was left illiterate. "Literacy eradication" was the noble and humble goal of education quality during that period. The system of primary schools expanded rapidly and reached all of the ten thousands communes in the country. Flexible schooling arrangements were developed to ensure that no communes were without a primary school and no villages were without primary classes (operating in satellite schools). At the same time primary education was made free for all. School infrastructure was very basic and constrained, with many schools operating three shifts per day. Young teachers with limited training were mobilized to come and teach in remote and disadvantaged areas. Four curricula operated in parallel.[60] By 2000, Vietnam declared that it had achieved the universalization of primary education and illiteracy eradication goals, and was therefore ready to move on to improve the quality of primary education, while further expanding access to secondary education, through more and better school resources (at both the upper and lower end student distribution), better qualified teachers, and larger use of fee exemptions. By the end of this decade, priorities have further shifted towards a new set of measures aimed at universalizing high quality education for all, including further expansion of early childhood and full day schooling and wider use of teacher standards.

The data in this chapter show that Vietnamese schools have indeed been receiving more and more resources. Also, the rate of improvement in things such as the Fundamental Input Index (FII) has been higher for the poorest schools. However, much work remains to guarantee equal opportunities and resources across all communities to experience a high quality education at all education levels. These resources and opportunities matter because as we will see in Chapters 6 and 7 they are correlated with educational outcomes explaining improvements but also some of the persistent gaps.

5.1 Supply and Quality of Primary Education

By making use of the very detailed 2004-2008/09 primary school dataset, it is possible to provide a detailed diagnostic of the distribution and time trend of the quantity and quality of primary schools in Vietnam.[61] The objective is to understand the main disparities on the supply-side at the primary level, and how these have evolved, starting by basic measures of supply affecting the mere access to school to measures of school quality affecting the quality of the schooling experience.

60 Chương trình chính thức 165 tuần; chương trình phổ cập giáo dục tiểu học (100 tuần); chương trình phổ cập giáo dục cho trẻ em các dân tộc thiểu số (120 tuần); và chương trình công nghệ giáo dục (được xây dựng và áp dụng thử nghiệm ở các khu vực thành thị).

61 Phân tích này dựa trên Nores (2008c).

A statistic called the coefficient of intra-class correlation (rho) is used to measure variation in school resources on the 2004/05, 2005/06 and 2006/07 data from the Primary School Dataset.[62] This is a measure of homogeneity among units (regions, provinces or communes). Analyses using rho examine whether differences in resources are fundamentally due to differences between communes or within communes, or any preferred unit of analysis (provinces, regions). As a population attribute, the intraclass correlation offers a measure of equity, or disparity, of learning opportunity[63]. Systems with low intraclass correlation have achieved higher equity of the resource at the level measured. For example, a low rho for preschool availability at the commune level (i.e. less than 0.25) means that only 25 percent of the overall variation in this variable is explained by differences in averages between communes; in other words, most of the variation in preschool availability is within communes (or between schools), but on average communes have similar levels of preschool availability. On the other hand, a rho of 0.90 for this variable points to more rigid differences across communes, as is the case in highly stratified systems (like an apartheid system). This means that 90 percent of the variation in preschool availability is attributable to differences in communes, and there is much less variation within the individual communes. From a policy standpoint the goal of public institutions is to equalize opportunities across administrative units, so lower rhos suggest more equality. But it is important to note that in this section the lowest unit available is the commune. So equality across communes (a low rho) can still have inequality between schools within the commune.

Rho is defined as:

$$\text{Rho/ICC} = \sigma_B^2 / (\sigma_B^2 + \sigma_W^2)$$

That is, the between unit variance is a percentage of the sum of the within-unit and the between unit total variance. The rhos are presented for communes, provinces and regions. For each unit the interpretation is the same: the higher the value, the more inequality across units (communes, provinces, regions), whereas lower rhos suggest that the overall averages are similar across units, and that most of the variation is within communes, provinces, and regions.

Appendix E contains a more detailed overview of the methodology used by Nores (2008c), together with the results from the nested analyses of variation based on multilevel methods. These results are not much different from those presented here, so they are not included.

Access to School

This first section looks at measures of access to primary school in an attempt to quantify progress but also if there are any remaining challenges in ensuring opportunities of enrollment for all. Despite variations in the number of satellites, incomplete schools, and supply of schooling, overall access to schooling and classroom distributions are not major constraints in Vietnam.

a. Complete school and satellite availability

Primary education is provided in Vietnam through main sites sometimes complemented with the use of satellite schools to satisfy demand, rather than with additional schools. The number of satellites varies widely, and an intra-class correlation above 0.76 for all years means that between-commune variance represents more than 76-78 percent of the total variance in the number of satellites as means to provide for primary education (Table 5.1). Differences across

62 While separate data elaborations are also undertaken on more recent datasets, the 2008 and 2009 were not available in a format which would allow the Rho analysis to be performed.

63 Foy, P. (2004) P25: Intraclass Correlation and Variance Components as Population Attributes and Measures of Sampling Efficiency in Pirls 2001. Hamburg, Germany: IEA Data Processing Center.

all provinces (regardless of the region) explain approximately 30 percent of the total variance in the number of satellites. Main sites on average have about 2.5 satellites (with a range from 1-21), and this has been very slightly decreasing in the 2004-2006 period (from 2.6 to 2.49). Satellites are about 1.4-5 km from the main site. However, there are large differences in terms of distance. Between-commune variance represents over 60 percent of the total variance in distance of satellites. The significant variation in number of satellites across communes indicates their more intensive use in poorer areas where fewer main sites are available and as such is not a sign of lesser school supply in poor areas. However, higher distance of satellites combined with much less use of car in remote communes (likely to explain the high variance in these variables) is likely to make commutes more complicated in these areas hampering somewhat completion.

Table 5.1. Intraclass correlations for Satellite versus Main Schools, availability and distance

	2004				2005				2006			
	Mean	Intra-class Correlation			Mean	Intra-class Correlation			Mean	Intra-class Correlation		
		Com	Prov	Reg		Com	Prov	Reg		Com	Prov	Reg
Satellites												
No. Satellites	2.60	0.76	0.31	0.17	2.54	0.77	0.31	0.17	2.49	0.78	0.32	0.17
Distance Sat., km	1.42	0.63	0.24	0.14	1.47	0.63	0.25	0.15	1.46	0.64	0.25	0.16
% Car to satellite	53.33	0.48	0.13	0.09	60.64	0.55	0.26	0.17	61.70	0.54	0.27	0.17
% Bike to satellite	35.12	0.40	0.09	0.06	12.28	0.32	0.09	0.06	12.05	0.33	0.09	0.06
% Walk to satellite	8.98	0.43	0.09	0.05	19.16	0.37	0.11	0.07	18.47	0.37	0.12	0.07
% Oth. to satellite	2.58	0.42	0.32	0.07	6.09	0.42	0.15	0.08	6.01	0.42	0.15	0.08
Complete /Incomplete Schools												
Satellite Comp	78.89	0.42	0.14	0.07	77.28	0.39	0.15	0.08	77.25	0.37	0.16	0.09
Satellite Incomp.	21.11	0.42	0.14	0.07	22.72	0.39	0.15	0.08	22.75	0.37	0.16	0.09
Main school Comp	99.0	-	0.01	0.00	98.0	0.01	0.01	0.01	98.0	0.05	0.01	0.01
Distance to Attend Primary												
Avge. Distance	7.50	0.88	0.09	0.06	9.44	0.84	0.11	0.07	9.88	0.84	0.10	0.08

Source: Nores, 2008c.

An important measure of resource availability is the existence of complete versus incomplete primary schools (grades 1-5). Incomplete schools are more likely to increase dropout because they increase costs of transfers and adaptation to a new school, and might increase transportation costs as well. Overall, 77 percent of satellite schools are complete and 23 incomplete and most (98 percent) main schools are complete. The proportion of complete satellites has decreased slightly likely reflecting the decreasing primary school age population. Between-commune variance in (in)complete satellite schools explains 37 percent of the total variance. This variance has been slightly decreasing. Province and regional level differences explain very little of this total variance in the availability of complete satellite schools, which means that most of the variation is within provinces and regions. Most main sites are complete (offer all 1-5 grades) therefore only slight variations where observed for this variable.

Finally, supply (quantity, school size and location) also determines the average distance that students have to travel to attend primary education. This affects households in terms of both travel time and direct travel costs, since transportation is not provided for children. On average, students enrolled in primary education travel 7-10 km to the nearest primary school (or satellite), and this distance has been on the rise. In 2006, 84 percent of the total variance in the distance travelled by children (standard deviation of 31 km) was explained by differences across all communes. In other

words, there is a lot of variation in this variable across communes, which is not surprising given varying levels of urbanization but also suggests variations in school supply. Between-provinces or between-regions differences explained very little (less than 10%) of the total variance of distance. This evidence suggests once again that in some rural and remote communes where car is little used and distance to school is significant travel costs and time may still be an obstacle for primary completion, and even enrollment. The disagregations of the previous chapter only by urban/rural may not fully capture persistent inequities in access between types of areas, which on the other hand may be better captured by the primary completion outcomes of ethnic minorities (who live in rural but also remote areas).

b. Classrooms

Ideally, the distribution of classrooms for the different grade levels should not differ significantly across communes, provinces and regions. Larger inequalities in the distribution of higher level grades could be either supply or demand driven, as enrollments drop in the higher primary grades due to student dropout and repetition. Table 5.2 shows that the number of classrooms has been fairly stable during the 2004-06 period, while differences between communes have been slightly decreasing (see rhos for commune category). A rather stable number of classrooms for a decreasing primary school age population indicates increased relative availability.

Table 5.2. Intraclass correlations for Classroom Availability by Grade Levels

Room Availability by Grade Level	2004				2005				2006			
	Mean	Intra-class Correlation			Mean	Intra-class Correlation			Mean	Intra-class Correlation		
		Com	Prov	Reg		Com	Prov	Reg		Com	Prov	Reg
Total rooms	14.37	0.47	0.19	0.05	14.21	0.44	0.20	0.05	14.25	0.44	0.19	0.05
Total gr 1	4.27	0.09	0.03	0.01	3.62	0.36	0.12	0.05	3.80	0.41	0.17	0.06
Total gr 2	4.31	0.15	0.02	0.01	3.53	0.41	0.11	0.03	3.46	0.38	0.15	0.05
Total gr 3	4.24	0.13	0.02	0.00	3.60	0.31	0.10	0.03	3.35	0.43	0.13	0.03
Total gr 4	4.31	-	0.01	0.00	3.58	0.28	0.08	0.02	3.46	0.39	0.13	0.03
Total gr 5	4.19	0.26	0.01	0.00	3.64	0.27	0.08	0.02	3.45	0.36	0.12	0.03

Source: Nores, 2008c

Quality of Primary Education

Even if full access was insured, inequities could appear in differential access to quality education. We review in this section school quality measures, going from more to less basic, to track progress and challenges in providing a minimum quality education for all. There has been encouraging progress in decreasing the basic resource gap over this last decade, including improved supply and equity in learning infrastructure, increase in teachers with pedagogical college degree and pedagogical university education, and increase in preschool availability. Despite these gains, there is still room for improvement as Vietnam aims to provide equitable access to quality education.

a. Towards Minimum Quality Standards (FSQL)

Primary education management is decentralized to the district level in Vietnam. The role of the Central Ministry of Education and Training largely includes: (i) setting the curriculum; (ii) publishing the textbooks; and (iii) provide regulations on teaching and assessment. The center therefore has limited influence on the availability of primary school resources, and this has resulted in large differences in resources across schools. To address this issue, in the mid 1990s,

MOET established the Department of Primary Education and one of the important policies that came out as a result was the "National School Standards for 1996-2000 period". This was a set of requirements and expectations that schools needed to meet. The standards were a mix of: (i) input standards such as qualifications of school head and teachers; infrastructure, playground area and teaching and learning resources; (ii) process standards such as annual school planning, participation of parents in school activities; training and professional development of teaching staff; and (iii) output standards such as net enrolment rate, progression, drop out and completion rates. These standards constituted a model of what a primary school should be and had the additional purpose of making schools more accountable. All standards were considered equally important. The application of these standards brought mixed results. Schools in urban areas tended to have high qualified teaching staff, good school management processes and good output indicators but did not meet the minimum space requirements. Schools in rural areas, on the other hand, tended to meet the infrastructure and space requirements but did not meet the other standards. Overall, the number of schools that were recognized to having met these standards was small. By 2007, only 30% of schools have been recognized as having met the national standards. The certification process certainly has drawn attention on the school resources and many local authorities and communities have since provided financial support to improve schools resources to help them meet the national standards.

During the late 1990s, as the imperative of school quality became more evident, a different policy debate was initiated focusing on improving the resources and conditions for the most disadvantaged schools. School conditions varied significantly across the counties and schools in rural and remote areas lagged far behind schools in urban areas. Moreover, within each school, teaching and learning conditions differed significantly between main and satellite campuses, with satellites campuses having very basic and temporary resources. The Fundamental School Quality Level (FSQL) was then introduced as a minimum quality standard for all schools. FSQL was developed through a participatory process involving key actors from different levels of the decentralized education system including parents. FSQL was envisaged to be providing an objective basis for allocating resources to schools with the aim of allocating money where it is most needed. The development of FSQL started with seventeen statements of "fundamental" standards recognized as minimum requirements for the provision of basic education services. By the time FSQL was adopted for pilot use in 2003, it had expanded to cover thirty five standards ranging from short to medium term targets. The FII (FSQL Input Index) was constructed based on these targets.

The actual input indicator (or index) is based on five components relating to school quality. These are summarized in Table 5.3. The largest areas are for school organization/ management, teaching staff and infrastructure. These include key inputs related to physical inputs but also human capital inputs like teacher education levels. The index is also made up of process indicators related to implementation and quality.

Table 5.3. Summary of FII Calculation

No.	Content groups	Points
1	School organization and management;	26
2	Teaching staff;	27
3	Infrastructure, teaching and learning equipments;	25
4	Implementation of education socialization;	7
5	**Education activities and quality.**	**15**
	Total	**100**

The FII is available for all schools in Ministry of Education and Training (MoET) data sources. Based on the summary in Table 5.3 it is clear that this is not just an index of inputs in the school, but it also includes actual process indicators. In other words, the FII includes some elements of actual school performance. This distinction between a pure input indicator—which gives an idea of the school's potential—and a hybrid that includes actual performance levels in some areas is important from a policy standpoint. For example, a very well equipped school may not be using its resources to full capacity, whereas a poorly equipped school may increase its FII through better management, etc. Nevertheless, the FII is weighted towards inputs, so this issue of performance affecting the overall index is not crucial.

FSQL is a good concept for determining minimum levels of service provision, while providing an excellent information base for both calibrating the needs of individual schools as well as monitoring performance, and is a potential good tool for targeting resources to the most disadvantaged schools. The application of FSQL requires extensive data collection and monitoring as each input indicator will need to be measured systematically. The target level of the indicators needs to be matched with the resource level to be provided The process of institutionalizing FSQL, therefore, needs to be integrated fully within the planning and budgeting process at various levels of education i.e. school, district, province and national. The strength of the FII is its coverage across different aspects of schools; in this way it is not too dependent on a single thing, such as teacher education or physical inputs.

To sum up, taken as a whole, Vietnam's process of setting school standards in the last fifteeen years has produced a profile of:

i. basic FSQL standards;
ii. FSQL version 1 (2003);
iii. FSQL version 2 (2007);
iv. national standards version 1 (1997) and
v. national standards version 2 (with two levels of performance).

There is overlap in the specification of these standards and there is a tendency of increasing the standards. This reflects the desire to set high expectations at the national level but presents the risk that resources are not sufficiently aligned to meet these objectives.

b. Trends in the FSQL Input Index

How did FSQL evolve over this last decade? Aggregate data taken from the District Fundamental School Quality Audit (DFA) reveal good progress in the FSQL Input Index (FII) and several of the individual FSQL indicators between 2003/05 and 2008/2009 (Table 5.4). In particular, the FII increased from 62 to 71 percent, the proportion of schools achieving a FII of more than 80 percent from 16 to 24 percent and the proportion of schools achieving a FII of more than 60 percent from 71 to 90 percent. Teacher training (except in the last two years), availability of teaching materials and quality of the infrastructure all improved substantially during this period.

Table 5.4. Trends in FSQL Indicators

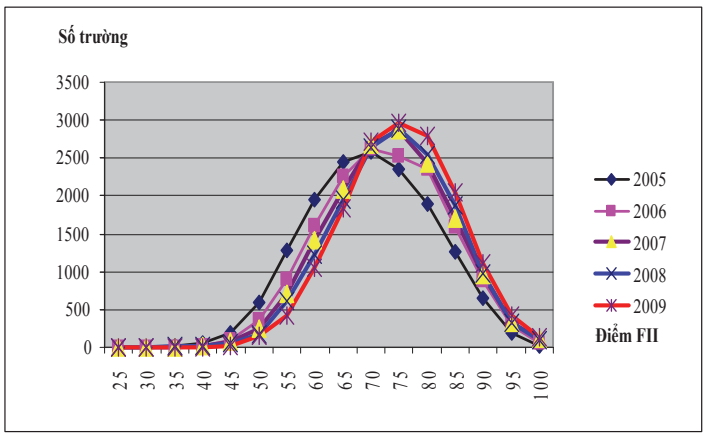
Indicators	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Average District FSQL Input Index Score	62.1	65.0	67.8	68.9	69.6	70.9
No. and % Schools that Score >80 in FSQL Input Index	2,443 16%	NA	2,820 18.1%	3,102 19.9%	NA	3,804 24%

No. and % Schools that Score >60 in FSQL Input Index (b)	NA	11,081 71%	12,359 79%	12,759 82%	13,306 85%	14,124 90%
No. and % of Teachers (all sites) to have Received 5 or more Days on In-Service Training FSQL	228,849 64%	237,738 66%	256,692 74%	246,205 71%	166,236 52%	222,303 64%
No. and % of Grades to Have Teaching Aids for Reading FSQL	123,228 75%	127,095 81%	230,515 83%	239,584 87%	238,146 89%	235,739 88%
No. and % of Schools (all sites) to have Potable Water FSQL	9,216 23%	11,248 28%	12,118 31%	13,710 35%	16,308 43%	18,129 48%
No. and % of Classrooms (all sites) to have a Good Blackboard FSQL	73,948 34%	110,137 49%	127,849 58%	202,689 91%	210,161 94%	217,113 96%
No. and % of Classrooms (all sites) to have Achieved School Construction FSQL	140,226 65%	136,904 61%	143,526 65%	150,711 68%	155,996 70%	163,501 73%

Source: DFA data, various years, unless otherwise indicated; Notes: in Italic, estimates; (a) Except for grade 5 achievement, where baseline is for 2001; (b) Not one of the original indicators, only added for information.

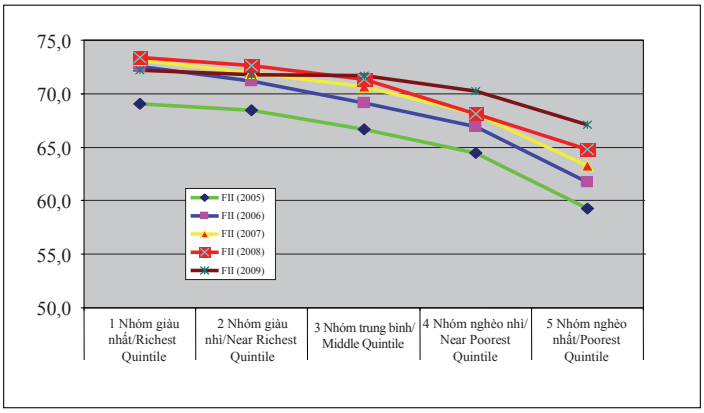
The data also show decreased variance in the FII (Figure 5.1) and in particular greater progress in the FII achieved among disadvantaged districts and the poorest district quintile (Table 5.5 and Figure 5.2) since 2004/05. Notwithstanding this positive trend, it is clear from Table 5.5 that gaps remain in the provision of quality by community type. The rate of change has generally been positive across the board, so while the poorest are making relative improvements the rate of change is not positive enough to insure equal provision of opportunity in the near future. So once again the challenge is maintaining an overall positive trend for quality in the country while targeting more inputs for the poorest schools.

Figure 5.1. Distribution of FII across Schools Nationwide from 2005 to 2009



Source: MoET, Analysis of DFA Data in the School Year 2008-2009.

Figure 5.2. FII and Poverty Levels from 2005 to 2009



Source: MoET, Analysis of DFA Data in the School Year 2008-2009.

Table 5.5. FSQL Input Index Nationwide and by Different Groupings[64]

Indicator FII (FSQL Input Index)	Number of Districts (2008)	Number of Primary and Secondary Schools	FII (2005)	FII (2006)	FII (2007)	FII (2008)	FII (2009)	Increase of FII (2005-2009)
Nationwide	677	15,610	65.0	67.8	68.9	69.6	70.9	5.9
Averagely Disadvantaged Districts	204	5,104	66.4	68.6	69.4	69.9	70.9	4.5
Disadvantaged Districts	227	4,978	57.6	60.7	62.4	63.4	67.2	9.6
Advantaged Districts	246	5,528	71.5	74.1	75.1	75.4	74.7	3.2
Richest	133	2,649	69.1	72.5	73.1	73.4	72.2	3.1
Second Richest	133	3,112	68.4	71.2	71.9	72.6	71.8	3.4
Averagely Advantaged	128	3,620	66.7	69.1	70.6	71.4	71.7	5
Second Poorest	138	3,432	64.5	66.9	68.1	68.2	70.2	5.7
Poorest	135	2,797	59.3	61.7	63.3	64.8	67.1	7.8

Source: MoET, Analysis of DFA Data in the School Year 2008-2009.

The results in this section show the progress that Vietnam continues to make in improving the opportunities to learn for primary education children. This is critical for insuring adequate levels of learning for all students, regardless of background or location. However, these overall averages and trends provide only a general overview of the distribution of these features of schools. In the next section a more detailed review is provided together with information on how the distribution of minimum school quality varies between different areas.

c. Distribution of Basic and Learning Infrastructure

Measures of basic infrastructure report percentages (across main site and satellites). Table 5.6 reports the existence of drinking water, toilets, and health boxes at the schools. It is worth noting that not all schools have these basic elements in their infrastructure, but there have been

64 Source: MoET, Analysis of DFA Data in the School Year 2007-2008.

improvements through time. Overall, across all these indicators the intraclass correlations at the commune level are between 40-55 percent, at the provincial level between 17-30 percent, and at the regional level 10-20 for the different years. A very slight decrease is observed in all three rhos over time for drinking water, the percentage of buildings with teacher toilets and health boxes. In other words, the differences between units are being reduced, and more and more of the variation is attributable to difference within these units (i.e. between schools).

Table 5.6. Intraclass correlations for Basic Infrastructure

Basic Infrastructure	2004				2005				2006			
	Mean	Intra-class Correlation			Mean	Intra-class Correlation			Mean	Intra-class Correlation		
		Com	Prov	Reg		Com	Prov	Reg		Com	Prov	Reg
% drinkwater	43.17	0.56	0.31	0.19	45.86	0.51	0.27	0.17	50.44	0.52	0.26	0.16
% toilet shared for pupils	54.83	0.44	0.20	0.13	56.39	0.41	0.17	0.10	59.03	0.42	0.17	0.09
% toilet for boys	46.64	0.43	0.24	0.16	49.02	0.44	0.22	0.15	53.42	0.43	0.23	0.15
% toilets for girls	46.21	0.44	0.24	0.17	48.65	0.43	0.22	0.15	53.10	0.42	0.23	0.15
% toilets for teachers	40.38	0.46	0.24	0.14	42.97	0.45	0.24	0.13	46.86	0.43	0.24	0.14
% healthbox	46.05	0.56	0.30	0.21	50.07	0.54	0.28	0.20	56.88	0.53	0.25	0.15

Source: Nores, 2008c.

Table 5.7. reports averages and intraclass correlations for learning infrastructure features such as classroom area, poor condition versus good condition classrooms, library and laboratories, seat availability by conditions, and blackboard availability by condition. There have been improvements through time for all indicators. Intraclass correlations at the commune level have decreased (with different degrees) for most of the indicators presented. Currently, between-commune variation explains between 20-45 percent of total variation in these resources, therefore allowing for a large percentage of variation to be explained by within-commune differences. However, between-province variation is quite elevated (20-30 percent) for measures of seating availability and quality of seating, and the total number of blackboards. The latter implies some large degree of variation across provinces as well, regardless of the lower level variations.

Table 5.7. Intraclass correlations for Learning Infrastructure

Learning Infrastructure	2004				2005				2006			
	Mean	Intra-class Correlation			Mean	Intra-class Correlation			Mean	Intra-class Correlation		
		Com	Prov	Reg		Com	Prov	Reg		Com	Prov	Reg
Avge class room area	48.47	0.68	0.03	0.01	48.11	0.24	0.18	0.11	48.10	0.22	0.17	0.11
Tot good-condition class rooms	5.04	0.42	0.16	0.07	5.12	0.40	0.20	0.09	5.60	0.34	0.18	0.08
Tot poor-condition class rooms	9.43	0.47	0.15	0.05	9.13	0.44	0.16	0.06	8.67	0.42	0.15	0.04
% having library	46.49	0.32	0.13	0.08	51.08	0.28	0.14	0.08	53.96	0.30	0.15	0.08
% having laboratory	7.79	0.42	0.08	0.04	9.48	0.44	0.09	0.05	10.36	0.46	0.11	0.05
Tot good-condition seats	184.35	0.51	0.21	0.10	215.25	0.49	0.26	0.10	245.78	0.47	0.27	0.11
Tot poor-condition seats	251.06	0.38	0.16	0.09	231.50	0.41	0.19	0.10	215.31	0.37	0.20	0.11
Avge % of poor-condition seats	62.51	0.46	0.24	0.15	58.30	0.48	0.26	0.14	53.57	0.46	0.28	0.15

Tot No. of seats	435.41	0.44	0.16	0.05	446.76	0.43	0.23	0.08	461.09	0.43	0.25	0.10
Tot good-condition black boards	7.14	0.52	0.27	0.13	8.26	0.51	0.31	0.15	13.03	0.35	0.15	0.05
Tot poor-condition black boards	7.63	0.50	0.22	0.12	6.37	0.60	0.27	0.15	2.01	0.37	0.10	0.03
Avge % of poor-condition BBs	55.92	0.52	0.30	0.20	48.25	0.51	0.32	0.22	14.80	0.21	0.10	0.10
Tot No. of black boards	435.41	0.44	0.16	0.05	446.76	0.43	0.23	0.08	461.09	0.43	0.25	0.10

Source: Nores, 2008c.

d. Distribution of Head and Teacher Education and Training

During the seventies, eighties and nineties, due to the rapid expansion of the education system, many teachers were recruited into the system without having minimum qualifications. Since the beginning of 2000s, however, Vietnam no longer faces shortage of teachers because of the decline in the school age population. As a result, more attention has been given to address the quality of the teaching force than before when most efforts were to recruit and maintain teaching force in the schools. Vietnam has put significant emphasis on upgrading teacher qualifications as one of the key measures for improving quality.

In 2006, there were no large intraclass correlation coefficients at the commune, province or region level for the School's head education or training level (Table 5.8). Intraclass-correlation at the commune level has decreased from 0.33 in 2004 to 0.22 by 2006. However, the story is quite different for teacher qualifications. Intraclass correlation coefficients are higher for measures of higher levels of teacher education (average percentages for the main site and satellites). There are larger concentrations of teachers in the system with higher secondary education training and lower average percentages in the system with other levels of education (means). The average percentage with primary and lower secondary has decreased over time (means), while the percentage of teachers with pedagogical college degree and pedagogical university education has increased steadily. Between-commune inequality explains 60-70 percent variation in teacher qualifications in the availability of teachers with lower secondary, higher secondary, vocational training or even availability of teachers with pedagogical college degrees. Between-province variations (regardless of the nesting of communes) explain around 30-40 percent of total variation in the availability of teachers with education levels of lower secondary and beyond.

Table 5.8. Intraclass correlations for Head and Teacher Qualifications

Teacher Training and Education	2004				2005				2006			
	Mean	Intra-class Correlation			Mean	Intra-class Correlation			Mean	Intra-class Correlation		
		Com	Prov	Reg		Com	Prov	Reg		Com	Prov	Reg
School Head												
Head Ed Level	2.85	0.33	0.07	0.04	2.89	0.24	0.06	0.04	2.91	0.22	0.06	0.04
Head Training Lev.	3.91	0.06	0.09	0.03	4.05	0.06	0.10	0.02	4.16	0.06	0.10	0.02
Teacher Education and Training, Percent Average												
Primary	3.13	0.42	0.05	0.01	1.81	0.40	0.05	0.01	1.52	0.35	0.04	0.01
LSE	14.32	0.65	0.31	0.19	11.49	0.61	0.37	0.22	10.09	0.63	0.39	0.25
HSE	82.55	0.62	0.29	0.17	86.70	0.59	0.34	0.21	88.38	0.60	0.35	0.22
9+3 training inc	3.88	0.32	0.08	0.04	2.66	0.27	0.08	0.04	2.10	0.21	0.08	0.04
9+3 training	22.31	0.74	0.62	0.27	20.01	0.72	0.62	0.26	17.73	0.70	0.60	0.24
12+2 training	44.92	0.67	0.43	0.08	42.95	0.66	0.42	0.08	39.70	0.65	0.42	0.07

Pedag coll degree	18.97	0.72	0.44	0.27	22.18	0.71	0.43	0.25	25.27	0.68	0.41	0.24
Pedag univ	7.38	0.57	0.24	0.05	9.75	0.50	0.23	0.03	12.67	0.53	0.30	0.03
Other training	2.53	0.32	0.04	0.02	2.44	0.27	0.04	0.02	2.51	0.30	0.03	0.01

Source: Nores, 2008c.

The results in Table 5.8 are consistent with a fairly fixed distribution of School Head training and education opportunities. But for teacher education and training there is much more potential for variation, and this variation is likely to be related to commune, province and even regional characteristics as certain kinds of teachers are more concentrated in these different areas.

e) Preschool Availability

Besides primary education, schools may or may not provide preschool at the main site or in a separate site close to the main site. Preschool availability increases school readiness, increasing the likelihood of school success, and in-time enrollment, among other things, and, as such, we include it as a measure of access to quality education. Currently 42 percent of schools have no preschool on site, or nearby (Table 5.9). Between-commune variance explains 57 percent of total variance in the lack of preschools. Over time the absence of preschools has decreased significantly, but variance between communes remains practically as high, while the variance across provinces has even increased.

Of the main sites where preschools are available, these either shared primary rooms (an additional 8.5 percent), are in the primary site in separate rooms (28 percent), or on a separate site in the same village (21 percent). The first of these seems a much more common resource since there is a lower intraclass correlation at the commune level for this arrangement compared with the other two (meaning there is more equity in the distribution of preschools located in shared primary school rooms). Between-commune variance explains 34 percent of the total variance in the shared primary arrangement, 50 percent of the total variance of the preschool arrangement in separate rooms in the primary site, and 64 percent of the total variance of preschool arrangements in separate sites within the village. While inter-commune inequalities in the first have actually slightly decreased, they have slightly increased for the last type of arrangement (see increasing rho for commune category).

Table 5.9. Intraclass correlations for Preschool Availability and location of Preschool

	2004				2005				2006			
	Mean	Intra-class Correlation			Mean	Intra-class Correlation			Mean	Intra-class Correlation		
		Com	Prov	Reg		Com	Prov	Reg		Com	Prov	Reg
No. preschools	63.29	0.60	0.16	0.03	41.12	0.60	0.27	0.07	42.34	0.57	0.25	0.08
Preschool Available in:												
Shared Prim Rooms	8.26	0.39	0.17	0.09	8.49	0.35	0.17	0.09	8.48	0.34	0.18	0.10
Primary site	15.99	0.51	0.11	0.02	33.97	0.56	0.18	0.05	27.84	0.50	0.13	0.03
Separate site Village	12.46	0.60	0.08	0.03	16.42	0.61	0.14	0.04	21.34	0.64	0.23	0.06

Source: Nores, 2008c.

School Supply and Quality: Summary

Despite clear improvements, there are still issues of equity in the provision of opportunities to learn in Vietnam. The results demonstrate steady improvements in the overall availability of resources like preschools, learning infrastructure and teacher education levels, which are likely to explain some of the improved attendance and learning outcome indicators. However, in terms

of equity there are some features of schools that are more equally distributed across Vietnam than others. While gaps between communes are decreasing for most basic and learning infrastructure, the results show persistently large intraclass correlations at the commune level in the use of satellites as a form of expanding supply (over main schools), distance to satellites and main sites, and in preschool availability. Additionally, while the results do not show large disparities between communes in the number and conditions of classrooms, seats and blackboards in 2006, although decreasing there is evidence of persistent large gaps between communes for some basic infrastructure. The latter is also evident for the availability of teachers with higher levels of education and training (beyond lower secondary), where gaps between communes have been stable or decreasing very slowly.

Overall the results confirm that Vietnam is continuing to make progress in the provision of school quality, and that over time school resources appear to be equalizing, if slowly, in particular at the most basic level. Nevertheless, there is still much to do to insure equal opportunities. Furthermore, the fact that the poorest communities still tend to have the lowest amounts of quality-related resources highlights the larger challenge of insuring equity of outcomes (like achievement) because these children have fewer learning resources outside of school to draw on.

And the challenge of insuring equal opportunities of learning increases as education levels increase and quality measures become more sophisticated. These further challenges are illustrated in the following two sections by looking at levels and trends in private expenditure on education and at trends in full day schooling in Vietnam. Differentiated expenditure levels strongly suggest persistent inequality in access to quality education in Vietnam, beyond the basic indicators analyzed above.

5.2. Private Spending on Education: Further capturing Inequality to Quality Education

The VHLSS data allow us to look at overall and education expenditure trends. Inequalities in educational expenditure are commonly a function of income inequalities. It is a policy concern whether a system reinforces or attenuates income inequalities. Measures of income such as household expenditures and per capita expenditures, as shown in Table 5.10, provide insight into this relationship through time. Overall, average per capita expenditures have increased from 1992 to 2006 for all groups. However, across subpopulations, there is a larger expenditure capacity for urban households, and for the Kihn and Chinese. The latter has increased slightly over time (from 1.75 times to 2 times the per capita expenditure capacity of ethnic minorities in 2004 and 2006). Middle income households have about three times the per capita spending capacity of the poor, and the highest quintile has six times the per capita spending capacity of the poor.

Table 5.10. Total Expenditures, by population indicators (thousand dongs, 2006)[65]

	1992		1998		2004		2006		Change	
	Hhold Exp	Per capita	Hhold Exp	Per capita	Hhold Exp	Per capita	Hhold Exp	Per capita	Hhold Exp	Per capita
Rural	19,607	3,443	20,121	3,704	20,429	4,213	21,346	4,538	9%	32%
Urban	42,606	7,457	42,107	8,410	45,599	9,981	43,681	9,886	3%	33%
Q1	10,656	1,695	11,909	1,877	12,350	2,156	12,550	2,222	18%	31%
Q2	15,389	2,486	16,291	2,769	17,010	3,311	17,277	3,475	12%	40%
Q3	19,475	3,265	19,283	3,558	21,801	4,412	22,688	4,760	16%	46%

65 GDP deflator used to translate from current to 2006 dollars: World Development Indicators Database, World Bank, Washington, D.C..

Q4	25,853	4,497	25,757	4,891	29,675	6,384	31,555	6,809	22%	51%
Q5	49,206	9,198	50,514	10,342	57,711	13,248	56,036	13,543	14%	47%
K&Ch	25,371	4,497	27,685	5,341	27,880	5,998	29,012	6,439	14%	43%
Minority	16,435	2,572	15,701	2,642	17,187	3,009	16,571	3,098	1%	20%
Males	24,323	4,230	26,196	4,966	26,310	5,557	26,920	5,858	11%	38%
Females	24,097	4,260	25,972	4,992	26,370	5,578	26,602	5,811	10%	36%
Total	**24,206**	**4,246**	**26,079**	**4,979**	**26,340**	**5,568**	**26,758**	**5,834**	**11%**	**37%**

Source: Nores, 2008b.

It is important to observe how these differentials in expenditures translate into inequalities in educational expenditures. Table 5.11 reports education expenditures as a percentage of total household expenditures, educational expenditures per child, and per child as a proportion of per capita household expenditures, across subpopulations of interest and VLSS survey years. These have increased across the years differently across subpopulations. Education expenditures per household, per child, and per child in proportion to per capita household expenditures have increased for rural populations and decreased for urban populations. While in 1992 average household educational expenditure for an urban child was 5 times that of a rural child, by 2006 average educational expenditure for an urban child was 2.5 times that of a rural child. However, average household educational expenditure of a middle-income child was 2.6 times that of a poor child in 1992 and increased to 3.4 by 2004 and to 4 by 2006, with large increases in the percentage of household expenditures devoted to education. The ratio between average household expenditure for a child of the upper quintile versus the third quintile went from 5.1 in 1992 to 3.1 by 2006. Therefore, differences in household expenditures per child increased at the lower end of the income distribution and decreased at the upper end. As a consequence, the ratio of average household education expenditure between the highest and the lowest quintile changed very little (13 to 12.5).

The ratio between educational expenditures among Kinh and Chinese and ethnic minorities decreased slowly through the period (4.6 to 3.7, although it did show an increase in 1998). This appears to be due to a larger increase in the percentage of expenditures devoted to education among ethnic minorities. The percentage of total expenditures spent in education, and the amount of expenditures spent per child in education exhibit gender parity across all years.

Table 5.11. Education expenditures by population indicators (thousand dongs, 2006)

	1992			1998			2004			2006		
	Ed/ Tot %	**Ed p/ child**	**p/ child p/ capita**	**Ed/ Tot %**	**Ed p/ child**	**p/ child p/ capita**	**Ed/ Tot %**	**Ed p/ child**	**p/ child p/ capita**	**Ed/ Tot %**	**Ed p/ child**	**p/ child p/ capita**
Rural	1.82	198	1.01	4.24	551	2.74	4.47	617	3.02	4.98	829	3.88
Urban	3.44	984	2.31	6.49	2,139	5.08	5.17	1,740	3.82	5.62	2,087	4.78
Q1	1.53	79	0.74	2.95	167	1.40	3.26	212	1.71	3.49	244	1.94
Q2	1.66	117	0.76	3.78	307	1.88	4.31	427	2.51	4.87	568	3.29
Q3	1.94	203	1.04	4.32	480	2.49	5.15	725	3.33	5.54	974	4.29
Q4	2.37	355	1.37	5.18	877	3.41	5.13	1,130	3.81	6.34	1,695	5.37
Q5	3.20	1,027	2.09	7.31	2,769	5.48	5.69	2,637	4.57	5.78	3,036	5.42
K&Ch	2.31	392	1.54	5.25	1,068	3.86	5.00	975	3.50	5.61	1,295	4.46
Minority	0.99	85	0.51	2.28	196	1.25	2.45	244	1.42	2.97	351	2.12

Males	2.18	352	1.45	4.89	924	3.53	4.63	851	3.23	5.15	1,101	4.09
Females	2.12	354	1.47	4.81	957	3.68	4.63	859	3.26	5.12	1,101	4.14
Total	**2.15**	**353**	**1.46**	**4.85**	**941**	**3.61**	**4.63**	**855**	**3.25**	**5.13**	**1,101**	**4.12**

Source: Nores, 2008b.

Table 5.12 summarizes average educational expenditures per child by education level and ratios across particular subpopulation groups. The gaps observed when analyzing average per child expenditures are present within education levels. The decrease in the ratio between urban and rural education expenditures per child is slightly more pronounced at higher education levels; it went from 5 to 3.2 in primary, from 4.3 to 2.9 in lower secondary and from 4.3 to 2.5 in upper secondary.

While the lower quintile experienced increased inequality compared with the third quintile for all education levels, at the upper end of the income distribution this trend was reversed. This has the effect of making the overall differences fairly stable. The ratio of educational expenditures per child between the third quintile and the first went from 2.2 for all levels to 3.1 for primary, 2.8 for lower secondary and 3.2 for upper secondary.

For ethnic minorities, the differences have increased at the primary and lower secondary level, but not at the upper level. The ratio in average expenditures in primary between the Kinh and Chinese and ethnic minorities increased from 3.8 to 5.0, in lower secondary it increased from 3.7 to 4.0, and in upper secondary it decreased from 3.8 to 3.4 between 1992 and 2006.

Table 5.12. Average education expenditure per child by education level (thousand dongs, 2006)

	1992			1998			2004			2006		
	Prim	**LSE**	**USE**	**Prim**	**LSE**	**USE**	**Prim**	**LSE**	**USE**	**Prim**	**LSE**	**USE**
Rural	192	234	251	376	482	563	386	457	594	483	543	727
Urban	963	1,004	1,078	1,525	1,729	2,029	1,349	1,387	1,574	1,551	1,591	1,848
Q1	99	107	108	177	199	204	207	225	245	230	256	280
Q2	134	144	146	292	322	340	372	395	448	466	483	567
Q3	213	230	241	409	464	504	542	590	718	711	727	906
Q4	329	387	424	655	761	872	795	865	1,085	1,060	1,116	1,428
Q5	983	1,031	1,092	1,831	2,060	2,383	1,902	1,954	2,243	2,261	2,295	2,610
K&Ch	354	412	453	665	833	1,005	668	727	898	866	907	1,132
Minority	94	111	118	188	223	248	151	201	247	174	229	331
Males	328	382	424	572	707	859	559	632	791	679	741	959
Females	317	379	414	597	791	958	567	638	802	721	768	972
Total	322	380	420	583	746	905	563	634	796	699	754	966
Differentials												
Urban/Rural	5.0	4.3	4.3	4.1	3.6	3.6	3.5	3.0	2.6	3.2	2.9	2.5
Q3/Q1	2.2	2.2	2.2	2.3	2.3	2.5	2.6	2.6	2.9	3.1	2.8	3.2
Q5/Q3	4.6	4.5	4.5	4.5	4.4	4.7	3.5	3.3	3.1	3.2	3.2	2.9
Q5/Q1	9.9	9.6	10.1	10.3	10.4	11.7	9.2	8.7	9.2	9.9	9.0	9.3
K&Ch/E.Minor.	3.8	3.7	3.8	3.5	3.7	4.1	4.4	3.6	3.6	5.0	4.0	3.4
Fem/Males	1.0	1.0	1.0	1.0	0.9	0.9	1.0	1.0	1.0	0.9	1.0	1.0

Source: Nores, 2008b.

Beyond the trends, what remains noticeable are the very significant expenditure gaps between quintiles – in particular of the first quintile in relation to the other quintiles - and Kinh/ Chinese and ethnic minorities. These gaps, which are so strong that they do not translate into higher ratios of education expenditure per child in relation to p/c expenditure for the poor in spite of much lower overall expenditure levels, point to large quality differentials in the education received. In fact, as access has continued to increase, quality of education has become more important for education segregation, and this is clearly illustrated by the high fee differentiation. Wealthier families pay more for higher quality of education. Table 5.13 presents mean educational expenditures by type and subpopulations and what these represent on average in terms of household educational expenditures. While tuition is only one part of the education spending, it is an important one. The data clearly show that tuition fees have increased in time and that the amount and percentage spent on tuition is correlated with income. Urban households spend three times on average what a rural household spends in tuition; households in the third income quintile currently spend almost seven times what poorer households spend (without adjusting for the larger households of the poor) and the upper quintile households spend three times what the middle income households spend in tuition. Similarly, Kinh and Chinese families spend in tuition five times the amount spent by ethnic minorities. In terms of what this represents as a percentage of average household expenditures (lower section of Table 5.13), middle income households spend twice on average of their total household expenditure in tuition compared with what is spent by low-income families, and upper income families spend three times that spent by low-income families. Likewise, urban households and the Kinh and Chinese spend a larger proportion of their educational expenditures in tuition than their counterparts.

Although expenditures in PTA do not show such large inequalities as expenditures in tuition, these are nevertheless important. Urban families spend about twice on average what is spent by rural families, the upper quintile spends three times what the lower quintile spends on average, and Kinh and Chinese households spend twice what is spend by ethnic minorities. While part of the tuition and PTA fee differences may capture higher incidence of fee exemptions for the poor, this is only part of the story (all the more as, we will see, fee exemptions are not very well targeted). The higher fees paid by the urban, wealthy and Kinh students to a large extent reflect access to higher quality education, including access to full day schooling in primary. Since inter-communes inequalities in many infrastructure quality-related indicators have decreased in time, these inequalities most likely capture the persistent inter-communes inequalities in teacher qualifications and satellite sites, among other factors, as well as intra-commune inequalities.

Table 5.13. Education expenditure by type and education population indicators, th. VND and %

	1998				2004				2006			
	Tuition	**PTA**	**Books**	**Oth.**	**Tuition**	**PTA**	**Books**	**Oth.**	**Tuition**	**PTA**	**Books**	**Oth.**
Mean th. VNDs (2006)												
Rural	60	7	59	360	163	78	83	292	213	87	89	366
Urban	427	26	100	1057	556	146	138	676	603	154	137	862
Q1	16	4	37	142	35	54	45	97	38	57	48	115
Q3	58	8	64	357	172	91	94	291	254	103	101	393
Q5	479	26	110	1301	783	163	173	956	825	167	165	1225
K+Ch	170	13	74	578	288	103	105	425	363	114	113	554
Minor.	15	5	41	168	56	44	38	123	69	56	44	190

Males	151	11	69	527	271	91	97	381	319	106	100	488
Females	146	12	70	513	238	98	94	383	295	100	101	484
Total	149	12	69	520	255	94	96	382	307	103	100	486
Mean % of total educational expenditures												
Rural	9.4	1.8	15.0	61.4	23.6	13.6	10.8	41.1	16.1	18.3	15.5	45.1
Urban	18.1	1.8	8.7	63.3	13.7	17.9	13.8	40.8	24.9	13.8	11.6	44.8
Q1	7.6	1.6	16.4	59.9	8.3	24.0	13.9	39.9	8.8	24.7	16.4	43.4
Q3	9.7	1.8	14.4	61.6	16.3	15.6	14.1	39.9	19.2	15.7	14.9	45.6
Q5	18.0	1.8	8.7	65.0	26.4	10.8	9.8	43.3	28.2	11.1	10.1	46.4
K+Ch	12.4	1.8	13.0	61.6	17.4	15.9	13.4	39.9	20.8	15.8	14.7	44.3
Minor.	5.0	1.7	16.9	63.3	6.9	23.5	11.2	47.2	6.6	23.7	13.7	48.6
Males	11.5	1.8	13.3	61.8	16.7	16.8	13.0	40.5	18.6	17.4	14.4	44.5
Females	11.3	1.8	13.8	61.8	15.2	17.0	13.2	41.3	17.8	16.9	14.7	45.7

Source: Nores, 2008b.

Further evidence on the distribution of parental contributions for tuition fees in primary education suggests that intra-commune inequality is the main driver of differences in tuition fees pointing, among other possible factors, to the un-equalizing role of full-day schooling. Indeed, in 2006 between-commune variation explained 35 percent of total variation in tuition contributions (Table 5.14),[66] which is much smaller than what was observed in terms of differences between communes in satellite supply and availability of preschools. This means that within-commune variation (between schools) explains the remaining 65 percent, which points to large differences across schools within communes. Analyzing differences between higher units of analyses shows very low percentage of variation explained between provinces or regions. Consequently, communes and particularly schools appear to be the main unit of per capita tuition variation. Tuition measured as the average tuition of the institution (the main site and its satellites) shows a larger variation due to between-commune variation. It would appear (evidenced by lower mean total FTE to average FTE) that satellite schools might be serving lower income populations relative to main sites, and therefore these reduce the average per capita FTE observed. Therefore, the more communes use satellites rather than main sites as means to increase supply, the larger between-commune versus between-school variation in tuition contributions.

Table 5.14. Intraclass correlations for Tuition Contributions

Per Pupil Contributions	2004				2005				2006			
	Mean	Intra-class Correlation			Mean	Intra-class Correlation			Mean	Intra-class Correlation		
		Com	Prov	Reg		Com	Prov	Reg		Com	Prov	Reg
Full Time Equivalent												
Total	30.37	0.31	0.08	0.01	35.07	0.22	0.06	0.01	42.29	0.35	0.08	0.01
Average	30.58	0.50	0.22	0.06	37.29	0.42	0.18	0.06	44.72	0.50	0.22	0.07

Source: Nores, 2008c.

66 Two measures of expenditures are reported in Table 5.14: total per capita at the schools and average per capita at the schools (main and satellites together, thousands). In the average calculation, satellites and its main site are considered one school, and total and average contributions are calculated for all of these. Parental contributions are reported for full time equivalent tuition (full day tuition fee).

5.3. Full Day Schooling

Finally, Vietnam has shown an impressive expansion of full day schooling. Officially, government provided compulsory primary education in Vietnam is only half day (25 periods per week). Periods are only about 40-45 minutes and often the actual teaching time is much lower making Vietnam – with less than 700 hours as yearly allocated instructional hours- one of the countries with lower instructional time in primary education internationally. Normally two class groups share one class room, alternating morning and afternoon shifts. However, over the past decade, the Government allowed schools to move to a full day if they so wished. The move to full-day schooling was initially quite spontaneous and sporadic. It sprung up in the biggest cities in Vietnam as a result of the following motivations: (i) families' demand to have their children in school for longer hours; (ii) families' willingness to cover the extra costs incurred by the schools as a result of FDS; (iii) schools who had sufficient infrastructure (one class room for a class group) wishing to have additional time to cover the dense curriculum; and (iv) government's laisser-faire approach to this phenomenon. By early 2000s, this transition had gained momentum and the number schools in urban areas opting for this mode of provision increased quite significantly. The mode of adoption of FDS varied from whole school adoption to adoption by only selected number of class groups. Also, some schools opted for full FDS (35 or even 40 periods/week) while others opted for partial FDS, i.e. around 30 periods/week.

A survey conducted in 413 schools points out the use of the additional time varies across schools, but schools tend to use this additional time for: (i) strengthening of Mathematics and Vietnamese; (ii) subjects that would otherwise be limited under the HDS such as music, arts, foreign languages and IT; and (iii) remedial programs for weak performing students.[67] Except for specialized subjects, teachers in charge of their class groups extend their teaching into the second half of the day. These teachers receive additional income for the extra tuition they provide. Schools charge parents for the following: (i) additional teaching and administrative costs; and (ii) lunch in case lunch is provided at schools. The infrastructure gap is often provided by the schools or local communities.

As full day schooling is based on cost-recovery, its development concentrated primarily in urban and more affluent areas of the country. Rural and disadvantaged areas where school infrastructure is constrained and families cannot pay for the teachers' additional costs lag behind.

As a result of the above policy, the share of primary education students in FDS (at least 30 periods per week) has increased over time from 43% in 2003/04 to 59% in 2008/09, which is substantial. However, the incidence of the full day is half the average in the poorest districts (Table 5.15) and rural areas (31%), as well as for ethnic minority students (32%). Poorest districts have had a somewhat faster increase than the average given the initial very low levels but the gap remains significant. Variations in FDS are also very significant within districts and communes, and evident even within schools.

Table 5.15. Proportion of students in full day schooling

	Nationwide					Poorest districts				
	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
% of students with at least 30 periods per week	45%	49%	54%	56%	59%	14%	16%	21%	25%	30%

Source: MoET, Analysis of DFA Data in the School Year 2008-2009.

67 Car-Hill, 2008.

5.4. Conclusion

Larger spending capacities of urban, Kinh and Chinese and upper quintile household seem to translate into inequalities in household educational expenditures. Although inequalities in expenditures are decreasing between rural and urban households, they are increasing within the lower part of the income distribution, particularly for children of upper secondary age. The same is true for ethnic minorities of primary and lower secondary age. At the same time, urban households spend three times what rural households spend, the third quintile spends seven times what the poor spends, and Kinh and Chinese households spend seven times what ethnic minorities spend for tuition. This translates into expenditures differentials that are likely to be accompanied by quality differentials. This is so even though, within groups, vulnerable populations spend twice as much in upper secondary education than they do in primary, which is not the case for the rest of the population.

Overall the results confirm that Vietnam is making good progress in providing access to quality schooling, and that over time some school resources appear to be equalizing. However, gaps persist in many basic resources in primary education. And beyond this, persistent differentials in education expenditure reflect the even more difficult task of equalizing quality beyond the basic level in primary education (where we can say that an improvement in the distribution of some critical school resources has been counter-balanced by too slow improvements in the distribution of instructional time) and beyond primary education in secondary education.

Given the existence of these persistent quality differences the task of the government to insure opportunities becomes even clearer. This in turn means focusing policy actions (and resources) in areas where they are likely to have the biggest impact. While the fact that outcomes related to attendance and achievement have been improving during a period when more resources have become available to schools certainly suggests that public policy has played a significant role in improving these outcomes, this largely descriptive overview has little to say about the mechanisms that are actually responsible for these changes, let alone the potential for specific policies and interventions to directly affect the educational performance of students. This further analysis is needed to make specific policy recommendations.

The next two chapters in this report take up these policy-related questions in more detail by examining the factors that are associated with variation in school attendance and student achievement in Vietnam. The overview/policy report summarizes the main policy implications that can be drawn from the combined findings.

CHAPTER 6: THE VARIABLES THAT MATTER: DETERMINANTS OF SCHOOL ATTENDANCE OUTCOMES

Discussions of the factors that affect school attendance tend to emphasize family and student background measures, including parental education, family socioeconomic status, and child labor. This emphasis on the "poverty explanation" for outcomes like primary school dropout is easily understood, and no doubt reflects the importance of family background in these processes.

Nevertheless, as discussed in Chapter 2, from a policy standpoint it is important to look beyond household factors. Elements of the opportunity structure are also likely to matter. This includes school quality and supply at various levels. Furthermore, in no country are these features of opportunity randomly distributed, meaning that certain kinds of households are more likely to have access to quality schools (at all levels).

Does one group of influences matter more than the other? This question is very difficult to answer, especially given the tendency for things like school quality and supply to be correlated with the local socioeconomic conditions. The safest answer is that poverty is a very powerful predictor of human development outcomes, but policymakers need to be aware of policy options that go beyond directly tackling features of poverty.

This chapter reviews evidence on the dynamics of school attendance in Vietnam. This begins in Section 6.1 with a review of recent work in Vietnam that considers the relative importance of short-term liquidity constraints versus more "permanent" family wealth and endowment factors. Section 6.2 then reviews the evidence on student (including family and community) teacher, and school influences on school attendance outcomes. This includes summaries at the national level as well as reviews of how certain kinds of groups are affected by these conditions. Section 6.3 concludes.

Overall, there is evidence that both student background and school variables matter. Both longer-term family endowments and short-term liquidity constraints have a role to play in explaining attendance outcomes. Among other factors, school resources such as classroom conditions and instructional time also matter, in particular for disadvantaged groups. This evidence confirms that the trends in school resources and price highlighted in Chapter 4 also matter for good or for bad with implications for public education policy.

6.1. Family Background Influences: Short Term versus Long Term Wealth Constraints[68]

As described in Chapter 3, fees in the Vietnamese education system were introduced in 1989 on a scale that increased by level. The policy is not uniform, as total or partial tuition fee exemptions

68 This section summarizes the work completed by Nores (2009a). She used statistical analysis to model the joint probability of being enrolled at the corresponding level (LSE, USE) conditional on having completed primary or lower secondary (previous level). In line with previous studies (Jacoby & Skoufias, 2002), this can be decomposed into the probability of enrollment conditional on completion of the previous level times the probability of completion (since these are not independent probabilities). The resulting model captures the dynamic nature of enrollment and educational decision-making by families. The work is based on two surveys: VLSS 2004 and 2006. The VLSS survey of 2006 surveyed a total of 9,189 households (45,945 individuals). Of these, half the households had been surveyed in the 2004 VLSS survey (21,844 individuals). This results in a longitudinal database with information for half of the families in both 2004 and 2006 (See Nores (2009a) for more details).

are available for children of some disadvantaged groups[69], and since 1993 tuition fees are no longer charged for primary education. Nevertheless, the increasing tuition fees in secondary education, combined with other private and opportunity costs that can affect school attendance for all children, may play an important role in constraining the educational attainment of the poorest sectors of society.

There is very little empirical evidence on this topic in Vietnam.[70] More specifically, little is known about the relative importance of short term liquidity constraints versus longer term (i.e. more permanent) factors in determining school readiness and the environment for skill formation. Long term factors include things such as parental education and household wealth (i.e. possessions and owning a home), while short term liquidity is largely a function of income and access to cash-paying labor activities.

This question is an important one because if educational investments are more affected by short-run liquidity constraints then the focus should be on policies that reduce the price of schooling (i.e. lower fees) or improve the family's capacity to afford schooling (i.e. cash or "in kind" transfers). On the other hand, if longer term factors are more important determinants of access and attainment—especially in secondary education—then effective interventions would likely focus on preparing children for higher education levels through learning investments beginning at an early age, which could include early childhood education and public campaigns for education awareness. These kinds of interventions work to offset the influences of poverty, especially the cumulative effects of poor and disadvantaged households not investing as much in their children's education.

There are two sets of multivariate models to discuss. The first looked at the determinants of enrolling in secondary school conditional on completing primary school for children aged 11-15. This primary-secondary transition is one of the "pressure points" referred to in the conceptual framework discussion in Chapter 2. The second set looked at enrollment in upper secondary education conditional on completion of lower secondary for children aged 15-18. In both sets of analyses the probability of enrolling in the higher level of education was modeled as a function of a range of household characteristics, including things such as consumption (which is a proxy for income) and more permanent features of the home like parental education, household possessions and the value of the family's home. Each set of results included estimations for the entire sample as well as sub-samples for rural, poor and minorities. This makes it possible to focus in on specific constraints for specific groups of disadvantaged. Finally, different specifications of the model were used, including a model (Model III) with a full set of permanent income measures like value of home.

Table 6.1 provides a summary of the main findings for the determinants of lower secondary enrollment; the results for primary school completion are not presented here, but are in the full tables included in Appendix F (primary completion is also returned to later in this chapter using additional datasets). The results are presented for the entire sample as well as for Ethnic Minorities, Rural children and the poorest. The baseline specification (Model I) is summarized here.

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69 Fee exemptions are present and amount to 100 percent for handicapped, boarder students in minority areas, students, children of deceased or seriously wounded soldiers and children in remote areas; and to 50 percent for children of less seriously wounded soldiers, children of government workers disabled on the job, ethnic minority students and children certified as poor. Certifications are extended by the village or the neighborhood school committee.

70 See Jacoby & Skoufias, 2002..

Current income is a strong determinant of LSE enrollment conditional on primary completion, which supports the contention that short-term factors—measured in this case by consumption which is mainly a function of income—affect school attendance decisions. However, there are also more permanent income constraints as well, measured in Table 6.1 by parental education; also in Appendix Table F2 see results for things like value of the home and household possessions. In other words, the probability of enrolling in lower secondary school is affected by both current income/consumption as well as more permanent indicators of wealth. However, when the full set of permanent features is included the indicator for household consumption (which proxies short term liquidity) is no longer statistically significant (Model III, see Appendix Table F2). This result suggests that the more permanent features of wealth may exert a stronger overall effect in the transition to lower secondary.

Table 6.1. Determinants of lower secondary enrollment (modeled jointly with primary completion)

Variables	Full Sample:	Rural Only:	Minority Only:	Poorest Q Only:
	Model I	Model I	Model I	Model I
P/capita log hh expendit 2006	0.091***	0.087***	0.178***	0.097*
	(0.030)	(0.033)	(0.059)	(0.057)
Ed Att hh Primary	0.139***	0.149***	0.245***	0.102
	(0.047)	(0.052)	(0.074)	(0.077)
Ed Att hh LSec	0.241***	0.221***	0.146	0.157
	(0.050)	(0.056)	(0.178)	(0.129)
Ed Att hh USec+	0.041	-0.005	-0.613***	-0.515**
	(0.073)	(0.086)	(0.179)	(0.252)
Child Age	-0.165***	-0.145***	0.099**	0.013
	(0.039)	(0.047)	(0.040)	(0.056)
Child is Female	0.076***	0.058	0.040	0.114*
	(0.024)	(0.037)	(0.120)	(0.067)
Child is Minority	-0.317**	-0.382***	----	-0.369***
	(0.141)	(0.116)		(0.086)
HH Children	-0.048***	-0.053***	-0.074*	-0.072***
	(0.018)	(0.021)	(0.039)	(0.026)
Rural	0.001	----	-0.401**	-0.113
	(0.043)		(0.168)	(0.224)
Commune Poverty Rate	-0.194*	-0.171	-0.069	-0.085
	(0.106)	(0.115)	(0.129)	(0.139)
Observations	4,352	3,473	920	1,167

*Note: Controls for Regional Price Index and regions. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Source: Nores, 2009a.

There are also slight advantages for females for enrolling in LSE, lower probabilities for minorities, and a negative impact of the number of household children (on the probability of

lower secondary enrollment). These results are generally consistent with previous research, but the difference is that this is a dynamic model that considers lower secondary enrollment while controlling for primary completion. These kinds of child, family and community influences will be reviewed in more detail in the next section.

For rural, minority and the poorest children the main results for constraints are generally pretty similar (see columns 2-4 in Table 6.1). Once again the proxy for short-term liquidity is significantly related to enrollment in lower secondary education, although for minority children the coefficient is nearly twice as large as the whole sample. This suggests that non Kinh-Chinese households are especially affected by short term liquidity constraints. In rural and minority households there is no significant advantage for girls in LSE enrollment, whereas in the poorest households girls are especially more likely to enroll than boys (perhaps because of work demands for boys).

In some additional analyses (not presented) the full set of household features associated with more permanent wealth was included in the statistical analyses. With these additional controls the short-term liquidity effect (as captured in Table 6.1 by the per capita expenditures 2006 variable) further diminishes in each analysis. For the poorest children (in income quintile 1) the permanent features are much more robust. So once again there is evidence that of the two influences—liquidity and more permanent features of poverty—the more permanent features are more important at this level.

Table 6.2 presents the summary for upper secondary enrollment conditional on completing lower secondary. The same presentation strategy is incorporated as before; full results for the whole sample are available in Table F3 in Appendix F.

Table 6.2. Determinants of upper secondary enrollment (modeled jointly with lower secondary completion)

Variables	Full Sample: Model I	Rural Only: Model I	Minority Only: Model I	Poorest Q Only: Model I
P/capita log hh expenditures 2006	0.132***	0.142***	0.241***	0.115**
	(0.025)	(0.027)	(0.069)	(0.056)
Ed Att hh Primary	0.325***	0.385***	0.329*	0.559***
	(0.101)	(0.087)	(0.187)	(0.191)
Ed Att hh LSec	0.723***	0.761***	0.881***	0.775***
	(0.134)	(0.132)	(0.281)	(0.209)
Ed Att hh USec+	0.998***	1.061***	0.982***	1.101***
	(0.110)	(0.102)	(0.260)	(0.178)
Child Age	-0.021	0.021	0.165***	0.222***
	(0.044)	(0.051)	(0.056)	(0.050)
Child is Female	0.132***	0.128**	0.060	0.169
	(0.041)	(0.052)	(0.093)	(0.138)
Child is Minority	-0.226*	-0.230*	----	-0.106
	(0.126)	(0.128)		(0.183)
HH Children	-0.105***	-0.113***	-0.094***	-0.116***
	(0.020)	(0.020)	(0.030)	(0.034)
Rural	-0.110	----	-0.308	0.131
	(0.077)		(0.317)	(0.289)

Commune Poverty Rate	-0.391***	-0.402***	-0.224	-0.186
	(0.140)	(0.156)	(0.157)	(0.217)
Observations	3,709	2,923	735	770

*Note: Controls for Regional Price Index and regions. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Source: Nores, 2009a.

The results for the second set of analyses for upper secondary education (USE) conditional on completing lower secondary education are broadly similar, at least for the whole sample. One notable difference for this higher level transition is that the coefficients are much larger. This is true both for the liquidity indicator as well as the permanent features associated with parental education.

However, for the LSE-USE transition there is more variation by rural, minority and poor sub-populations. One important point to note is that these groups have substantially lower enrollment rates in upper secondary (see Chapter 4), so these dynamics may change over time as more and more children enter this level. Nevertheless, this kind of interaction by population group is extremely important because of the implications for policymaking and targeted programs.

Once again minority children's enrollment is especially sensitive to short term liquidity. This suggests that these families struggle to come up with the money required to cover the "immediate" costs of schooling, which at the upper secondary level includes significantly higher fees and other costs. It is not that the so-called permanent features like parental education don't matter for this level. These background indicators still appear to have more overall importance. But at the upper secondary level the immediate effects of poverty and liquidity do appear to be more important than at the lower secondary level.

There is therefore evidence of liquidity constraints, meaning that the family's ability to invest in the education of their children is affected by their current income levels and access to cash. This is especially true for upper secondary school enrollment. Also, there is consistent evidence of permanent income effects related to the households' physical (possessions, value of home) and human (education) capital. Both of these wealth effects are stronger for rural population and children of minorities and the lower quintiles.

What are the policy and research implications of these findings? One important result is that there is no clear "winner" in terms of the kinds of interventions that are needed to help push vulnerable populations into the higher levels of education. Of the two general groups of variables the permanent income measures are generally more significant, which in turn points to interventions that affect the accumulation of human or physical capital and better equip the household to make long-standing investments in children. But at higher levels of education the short term constraints do enter more forcefully into the picture, which supports more focused, immediate help for getting children into school in the form of scholarships or other in-kind transfers.

From a research standpoint the results provide a very useful segue into the next two sections of this chapter. This begins in 6.2 with a more detailed review of the household and schooling context factors that are associated with school attendance outcomes like primary completion and secondary enrollment. These findings not only shed some further light on how household features affect these processes, but also demonstrate the importance of taking into account school features themselves. These school characteristics may play a role in affecting access and attainment through more "long term" mechanisms related to preparing children for higher levels of schooling, or affecting the expected returns to attending school. Section 6.3 then considers the evidence on more direct interventions, namely those that address short term liquidity constraints in the form of scholarships and subsidies.

6.2. Family Background and School Context Influences on Attendance Outcomes

This section of the report is the most extensively supported by the background papers[71]. As a group these studies provide an excellent research base because the child's educational progress can be analyzed as a function of an extensive list of family (and child) background measures as well as indicators related to the school. This ability to consider multiple features at once is the defining feature of multivariate analysis. What this kind of modeling does is in effect compare outcomes among students that vary in some important way (like boys versus girls) but otherwise share similar or nearly identical background and contextual characteristics.

For more details on sampling, methods, and database construction the reader is referred to the individual background papers. In most cases the researchers "triangulated" the results across a range of statistical specifications. However, it is important up front to acknowledge the limitations of these analyses. These are not causal findings, and the correlation between factors like family background and school quality complicates the task of answering the "what matters the most?" question. In a handful of analyses[72], there are controls available for factors like previous test scores. But the inclusion of this kind of detailed information—which certainly increases the causal properties of the remaining variables in the model—means dropping many children due to missing data.

The information generated by these papers is extensive. To keep the review manageable the results are summarized in this section by variable grouping. Also, the discussion focuses mainly on the results for the enrollment, completion and dropout outcomes. Within each sub-section the main results are also reviewed by schooling level, and any important interaction by place of residence, ethnicity, gender or poverty is described. Finally, at the end of the section two summary tables are provided that highlight the most important predictors of primary school completion and secondary attendance. Appendix G includes the full regression results for the main primary and secondary level analyses.

Student Factors

The results of regression analyses suggest that household wealth and parental education are among the strongest student factor predictors of attendance for both primary and secondary education. Students with higher household wealth and parental education tend to have higher attendance rates. Other important student factors on attendance include the child's age, gender, ethnicity, household composition, and previous performance.

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71 These include three papers that focus on the determinants of school attendance outcomes in addition to Nores' (2009a) study summarized in the previous section. Dang (2009) analyzes primary school completion using very detailed data that combines the 2006 VLHSS data with follow-up survey data from 2008 as well as additional data on schools from the Primary School Dataset (PSD). Nores (2009c) uses very similar methods as Dang (2009), but her study of primary school completion (and dropout) uses data from the VLHSS from 2004 and 2006, also augmented with information from the PSD, but not with the 2008 follow-up. These two studies are therefore comparable, but based on different databases that vary by size (Nores' sample is larger) and detail (Dang has more variables). For the secondary school level the main source is Nores (2009b). This analysis uses the same data (VHLSS 2006) and similar methods to what was summarized in the previous section, only the focus is not on liquidity and permanent income constraints but rather on a wider range of variables (including school features). The main outcomes are enrollment (conditional on completing the previous level) and completion at both the lower and upper secondary levels).

72 See Dang, 2009.

a. Household Wealth

The fundamental tenet of the poverty explanation for unequal school attendance outcomes is that some households can afford more schooling than others. This finds strong support in the background papers prepared using data from Vietnam, as measures of **household possessions, expenditures** and **wealth** are consistently among the most significant predictors of enrollment, completion and dropout.

b. Parental Education

Parental education is more closely related to secondary than primary completion. Some analysis shows that the probabilities of primary education completion and, to a lesser degree, lower secondary enrollment are not much affected by parental education measured by categories (although having reached lower secondary education matters for lower secondary enrollment).[73] Other estimations[74], however show that the average number of years of parental education is consistently positive and significant predictor of primary completion. These kinds of inconsistencies are not unusual in statistical analysis, and the reader is reminded that these studies are not based on identical data and survey years.

For higher levels of schooling, namely upper secondary enrollment, there is stronger evidence that parental education matters. This means that when controlling for family wealth the parental education effect on school attendance appears to be concentrated in higher levels, perhaps because more educated parents place a higher value on education in general, regardless of their ability to afford it (also known as "tastes").

c. Child Age

The **child's age** is an important factor in affecting school attendance and progress. Older children are more mature and may be better equipped to deal with the pressures of school (including teachers and other students). But with each successive year their time is also more valuable as a wage-earning worker, domestic helper or even as a spouse. In other words, for many children in countries like Vietnam the "clock is ticking" from an early age.

The results from the various analyses generally confirm this. Older children in age groups such as 7-13 years are more likely to have completed primary school, although some results[75] show that this effect is positive but decreasing with each year (in some estimations). However, the probabilities of lower secondary enrollment are decreasing with age, which is the best evidence of the kind of tradeoff faced by older children as they (and their families) have to decide what is the best path to follow. The same is true for the positive effect of age on the probability of dropping out of primary school.[76]

d. *Child Gender*

Gender is another commonly analyzed child characteristic. In Vietnam girls are significantly more likely to complete primary school, although when controlling extensively for school background the gender effect is not significant at this level.[77] The female advantage is generally

73 Nores, 2009b.

74 Dang, 2009.

75 Dang, 2009.

76 Nores, 2009c.

77 Nores, 2009c; Dang, 2009

increasing by school level. This is likely a result of girls being better prepared for higher levels of schooling, or there is less pressure on them to leave school in order to do things like work (especially for wages).

There is some interaction by gender. For example, the girl's enrollment or completion probabilities are not significantly different than those for boys among ethnic minority families, or in the poorest households.

e. Ethnicity

The descriptive sections of this report have already summarized the large gaps in schooling outcomes between ethnic minorities and the majority Kinh (and Chinese). However, from a policy standpoint a critical question concerns the "direct" influence of **ethnicity** on these outcomes. If minorities fare worse because they are poorer then the policy response is to target them—together with other poor families—for subsidies (or, more broadly, increase opportunities of income generating activities for these groups in Vietnam, as part of a more equitable pattern of economic development). But if minorities fare worse even when controlling for family background and school contexts then it may point to a more complicated situation, and the policy response may in turn have to consider going beyond subsidies.

The multivariate evidence on ethnicity confirms that minorities are less likely to complete primary and secondary school. At the primary school level, ethnic minorities are significantly less likely to complete the primary cycle, but there is no significant difference in their dropout probability. This suggests that ethnic minorities struggle more to get through grades, which can include frequent episodes of grade failure. This result holds despite controlling extensively for family and school characteristics, although there is evidence of a decreasing ethnicity effect on primary school completion between 2004 and 2006. [78] Another study[79] also finds that minorities are less likely to complete primary school, but there is no significant difference once the full set of school features (including fees) is added.

There is no evidence of an ethnicity "effect" at higher levels of schooling in terms of enrollment. But ethnic minorities are significantly less likely to complete both lower and upper secondary school, conditional on completing the previous level.[80] This is true even when controlling for family background and features of schools.

These findings for ethnicity require careful consideration. The fact that minorities are less likely to complete primary and secondary school, even when controlling for many variables, suggests there is either something different about how they approach schooling, or that there is something different about their schooling experiences. It is simply not possible to conclude, based on this evidence, that minorities' marginally lower probability of completing school is due to discrimination. But the fact that minority children that come from similar backgrounds and similar schools are still more likely not to finish does raise this possibility. At the very least it reinforces the need for policymakers to be aware of the specific needs of these children, which may entail more emphasis on culturally-sensitive teaching and learning practices or earlier preparation for schooling through early childhood interventions. There are also the financial constraints (see previous section) that may underlie leaving school (especially at secondary level), which in turn point to interventions that alleviate the cost pressures of remaining in school for older minority students. These policy issues are returned to below.

78 Nores, 2009c.

79 Dang, 2009.

80 Nores, 2009b.

f. Household Composition

The structure of the household can impact schooling outcomes for children. In the VLHSS data the main compositional factor that is available is for sibship size, or the number of siblings in the household. It makes intuitive sense that larger families tend to be poor, and may struggle to finance the schooling of all of the children in the household. This tradeoff between quantity (number of kids) and quality (their education level) is a long-studied dynamic in educational research.

In Vietnam there is evidence of a quantity-quality tradeoff, although once again the results vary somewhat by study and level of schooling. One study[81] finds no significant relationship between the total number of children in the household and primary school completion, but finds a small positive effect on dropout when there are more children in the home. Results from another study[82] show that the number of children in the household are negatively associated with the probability of completing primary school, although the result is only significant in a couple of estimations.

Once again the larger impact is at higher levels. There are fairly consistent, negative effects for siblings on the probability of enrolling/completing lower secondary education, and enrolling in upper secondary education.[83] In terms of interaction, poor households are more affected by the sibship size variable than are wealthier households, although once again the effects are not very significant.[84] In ethnic minority households, the number of children has a much less significant impact on enrollment/completion probabilities at higher levels.[85]

There appears to be some tradeoffs between educational attainment and the number of siblings. But policymakers should be aware that these appear to be more strongly felt at higher levels of schooling, perhaps because of the difficulty of paying fees for multiple children to attend school at the same time.

g. Child's Previous Performance

It makes sense that children who do well in school are more likely to remain and complete higher levels, although it could be argued that high ability children can also earn more money outside of school and may be pulled out as a result. Nevertheless, this idea is rarely tested in countries like Vietnam.

An analysis[86] of primary school completion provides some insight into this question. Based on results for a relatively small sample that has complete data, he finds that the children with higher **test scores** and **grade point averages** (GPA) are significantly more likely to complete primary school. Of the two subjects only the reading test score is significant (math is not significant when included together with reading). These results are not very surprising, and simply confirm that the best students are more likely to complete primary school. Unfortunately, the data are not yet available to test this idea at higher levels of schooling. However, it is important to note that when the GPA variable is included in this analysis, the effects for family background are not much changed. This stability across different specifications does strengthen the case that these

81 Nores, 2009c.

82 Dang, 2009.

83 Nores, 2009b.

84 Dang, 2009.

85 Nores, 2009b.

86 Dang, 2009.

are actual causal relations. But compared with test scores GPA is a less powerful measure, so some caution is required (see beginning of this section).

The remaining groups of variables in this section focus on areas that are influenced by policy. Two general groups are considered. The first includes teacher background characteristics that affect the quality of the school. The second includes school factors that relate to the price and quality of school. Examples of the price of schooling for families range from school supply features, which affect costs by impacting how long it takes to get to school, to scholarships and subsidies that directly affect how much it costs to send children to school. In turn, constraints in school pricing can affect students' access to schooling. The second group also includes features of schools that are more directly related to quality (or improvements), and can influence household behavior by potentially affecting what children get out of going to school. Due to data limitations the evidence on school quality related features is drawn mainly from the primary school level.

Teacher Factors

There is some evidence that attendance is higher with more experienced teachers, and that primary school dropout is lower with more teacher education. However, overall the limited teacher level data did not indicate that teacher quality measured as their background characteristics is a strong predictor of student attendance.

a. Teacher Background

The information on teachers in the VHLSS and DFA databases is fairly basic, and does not reach into the critical areas of capacity (like content knowledge) and pedagogical choices (see Chapter 2). The results provide some support for the hypothesis that children are more likely to remain in schools that have better trained or more experienced teachers. One study[87] finds that primary school completion is marginally more likely in schools where a higher percentage of teachers have received **12+2 training**. But none of the other **teacher education** or training measures are significant in this analysis, or in another study[88] on primary and secondary school enrollment/ completion for the overall sample (teacher training and education are however positively and significantly related to the primary completion of the poor and ethnic minorities). There is a significant negative relationship between teacher education and training levels and dropping out of primary school.[89] These studies did not include measures of teacher experience. Primary school completion was also less likely in schools with higher a percentage of female teachers, but this is a difficult result to interpret directly.[90] It seems more likely that there is something different about the schools where more men or women work.

MThe fact that the teacher variables are not the strongest predictors of attendance/completion should not take away from the importance of teachers in the educational process. The review of the determinants of student achievement (next chapter) will make this point clearer. For outcomes related to attendance it may be that the kinds of teacher characteristics that really matter are those related to the climate in the classroom and the interaction that takes place. These are very hard elements to capture, especially using household survey data. There is also the possibility that certain teacher characteristics impact student learning, which in turn leads to staying in school longer; however this cannot be tested with the available data.

87 Dang, 2009.

88 Nores, 2009b; Nores, 2009c.

89 Nores, 2009c.

90 Dang, 2009.

School Factors

As household wealth and parental education are difficult for government and policymakers to improve, and as the teacher factors show few significant findings, improving school factors may be the most important mean of policy intervention for increasing student attendance. Results of the regression analyses find several school level factors that predict school attendance in primary and secondary education. Factors related to school access include school supply and school fees/contributions. Factors related to school quality include school resources (including complementary school services) and school management regime. This section presents the factors in relative order of importance, beginning with school resources as the most important school factor to student attendance.

Particularly for disadvantaged students, perhaps the most important school level contributor to student attendance is school resources. At the primary level, adequate school facilities, classroom materials and conditions, and more sessions are all positively associated with attendance. At the secondary level, complementary school services such as health and vision checks are positively associated with attendance. The evidence of the role of school fees and contributions in primary schooling is less clear; however, the results suggest that they can have a large impact on secondary enrollment, whereby education contributions are negatively associated and fee exemptions are positively associated with secondary enrollment. Measures of school supply also suggest that long distances to school are negative predictors of primary attendance, while preschool availability and satellite schools are positive predictors of secondary attendance. Finally, measures of school management regime find that head teacher quality and parental involvement are positively associated with attendance in primary schooling.

a. School Resources

Facilities, learning materials, infrastructure

Better equipped schools may be able to provide a higher quality learning experience, or households may associate schools with better resources with higher quality and more opportunity. There is some support for this hypothesis based on the Vietnam surveys, although the data on resources are mainly found in the primary level analyses. Variables such as the **availability of textbooks, libraries, drinking facilities, toilets**, as well as the **physical condition of classrooms,** are generally positive predictors of finishing primary school.

However, the school resource-school completion link is stronger for more vulnerable populations. This makes sense since wealthier families have access to better equipped schools and primary school completion for their children is never really in doubt (i.e. nearly 100 percent complete this level). Poorer families—despite having lower levels of education—may be more concerned about what the school actually offers, especially given the costs of sending all of their children to school. For example, the presence of a **laboratory** (positive) and the percentage of **leaky classrooms** (negative) are each much more significant predictors of primary school completion for the poorest families.[91] Primary completion in rural areas also appears to be more affected by the availability of textbooks, the physical conditions of the classrooms, and the availability of toilets.[92]

Instructional time

Time is another feature of the teaching and learning or resource environment. There is some evidence that the **number of sessions per week** in the school is positively associated with

91 Dang, 2009.

92 Nores, 2009c.

primary school completion.[93] But there is no evidence that the **number of days offered** in the school is related to attendance. This suggests that the more efficient use of time is to focus on maximizing time within the day. This is indirectly supported by the results for the **number of shifts** in the school, which is actually *negatively* associated with primary school completion.[94] Schools with two (and three) shifts have to economize time, while the single shift schools are more likely to be full day schooling (FDS).

Complementary School Services

An analysis[95] at the secondary level also considers the impact of school health resources on enrollment and completion probabilities. Her results reveal some fairly strong effects on these outcomes related to the availability of **Health Checks** as well as **Checking Anemia, Height, Vision** and **Checking for Worms**. The results are not consistent enough to emphasize one particular intervention, although the Health Checks are the most consistently significant. Furthermore, there is some interaction by sub-population group. Minority students appear to be especially affected by the presence of health-related school features. The results highlight the potential impacts of increasing this area of complementary school services, especially in communities where access to health services may be limited for some families.

b. School Fees/Contributions

School fees at the primary school level have officially been phased out, but families can still make **contributions** to these schools. The evidence on the educational effects of these contributions at the primary level is somewhat mixed. There is a positive relationship between some contributions and primary school completion. But this impact from tuition contributions is more likely to be correlational than causal.[96] For example, schools that receive more tuition contributions may have more financial freedom and can invest more in their school quality and thus can improve their students' primary completion rates. In fact, this effect may be more than correlational to the extent that higher contributions are associated with more sessions per week, which in turn are associated with higher completion (see below). An analysis on primary school completion did not find any significant effect of contributions.[97]

At the secondary level **school fees** are legal, and from a policy standpoint this is a more pressing issue. Most of the payment categories reported by families are negatively associated with being enrolled in lower and upper secondary education, although most are insignificant. The exceptions are in USE, and include payments made for **Buildings** and **Textbooks. Fee Exemptions** are positively associated with enrollment in LSE and USE, although the effect is especially significant at the LSE level.[98] This is an important finding because it confirms, as expected, that exempting students from fees increases their attendance probabilities. It also again highlights the issue of liquidity constraints at higher levels of education.

What do these results on contributions and fees mean for policy? At the primary level the use of voluntary contributions makes it nearly impossible to consider the real impact of this variable. In fact, what is missing from this analysis (at both primary and secondary level) is

93 Nores, 2009c; Dang, 2009.

94 Dang, 2009.

95 Nores, 2009b.

96 Dang, 2009.

97 Nores, 2009c.

98 Nores, 2009b.

a consideration of how these contributions (and fees) are used by schools to improve other features. Nevertheless, at the secondary level the results are a little more consistent, and certainly highlight the complicated reality of cost recovery. The sensitivity of some families to these kinds of payments, especially as indicated by the positive enrollment effect when fees are exempted, reinforces the equity concerns that naturally arise in the context of fee collection. Rather than abolish fees at this level—especially given the possibility that they lead to improvements in the school—the more realistic policy response may be fee exemptions and targeted subsidies for the poorest and most vulnerable families.

c. School Supply

The most basic measure of access is the physical proximity of the school building. The **average distance** from the home to upper primary school grades is negatively associated with completing primary school. There is also a negative effect for distance to the main campus, although this is not significant.[99] There is no information available on the physical proximity of higher levels of schooling for these families, so it is not possible to comment on how physical access to higher levels of schooling affects completion rates at lower levels.[100] However, primary completion rates are not significantly related to the **availability of higher grades** in the school ("Grade 5 Complete"). In Vietnam access to **satellite schools** is another important aspect of supply but results are not clear-cut and will therefore not be dwelt on.[101]

Another school supply measure is the percentage of schools (in the commune) with **preschools,** which is only available in an analysis of primary school completion[102] Her results show that for the whole sample this variable is positively associated with primary completion, but the coefficients are not statistically significant. However, in more focused analyses for rural children and, to a lesser degree, minority children the availability of preschools is positively associated (and significant) with the probability of primary completion. This is an important finding because it suggests that preschool exposure can help vulnerable children stay in school longer. This may be attributable to a school socialization effect that makes these children more comfortable with school, or preschool may provide a head start on obtaining basic skills that helps them later on.

d. School Management Regime

Things like school leadership and the overall climate are likely to be related to how long children remain in school. But these kinds of variables are not available in the Vietnam household or school surveys. What is available instead—mainly at the primary level—is basic background on head teachers. There is some evidence that the **head teacher (or principal) experience** or education level is associated with primary school completion probabilities. This is however not strictly a school management variable.

A better variable that is significant at both primary and secondary level is the percentage of **Active Parents** in the community. This may still be a somewhat indirect measure of school management, and probably has more to do with parental involvement, education and family background. But it does raise the possibility that when parents are actively engaged in the school their children are more likely to do better, in particular in vulnerable populations.

99 Dang, 2009.

100 Lavy, 1996.

101 There is evidence of a possible trade-off between improving access and lowering quality when using satellite campuses. There is some evidence that satellite supply is positive related to attendance but also negatively related to completion (Nores, 2009c).

102 Nores, 2009c.

Summary

Tables 6.3 and 6.4 provide a quick summary of the most significant predictors of primary school completion and secondary enrollment and completion for the overall sample as well as for disadvantaged groups that includes rural, ethnic minority and poor communities. Significance levels (together with direction of effect) are used rather than effect sizes because of the difficulty of comparing the coefficients across different models and datasets.

Table 6.3. Summary of Most Significant Independent Variables in Statistical Analyses of Primary School Completion, 2004-2006

	Primary School Completion Summary:						
Independent Variable:	**All 2006 (Dang)**	**All 2004 (Nores)**	**All 2006 (Nores)**	**Ethnic 2006 (Nores)**	**Rural 2006 (Nores)**	**Poorest 2006 (Nores)**	**Poorest 2006 (Dang)**
Family Background:							
Log of Expenditures	(+)***	(+)***	(+)***	(+)***	(+)***	(+)***	(+)**
Parental Education	(+)***						(+)***
School Supply:							
Number of Satellites		(-)**	(-)***	(-)**	(-)**	(-)**	
Distance to Satellites		(-)**		(-)**			
Preschool Availability				(+)*	(+)**		
Distance to upper primary	(-)*					(-)***	
School Resources/Management:							
Pupils>9 sessions/week			(+)**			(+)***	
Textbook Availability		(-)**		(+)**			
School has laboratory	(+)***						(+)***
Classroom Conditions				(+)**	(+)**	(+)***	(+)***
Very Active Parents	(+)*		(+)*	(+)**	(+)***	(+)***	
School Fees/Contributions:							
Tuition contributions	(+)**					(-)***	(+)*
Education contributions							(+)***
Teacher/Head Tch Quality:							
Teacher Training	(+)*			(+)***			
Teacher Education						(+)***	(+)*
Head Teacher Training		(+)**		(+)**			

*Note: Direction of effect in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table 6.4. Summary of Most Significant Independent Variables in Statistical Analyses of Secondary Enrollment and Completion, 2006

	Secondary School Enrollment:				Completion:	
Independent Variable:	**Lower All (Nores)**	**Lower Rural (Nores)**	**Lower Ethnic (Nores)**	**Upper All (Nores)**	**Lower All (Nores)**	**Upper All (Nores)**
Family Background:						
Log of Expenditures	(+)*	(+)*	(+)*	(+)**	(+)**	(+)**
Parental Education				(+)**	(+)**	(+)***

School Supply:						
Satellite Present		(+)***				
School Resources:						
Health Checks	(+)*	(+)***	(+)**			(+)**
School Fees/Contributions:						
Education contributions	(-)**	(-)**	(-)*	(-)*	(-)*	
Fee Exemption	(+)***	(+)***		(+)*	NA	NA

*Note: Direction of effect in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

The results in Table 6.3 show some inconsistency across years and datasets. However, the overall flavor of the results is roughly similar, meaning that a mixture of family background and school variables are the most significant predictors. The summary table also demonstrates the variation across sub-populations, and the added importance of school features in determining primary completion for the most vulnerable populations groups. The results of Table 6.4 are focused on family background and school supply/price of schooling related variables, providing therefore little guidance on quality related school resources for secondary students. However, the significance of price of schooling related variables, such as fee exemptions and health checks, is an important finding which deserves careful attention.

In sum, this section has presented a lot of evidence, and with so many variables and multivariate estimations it is easy to lose track of the main findings. By way of a very brief summary the main findings are consistent with recent research on school attendance in countries like Vietnam. Family contexts clearly matter, as evidenced by the strong effects of permanent wealth indicators as well as more short-term liquidity measures, in addition to things like the number of siblings.

However, it is not the case that family background *alone* explains outcomes like completion and enrollment. There is a lot of evidence that school contexts matter as well, meaning that children are more likely to stay in schools that provide a more favorable teaching and learning environment. In some cases these environmental features are related to the costs: see significant results for distance to satellite schools (which affects commuting times) and fee exemptions. But others are visible indicators of quality and resources such as leaky classrooms, textbook availability and the provision of different kinds of health checks. And finally, the importance of school contexts appears to be strongest for the kinds of children whose completion of primary (and even secondary) education is not guaranteed by their level of SES. The school quality-school completion link for vulnerable families, in particular, is the most important finding in this section.

6.3. Conclusion

The extensive output summarized in this chapter support two main results. First, poverty matters, even at the primary school level where most children are completing grade five. Of the background influences the measures of endowments, or more permanent wealth, appear to exert more of an effect than short term factors related to liquidity and income. Short-term liquidity constraints however have an important role to play in secondary education.

Counteracting deep-seated poverty effects requires addressing the issue at an early age (i.e. early childhood education and health). An increasingly popular approach is to subsidize school attendance for the poorest students. Based on the results summarized here this approach is supported, to some degree, especially in the highest levels of schooling. For the more deep-seated problems related to poverty a more long term policy response is required. This includes

early childhood interventions and other measures which address the long-term disadvantage of some vulnerable populations, including complementary nutrition or health care packages, more meaningful participation in the society, but also higher levels of respect and valorization for cultural diversity.

Another approach is to make sure that poor children have access to quality schools where they feel safe and are learning. This in turn highlights the second main finding in this chapter, namely the consistent evidence that schooling contexts are associated with attendance outcomes like completion and enrollment. Providing a quality learning experience is not a guarantee that children will remain enrolled; the impact of poverty may still be overwhelming, which again points to subsidies. But from the standpoint of addressing the cumulative impacts of poverty the potential for school quality investments seems considerable.

If schools are to play a role in counteracting the effects of poverty then an obvious question arises: What features of schools are most important? The answer to this question is complicated in part by the difficulty of establishing causal impacts with survey data, but there is evidence that, among other factors, school resources such as classroom conditions and instructional time matter, in particular for disadvantaged groups, as well as school management. This evidence confirms that the trends in school resources highlighted in Chapter 4 also matter for good or for bad with implications for public education policy. Do these and other school (and teacher) related variables also matter for student achievement?

CHAPTER 7: THE VARIABLES THAT MATTER: DETERMINANTS OF STUDENT ACHIEVEMENT

The global search for significant predictors of student achievement has fueled one of the largest empirical literatures in education research.[103] This chapter provides an update of the research that does exist, which mainly comes from the 2001 and 2007 grade five studies.[104] Once again it is important to point out that almost all of the evidence on student achievement in Vietnam comes from surveys of primary school students. As noted at the end of Chapter 4, this is a limitation, especially given the growth at the secondary level. On the other hand, the quality of learning in primary conditions the capacity of learning in any subsequent education level, making its improvement the first imperative of any education system.

The chapter is divided into four sections. Section 7.1 reviews the most significant predictors of student achievement based on the grade five surveys, with an emphasis on potential policy levers included in the more recent (2007) data, as well as the VLHSS data from 2006-08.[105] Section 7.2 focuses on analyses of equity within and between schools. Section 7.3 looks at the dynamics of improvement along two dimensions: outlier school analyses and a decomposition of the factors that explain the student achievement gains registered between 2001 and 2007. Section 7.4 concludes.

Overall, despite the disclaimers about strict causality, the results from the various data sources—especially the 2001-2007 grade five surveys—strongly support the contention that school and teacher characteristics are associated with variation in student achievement. And these effects are often stronger for disadvantaged groups. This evidence further confirms the role of public policy in conditioning past, current and future outcome trends in Vietnam.

7.1. The Determinants of Student Achievement

The conceptual discussion in Section 2.2 identified five key groups of variables that are potential predictors of student achievement. These include family background, teacher background, teacher capacity and pedagogy, the school access, and school quality related to school management regime and school resources. In this section these variables are reviewed in more detail based primarily on the results from statistical analyses of the 2001 and 2007 grade five surveys, augmented with the household survey data.[106] Within each group a range of potential indicators are available, although some are more amenable to policy interventions than others. Particular attention is paid to the largest and most significant variables, as well as those that are consistent across the different surveys.

The focus of the next paragraphs is on the whole sample results for the 2001 and 2007 grade five surveys. The output is extensive.[107] The 2001 study actually includes an even more extensive list of independent variables; a notable example is the very policy-relevant measure for teacher content knowledge. Nevertheless, the 2007 results are more informative about the

103 Fuller & Clarke, 1994; Glewwe, 2002; US Review, 2007.

104 World Bank, 2002; Griffin & Cuc, 2009.

105 Dang & Glewwe, 2009.

106 Dang & Glewwe, 2009.

107 World Bank, 2002; Griffin & Cuc, 2009.

kinds of challenges currently facing policymakers, especially given the improvement in primary completion between 2001 and 2007. Once again, it is only possible to speculate about how these kinds of school, teacher and classroom characteristics affect secondary level achievement.

The grade five survey studies provide very complete discussions about sampling and the kinds of analyses that were undertaken. In each year very large samples—upwards of 4,000 schools—were visited to obtain the information. This greatly facilitates the statistical analysis since the samples provide a very powerful cross section of schools in the country. But these are cross-sectional data, meaning the student achievement dependent variable (and independent variables) are measured only as a "snap shot" in one point in time. The results from cross sectional analyses are useful for providing clues about underlying processes, but they should not be interpreted in a strictly causal sense. The inclusion of multiple indicators for family background and community characteristics does make it possible to focus in on more specific comparisons between students, classrooms and schools while controlling for these differences between students and their communities. The student's grade four results (included in some estimations) is a potentially important control along these lines. Also, in a separate analysis (Section 7.3) a panel of roughly 1,000 schools that participated in both surveys is analyzed, this also provides a more powerful framework for considering the causal dynamics of improvement over time. These kinds of extensions certainly improve the power of the analysis, but for the bulk of the analyses the results are more associational than causal.

The inability to concretely state what is working and what is not may seem like a serious limitation, especially given the need for policymakers to take these results and turn them into actions. But in practice all it means is that caution is required in interpreting the main findings, and that it is always best to consider a range of sources of evidence for the variable in question (including more qualitative sources).

Many of the results presented in this section are in the form of "standardized effects." This is computed by multiplying the coefficient for the variable (obtained from the statistical analysis) by its mean and dividing this by the standard deviation for the student achievement dependent variable. For example, a standardized effect of 0.10 for teacher experience means that the average student's (or classroom) achievement is higher by 0.10 standard deviations for each standard deviation increase in teacher experience.

Summary tables are used to condense the main findings and make comparisons across years, subjects and sub-populations (and survey source). The complete results are presented in Appendix H.

Student Factors

The results of the regression analyses found student factors to be the largest predictors of grade 5 achievement. Socioeconomic status, parent's education, full day schooling (typically a school variable but calculated here at the student level because of differences within schools), ethnic majorities, and student meals are positively associated achievement; while student health problems and grade repetition are negatively associated with achievement. This suggests that implementing full day schooling, and possibly, including student meals and student health in schools—or targeting these dimensions directly through health and nutrition support at home—may be effective means for raising student achievement.

Student and Family Background

Discussions of student achievement tend to emphasize policy levers, but the impact of student and family background should not be discounted. The survey results from 2001 and 2007 document a

number of significant background variables. These results are important for two reasons. First they provide critical controls for understanding the impact of differences in schools, although as noted above their inclusion does not mean that all differences are being controlled. Second, the results for student and family background provide clues about potential interventions that go beyond school and teacher variables. At the very least these kinds of results provide clues about the contextual features in these households and communities that affect achievement. Finally, some kinds of school interventions (such as Full Day Schooling) are in fact measured at the student level.

Table 7.1 provides a summary of the student-family background results in the 2001 and 2007 grade five surveys. Seven variables were included in both sets of statistical analyses,[108] although in some cases there is minor variation in how they are measured. Another set of variables was included in the 2007 analysis, but not in 2001. For the common set of variables the results are generally consistent across years. The largest effects are found for the **number of meals per day** the student reports eating, the number of times they have **repeated a grade**, their **ethnicity** (i.e. non Kinh or Chinese), and parental education. The standardized effect sizes are on average around 0.04, and go as high as 0.10. These are not large individual impacts. But the cumulative sum effect of these multiple factors translates into sizeable differences between certain kinds of students.

Table 7.1. Summary of Student-Family Background Effects on Student Achievement, 2001-2007

	Reading:		Mathematics:	
	2001	**2007**	**2001**	**2007**
Available 2001-2007:				
Student age	-0.02***	-0.04***	-0.02***	-0.05***
Student meals/day	----	0.04***	0.07**	0.06***
Student travel time	-0.02**	-0.02***	-0.02***	-0.03***
Student absences	-0.02***	-0.03***	-0.02***	-0.05***
Student grade repetition	-0.03***	-0.05***	-0.02***	-0.06***
Student Kinh-Chinese	0.04***	0.04***	0.02***	0.07***
Parent education/support	0.07***	0.07***	0.06***	0.10***
2007 Survey Only:				
Student is Female	----	0.08***	----	0.02***
Family Possessions (SES)	----	0.08***	----	0.13***
Student Health Problems	----	-0.06***	----	-0.09***
Learning tools	----	0.03***	----	0.05***
Hours studying	----	0.02***	----	0.05***
Full Day Schooling (FDS)	----	0.06***	----	0.10***

Source: 2001 data (World Bank, 2002); 2007 data (Griffin & Cuc, 2009).

In general the effect sizes are larger in 2007, which could be a reflection of the fact that the variance in overall test scores increased between 2001 and 2007, especially for Mathematics (see Table 4.14).

The variables added in 2007 merit some attention as well. The most significant is the variable labeled as **family possessions,** which is an indicator of the household's socioeconomic status

108 See World Bank, 2002 and Griffin & Cuc, 2009.

(SES) based on the sum of things like television, electricity, refrigerator, running water, etc. Also, another important addition to the 2007 data is the indicator for the **child's health status,** which was a sum of problems reported by the student. Not surprisingly, students with more frequently reported health issues score significantly lower on both exams. Finally there is the **Full Day Schooling** variable, which is treated here as a student-family characteristic because families can decide whether or not to take advantage of this service and access to FDS varies not only by school but also by grade and classroom. The apparent impact of extra studying time is on an order of 0.06-0.10 standard deviations.

In sum, the effects of student and family background are substantial, which is an important reminder that issues related to poverty and context are always relevant. And in some cases (full day schooling, learning tools, health status) these factors are potentially affected by policy.

Teacher Factors

Although Chapter 6 found little relationship between teacher factors and student attendance, there is much evidence for the need to improve teacher quality in order to raise student achievement. The teacher factors include those characteristics related to the teacher's background and those related to teaching capacity and pedagogy. Analyses of teacher background characteristics find teacher education and teacher certification—identifying "excellent" teachers—to be strong predictors of achievement, and teacher experience is a moderate predictor of achievement. These factors are closely tied to the FSQL, which was also a significant predictor of student achievement. There is also some evidence that students of female teachers tend to score higher on achievement than students of male teachers; although the reason is not clear, this may be due to female teachers using better teaching methodologies. Analyses of teaching capacity and pedagogy find teacher content knowledge, student feedback, and homework as all strong predictors of achievement. Teacher planning and marking, and students working in groups, working with notes, and studying in the library are also moderate predictors. These findings illustrate the importance of having teachers that are university educated, have a good knowledge of their subject-matter, and provide students with sufficient feedback and homework. The section divides the teacher factors into background and capacity and pedagogy, and presents the findings beginning with the most relevant factors for improving student achievement.

a. Teacher Background

Teacher characteristics like experience, education level and training levels are among the most frequently analyzed variables in statistical analyses of student test scores. However, the results from these studies have not provided a consistent picture of what kinds of teachers are most effective. Concerns about the limitations of these background characteristics have stimulated researchers to collect more information on teacher capacity and actual processes (see below).

The grade five surveys provide extensive information on teacher background, although only a handful of these variables were included in the analyses summarized here. **Teacher education** is one of the critical education policy levers, and school systems around the world are constantly working to upgrade teacher capacity through pre-service and in-service training and education opportunities. The measurement of teacher education in the Vietnam data is complicated by the use of a general school quality index **(Fundamental School Quality Input Indicator, or FII)**. The FII was already introduced in Chapter 5, and is detailed in a recent Ministry of Education and Training report.[109] The scale score (between 0-100) is calculated based on a range of school inputs, including teacher education levels. Given the policy importance of the FII this variable is returned to below and in the policy report.

109 MoET, 2008.

The FII is a significant and positive predictor of student achievement in the 2007 studies. But since it is a scale it is not possible to determine the effect of teacher education. In the 2001 dataset the FII was not available, so a measure of teacher education and training was included. This was a very significant predictor of mathematics achievement, with a standardized effect of 0.05. In the 2007 supplemental analysis[110], a teacher education measure was included (together with the FII). The variable is significant and positive in most of the estimations, with effect sizes of 0.03-0.05.

This evidence linking teacher education and training levels with student achievement provides some support for on-going efforts to professionalize teachers. But what is missing from this analysis is a clear indication of what it is about teacher education that apparently leads to higher scores for students. Do better educated teachers get teaching positions in better schools? Or do they create a more effective teaching and learning environment inside the classroom walls? These kinds of questions need to be addressed in order to fully understand the policy dynamics of improving school quality through teacher training.

Vietnam has a process where teachers receive so-called "excellent" teaching status. This **teacher certification** is awarded at the school level (about 32 percent of teachers), the district level (about 42 percent), the province level (12 percent) and national level (less than 1 percent). All but about 12 percent of teachers have received some level of excellence.[111]

Are certification levels associated with student achievement? The answer is clearly yes, even when controlling things like school resources and teacher education levels. In both the 2001 and 2007 grade five surveys the teacher excellence category is a positive and significant predictor of student achievement, with effect sizes of about 0.05. However, the supplemental analysis using the 2007 data finds sizeable certification effects associated with the province level classification (upwards of 0.20 standard deviations) and, to a less degree, the district and national level classifications.[112]

These results for teacher certification strongly suggest that certain kinds of teachers are more effective than others. This is an important finding by itself, since (like teacher education) it reinforces the potential impact of good teachers.

Teacher experience is another commonly analyzed background indicator. It was only included in the 2007 supplemental analysis. The results show a moderate positive association between test scores and experience, mainly in reading. The positive effect suggests that teachers are able to improve over time, and this kind of "experiential learning" is a potentially critical feature of a quality teaching staff. Nevertheless, the effect is not large enough to conclude that teacher experience is an important determinant of student achievement.

Finally, **female teachers** are associated with significantly higher student scores in both Reading and Mathematics in the 2001[113] and 2007 supplemental analysis.[114] The effect sizes are not large,

110 Marshall, 2010.

111 The title of "teacher excellence" is awarded through a process of competition organized by schools. The competition looks at teachers' performance through an observation of a teaching session. A panel of reviewers then judges each teacher's performance. Teachers who are awarded the "teacher excellence" title at the school level are then nominated for a competition at the district level and so on to the national level. The title brings recognition and prestige to teachers. Parents, particularly in urban areas, like to place their children in class groups that are taught by these teachers.

112 Marshall, 2010.

113 World Bank, 2002.

114 Marshall, 2010.

generally between 2-4 standardized points (0.02-0.04). Does this mean female teachers are more effective? Male teachers may draw more isolated school assignments, which could impact their apparent effectiveness. There is also the possibility that the female teachers are more effective, although it should be noted that some results[115] show a negative relationship between percentage of female teachers in school and primary school completion rates. These different impacts by outcome could be related to how demanding female teachers are, although this is a very difficult link to make with this information (see Box 7.1 on following page).

Box 7.1. Teacher Gender in More Detail

The results from the achievement analyses show that children studying with female teachers have higher achievement. The results from two additional analyses are presented here to help fill in some more details on this issue.

Table 7.2. Comparison of Variables by Female-Male Teachers, 2007 Grade Five Survey

Variable:	Female Teachers	Male Teachers
Student-Family-School:		
Student Grade 4 Result	2.85	2.75*
Student is Minority (pct)	23.1	26.1*
Meals per day	2.79	2.65*
Full Day Schooling (pct)	39.4	22.5*
School location Remote	12.3	25.1*
National Standard School (pct)	34.1	17.8*
Fundamental Input Index	70.3	65.4*
Teacher Characteristics:		
Years of experience	7.6	8.4*
Teacher is Minority (pct)	10.0	13.1*
Teacher Excellent District (pct)	45.9	32.6*
Teacher Excellent Province (pct)	14.0	6.7*
Teacher Ed. University (pct)	41.9	29.2*
Teaching Methodology:		
Freq. guides students working	2.73	2.69*
Freq. gives homework	2.37	2.31*
Freq. gives feedback	2.60	2.53*
Freq. uses groupwork	2.38	2.38
Freq. uses notes	2.04	1.95*

** Difference in averages significant at p<0.05.*

First, in additional statistical analyses interaction terms were created to test for whether or not girls benefit from studying from female teachers, and boys with male teachers. The results show no significant interaction in either subject.

Table 7.2 summarizes the second activity, which is a comparison of the school, community and teacher characteristics by female and males. The results show that female teachers are working in more favorable conditions. However, despite being less experienced, they are more likely to be qualified as excellent teachers at the District or Province level. In terms of actual differences in teaching the female teachers rate marginally better than their male counterparts, although all but one of the comparisons is statistically significant. These results do not completely answer the question of why students do better when studying with

female teachers. Part of the reason is related to family background and the placement of these teachers. But the female teachers are also more likely to incorporate pedagogical choices that predict higher achievement.

115 Dang, 2009.

b. Teacher Capacity and Pedagogy

Teacher capacity and pedagogy includes a wide range of dimensions related to the work of the teacher, such as pedagogical choices, allocation of time, content knowledge, and attitudes. These variables are distinguished from background characteristics like experience and education levels by the fact that they are more directly related to the actual teaching process. As potential teacher quality mechanisms these kinds of variables have a very high value from a research and policy standpoint. Unfortunately, they are also very difficult data to systematically collect and analyze.

Few measures of teacher capacity are as important as **content knowledge**. Teachers must be familiar with the subject-matter they are teaching, and a profound understanding of content at different levels aids instruction at all levels.[116] Unfortunately there is only one study to draw on in Vietnam for testing the crucial hypothesis that teachers with higher levels of knowledge are more effective. The 2001 study[117] incorporated test items that were applied to both students and teachers, which made it possible to construct comparable scores between teachers and students. The results from the statistical analysis show that teacher content knowledge is a very significant predictor of student achievement. The standardized effect sizes are substantial: 0.13 standard deviations in Mathematics, and 0.10 SD in Reading.[118]

These results for teacher content knowledge help fill in some of the mechanisms that likely link teacher education and training with student test scores. They highlight the importance of guaranteeing minimum levels of teacher capacity, and also demonstrate once again the potential for certain kinds of teachers to make a significant difference in the learning experience of their students.

Compared with teacher capacity indicators like content knowledge, the actual teaching choices and pedagogy in the classroom are likely to be even more direct predictors of student performance. However, this is an exceedingly difficult element of the process to capture, especially in large sample quantitative studies. When data are available on this dimensions they do not usually come from observations, but rather from two sources: 1) student responses to questions about classroom processes; and 2) teacher-supplied information on teaching. Both sources have limitations. But they do at least provide some information on a critical aspect.

The analyses using the 2007 survey data provide a few more clues on teaching methodologies[119] Findings show that both the individual and school average measure for the **frequency the student reports receiving comments and feedback** from the teacher are significant predictors of test scores. The effect sizes are 0.06-0.09 for the school level average, and 0.03-0.04 for the individual measure. The inclusion of a student-level control sharpens the interpretation of the school level measure, meaning it is more likely capturing a pedagogical impact in the classroom instead of something intrinsic to the individual students who report getting the most feedback.

For the 2001 grade five survey there is very little on process. The one exception is a variable that measures the average frequency (in the school) that students report receiving/working on **homework**. This variable is significantly associated with test scores in both subject (standardized effect size of about 0.07-0.08). This result highlights the potential importance of out of class time for improving student achievement.

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116 Marshall & Sorto, 2009.

117 World Bank, 2002.

118 World Bank, 2002.

119 Griffin & Cuc, 2009.

The 2007 report also includes a measure for how much time the teacher spends in **planning and marking** (as reported by the teacher). Students with teachers who report more time in these activities have marginally higher scores in Reading (effect size 0.02).

The supplementary analysis of the 2007 data does more with pedagogical processes based on both student and teacher responses to survey questions.[120] The school-wide averages for process variables based on student responses provide a crude indicator of pedagogical choices made by teachers. The results confirm the earlier findings for homework and frequency of feedback (both are positive and significant). But additional significant results are found for: **frequency students work in groups,** the **frequency they report working with notes**, and the **frequency they study in the library**. The effect sizes for these variables are generally moderate, and range between 0.02 and 0.05 standard deviations.

The teacher-reported indicators of methodology are only available for about half of the classrooms that were surveyed; the issue of missing teacher data is discussed in more detail in the 2001 and 2007 reports. The results show that mathematics scores are lower in classrooms where the teacher reports that the predominant instruction mode is **teacher-centered.**

The results for teacher capacity and pedagogy are not intended to provide a checklist of things that teachers should do in the classroom. The summary instead is intended to provide some clues about these processes. At the very least the results reinforce the commonly held—if infrequently tested—belief that teacher pedagogical choices matter.

School Factors

Results from Chapter 6 showed that school factors related to both access to schooling and school quality are predictors of student attendance. For student achievement, school factors related to the quality of schooling (i.e., those related to school management regime and school resources) is an important predictor of achievement. The primary finding of school management suggests that the quality of head teachers (principals) can affect student achievement and that accountability matters. Head teachers who observe their teachers, are more experienced, and engage with parents are positively related to achievement. Both principal and community involvement effects also support the need for increased monitoring and accountability of teachers in the classrooms and for increased accountability of principals to communities. Similar to teacher factors, the school factors of the FSQL are also a significant predictor of student achievement. The specific school resources that contribute most to student achievement include full day schooling—mentioned earlier under student factors—classroom materials, and head teacher office resources. The school management and resource factors are presented in relative importance beginning with those that are the most important predictors of student achievement.

a. School Management Regime

Having the right mixture of inputs—including teachers—is not by itself a guarantee for success. Schools also need to be well run. Head teachers are expected to provide academic and pedagogical leadership and support, identify problem areas that need to be addressed, communicate with school personnel and the larger school community (students and parents), and be a source of positive reinforcement. When schools are not managed properly then there is a good chance that capacity will not be maximized, and the school's students will not reach their potential.

120 Marshall, 2010. The averages were calculated across all students in the school, and are not specific to each classroom. So these are not teacher-specific indicators, but rather general measures of the school teaching climate.

However, like teaching, the school management regime is a very difficult dimension to measure empirically. Nevertheless, there are a few results from the 2001-2007 surveys that stand out. The analysis of the 2007 data shows substantially higher test scores in schools where the head teachers are more actively engaged in **observing teachers.**[121] The effect sizes are fairly large for school-teacher effects (between 0.04-0.08).

The results for teacher observations merit some follow up analysis. The data are not fine-grained enough to say what it is about these visits that might lead to higher levels of teacher effectiveness. Also, the variation in this variable is not substantial: 2 percent of teachers report never being observed, 5 percent report being observed one time during the school year, 16.2 percent report two observations, and 77 percent report three or more visits. Nevertheless, there is the question of what kind of head teacher, school and teacher characteristics are associated with more frequent visits to classrooms.

Box 7.2 summarizes the results from some additional regressions. The model is an ordered probit, which is appropriate for the ordered categorical response for this variable. The results shows that the most significant predictors of Head Teacher visits are Head Teacher Female (39 percent of sample are female), the Fundamental Input Index (FII), and the percentage of students who are in Full Day Schooling. All three of these are positive. Also, Ethnic Minority teachers report being visited significantly less than non-minorities. The teacher's experience level or gender is not related to the frequency they report being observed. Also, teachers working in National Standard Schools report significantly fewer visits from Head Teachers (possibly because teachers are better trained in these schools and therefore need fewer visits?).

The supplemental analysis of the 2007 data shows that **head teacher experience and gender** (female head teachers) are significantly associated with student achievement.

Another aspect of school management is **community involvement**. When parents are more involved in the school, the school can benefit from extra help and resources. Parental involvement in the school may also act as an accountability mechanism and a way for the community to instigate changes. The nature of this involvement can vary considerably across different contexts, and will depend on parental education and capacity levels.

There is limited evidence that community involvement in the school is associated with higher student test scores in 2001 and 2007. The 2001 report shows that **parental contributions and education levels** are significantly associated with higher achievement levels. The 2007 results show that the parental education level is a positive predictor of achievement.[122]

Box 7.2. Covariates of Frequency Teacher Reports Visits to Classroom from Head Teacher, 2007 Grade 5 Survey

Independent Variable	Coefficient	T-Statistic
Head Teacher Female	0.28	6.14***
Head Teacher Experience	0.01	1.92**
Fundamental Input Index	0.01	4.13***
National Standard School	-0.10	-1.94**
Teacher Years Experience	-0.002	-0.83
Teacher Female	0.01	0.22
Teacher is Ethnic Minority	-0.17	-2.73***
Teacher District Excellent	0.07	1.69*
Teacher Province Excellent	0.06	0.97
Teacher National Excellent	0.23	1.00
School Mean SES	0.27	2.05**
School Mean Full Day School	0.21	4.10***
Pseudo R^2		0.03
Sample Size		6,777

121 Griffin & Cuc, 2009.

122 Griffin & Cuc, 2009.

Also, the frequency the head teacher reports meeting with parents is a marginally significant predictor of student achievement.[123]

School climate indicators like the frequency of discipline problems are not entirely determined by the school management; family and student background are likely to play a role as well. Nevertheless, these kinds of indicators can be affected by leadership. The 2001 survey included more extensive data on problems encountered in the school. The variable for the frequency the head teacher perceived problems with **student behavior** is negatively related to student achievement in both subject. The effect sizes are about 0.06 in each estimation.

b. School Resources

There are significant resource effects in both years of the grade five survey. The resources detailed here are different from those that the students bring to school with them, or are able to take advantage of outside of the home (i.e. SES, parental education, learning materials, etc.). One example that overlaps a little bit is **Full Day Schooling** (Table 7.1), which was previously introduced as a student-family background variable but is related to resources since the schools help determine the possible hours available. In both years FDS is associated with higher test scores.

In both the 2001 and 2007 surveys the indicator for **classroom materials/learning tools** is a significant predictor of achievement (effect sizes of 0.02-0.05). The 2007 data provide some additional clues on resource effects. The most important variable is the previously-referred to indicator of overall school inputs, the **Fundamental Input Index (FII)**. Since the FII is a scale made up of multiple inputs it is hard to provide a direct interpretation. Nevertheless, these inputs include both personnel and physical resources, so this is clearly a resource variable. The FII effect in the 2007 study is substantial: between 0.04 and 0.07 standard deviations.

The supplementary analysis of the 2007 data identified some additional resource effects. These include the **Head Teacher's Office Resources**, which was a strong predictor of achievement. However, it should be noted that one of more frequently analyzed resource measures—**class size**—was not a particularly strong predictor of student achievement in 2007. In fact, in both subjects the coefficient was actually positive. This highlights the complicated nature of this variable since classroom crowding is certainly a negative feature, but the best schools (or teachers) may have disproportionately large classes.

Grade Five Achievement Factors by Sub-Population

The discussion so far has emphasized the average effect of school and teacher variables on grade five student achievement. But there is always the possibility that certain variables are more important for some groups than others. For example, school resources may have an extra strong positive effect on the poorest students, or the teacher's experience level may be more important for non-Kinh students. These are examples of interaction effects, where the impact of the variable of interest changes depending on the group of students that is being considered.

In this section the results from a series of additional statistical analyses are summarized. The emphasis is on the 2007 data. The report using the 2001 grade five survey data[124] also presents analyses of this kind. But given the changes in the student population in recent years these interaction dynamics are likely to be sensitive to compositional factors. Therefore the emphasis is on 2007.

123 Marshall, 2010.

124 World Bank, 2002.

The first comparisons are by school location. The full results are presented in Tables H3, H4 and H5 in Appendix H. One source of variation across school location is student and family background. For example, parental education is a very strong (and significant) predictor of achievement in Urban schools, but is actually insignificant in Remote schools. A similar result is found for student age, which matters much more in Urban areas.

In terms of potential policy levers one result that stands out is the school average for teacher feedback in remote area schools. This variable is the strongest predictor of achievement differences in remote schools. It is also a much more significant predictor in remote areas compared with rural and especially urban areas, where the coefficient is insignificant (see Table H5). This result suggests that remote school student achievement is especially affected by this particular kind of interaction with the teacher. This may be because these students have much less access to learning aids (and feedback) outside of the school, unlike in urban areas where parents (or even tutors) may fill in these functions.

Another important finding is the variation across school location for Full Day Schooling. This variable is significant in remote areas, but has a noticeably larger effect in rural and urban areas. One concern is that school quality may be much lower in remote areas, so an extra couple of hours of class has very little real impact. This is an example of a finding that has potential policy implications right now, but it can't be assumed that these will hold in the future. In this case the spread of FDS may make less sense in Remote areas. But given the improvements in school quality that are taking place this may not be true in the future, and it may even be possible that with substantial improvements in quality in these schools the Remote students may have the most to gain.

Table H6 continues the sub-population summaries with Ethnic-only analyses. Once again several predictors appear to be especially important for this vulnerable population. These include the Fundamental Input Index (FII), teacher excellence categories (especially at the district level), student health status and Full Day Schooling. The larger impact for school features is consistent with the sub-population analysis conducted in Chapter 6 for attendance outcomes. These children are less likely to receive help in the home, and are exposed to fewer non-school sources of learning. So this reinforces the importance of teacher and school factors.

VHLSS Achievement Data (Beyond Primary)

The final source of information for factors that explain student achievement is the subsample of VHLSS households from 2006; this source was already described in Chapter 4.[125] In addition to applying standardized tests these household visits collected additional information about schools and schooling in general. This information was then brought together with the regular VHLSS 2006 data to estimate statistical models of student achievement, similar to the models summarized in previous sections of this chapter. The results are summarized in Tables H7-H9 in Appendix H. These data have some important features compared with the grade five surveys summarized earlier. First, the test score results are available for a wide range of age groups, although the small sample sizes mean that comparisons across age groups are largely illustrative. Second, the data on home background are even more complete than what is available in the grade five surveys. Also, the grouping of young people by household makes it possible to incorporate a statistical procedure known as fixed effects. This does not mean that the results are necessarily causal, but it does help to control for unobserved influences on the learning outcomes.

125 See also Dang & Glewwe, 2009.

The main conclusions are summarized here, referring to tables in Appendix H.[126] Not surprisingly, one of the strongest predictors of student achievement is the years of schooling variable. This is an important finding for the simple fact that it confirms that children are learning more as they progress through more grades. However, for the youngest children in the sample variables like age, gender and ethnicity have small effects, especially when controlling grade of enrollment and parental education. The household's economic resources, as measured by per capita expenditures, have a large positive impact on test scores, which is quite plausible. However, when commune fixed effects are added to the regression the size of the coefficient is much smaller and it loses statistical significance.

There are a handful of significant school and teacher variables to discuss. First, the share of teachers with 10 or more years of teaching experience is significant (and positive); also the percentage of females teachers is positive but less significantly related to test scores. The estimated impact of the teacher experience variable is quite large; moving from a school with no teachers with 10 or more years of experience to a school where all teachers with such experience raises test scores by 0.3 to 0.4 standard deviations (of the distribution of test scores). This is equivalent to a 2-3 year increase in the number of years in school.

Two measures related to physical characteristics are significant: the number of shifts per day (only for the math test score), and the number of book sets per student (only for the reading test score). The impacts of both of these variables are large. A student in a school with two shifts will have a math score 0.2 standard deviations lower than an otherwise similar student in a school with only one shift, an impact that is equivalent to a reduction of about 1.5 years of schooling. Similarly, giving a student a book set can increase reading test scores by around 0.2 standard deviations, which is roughly equivalent to the impact of an additional 2-3 years of schooling.

For purposes of making policy recommendations it is easier to focus on a particular level of schooling. So Dang and Glewwe (2009) carried out separate analyses for a focused group of children who had completed 6-9 years of schooling and were between the ages of 11 and 15. While this reduced the sample to about 230 children, the results concerning school characteristics clearly pertain primarily to middle schools.[127] The impact of child and household variables in test scores for this sample is broadly similar to the earlier results. Yet there are two minor differences. First, the impact of years of schooling is generally higher for this targeted group of middle schoolers, although it is less statistically significant for math scores. Second, the impact of parental education on reading test scores is slightly smaller and statistically insignificant, and the effect of mother's education on math scores is somewhat higher.

The number of book sets per student has a very strong impact on students' test scores in this age and grade cohort, and the size of these impacts is quite high: providing a set of books raises a student's reading and math test scores by an amount equivalent to about two years of schooling. For math scores, the number of shifts has a negative effect, so that an additional shift reduces test scores by an amount equivalent to a reduction of 1-2 years of schooling. Finally, in contrast to the earlier results, the share of students passing the school-leaving examination has a strong

126 The full results are included in Dang and Glewwe's (2009) paper.

127 Many of the children who had completed grade 9 by the fall of 2006 were in grade 10 in the 2006-07 school year and in grade 11 in the 2007-08 school year (which is when they were tested). However, these children had spent four years in lower secondary school and at most one year and 3-4 months in upper secondary school by the time they were tested, so it is reasonable to assume that lower secondary school characteristics had much more effect on their learning at the time they were tested than did upper secondary school characteristics.

positive, and highly significant, impact on math scores. While this implies that the household and school variables are not fully capturing all the determinants of math test scores, adding this variable does not have a dramatic effect on the estimated effects of the other variables and so does not signal a serious problem of omitted variable bias.

The 2006 VHLSS data set is unusual in that adults as well as children were given reading and mathematics tests. The main finding is that dummy variables for age cohorts show that younger individuals have higher test scores than older ones, after controlling for years of schooling, sex, urban location, ethnic minority status and parents' schooling. This holds even when household fixed effects are used, although the effect is reduced somewhat. This suggests that either older generations have forgotten much of what they learned in school, or that the quality of schooling has improved over time. Another possibility is that the curriculum has changed, and the test used is "unfair" to older generations who had a different curriculum. In fact, all three of these possibilities could be true. Unfortunately, with the data at hand it is difficult to determine which one is the most important factor.

There are several overall conclusions.[128] First, the results suggest that policies need to be put in place to retain experienced teachers, reduce the number of shifts in school and provide students with a full set of books, but it is wise to approach these policy options cautiously. It is still possible that there are problems of omitted variable bias; for example there may be other, unmeasured variables that are correlated with these and are the "real" causal effects. Also, the costs of these different policies need to be taken into account. In particular, the cost of retaining experienced teachers (perhaps by increasing the pay of more experienced teachers), or of building staffing in more schools so that each school needs to have only a single shift, could be expensive. In contrast, the cost of providing book sets should be more modest.

Summary of Variables Associated with Achievement

This summary of the various statistical analyses from 2001 and 2007 has identified a diverse group of variables that are associated with student achievement. Once again it bears noting that these results are not based on causal modeling like an experiment, so policy prescriptions should also bring in other kinds of research resources.

Despite the disclaimers about strict causality, the results from the various data sources—especially the 2001-2007 grade five surveys—strongly support the contention that school and teacher characteristics are associated with variation in student achievement. This is the fundamental research question relating to student achievement levels, and it is encouraging from a policy standpoint to encounter so many variables that are—at least to some degree—amenable to policy actions by policymakers and school systems.

128 Dang & Glewwe, 2009.

Table 7.4. Summary of Effect Sizes for Independent Variables in Statistical Analyses of Student Achievement, 2001-2007

Independent Variables:	2001 Survey (World Bank, 2002):		2007 Survey (Griffin and Cuc, 2009):							
			All Students:		Ethnic Minorities:		Rural Only:		Remote Only:	
	Reading	Maths	Reading	Maths	Reading	Maths	Reading	Maths	Reading	Maths
Family-Student Background:										
Kihn-Chinese	0.04**	0.02*	0.04**	0.07**	----	----	0.05**	0.06**	0.07**	0.08**
Family SES	----	----	0.08**	0.13**	0.01	0.02	0.11**	0.09**	0.09**	0.11**
Parent/father education	0.07**	0.06**	0.07**	0.10**	0.05	0.06	0.08**	0.07**	0.07**	0.06**
Student is Female	----	----	0.08**	0.02**	0.12**	0.01	0.09**	0.00	0.09**	0.01
Health problems	----	----	-0.06**	-0.09**	-0.06**	-0.07**	-0.08**	-0.08**	-0.06**	-0.07**
Age	-0.04**	-0.02**	-0.04**	-0.05**	-0.04**	-0.03**	-0.05**	-0.05**	-0.03**	-0.04**
Number of meals/day	----	0.03*	0.04**	0.06**	0.04**	0.05**	0.04**	0.04**	0.04**	0.05**
Number of days absent	-0.02**	-0.03**	-0.03**	-0.05**	-0.04**	-0.05**	-0.04**	-0.04**	-0.03**	-0.03**
Sum of repeated class	-0.11**	-0.09**	-0.05**	-0.06**	-0.05**	-0.05**	-0.06**	-0.05**	-0.08**	-0.06**
Sum of learning tools	----	----	0.03**	0.05**	0.01	-0.01	0.04**	0.04**	0.05**	0.06**
Full day schooling	0.11**	0.15**	0.06**	0.10**	0.07**	0.13**	0.08**	0.09**	0.04**	0.05**
Teacher Variables:										
Teacher feedback	----	----	0.06**	0.09**	0.04**	0.07**	0.03**	0.04**	0.12**	0.11**
Time for plan/mark	----	----	0.02*	----	----	----	0.03	0.02	0.00	0.01
Level of excellence	----	0.05**	0.02*	0.04**	0.05**	0.07**	0.03*	0.03**	0.03	0.04*
Teacher Education	----	----	----	----	----	----	----	----	----	----
Teacher Experience	----	----	----	----	----	----	----	----	----	----
Teacher Knowledge	0.10**	0.13**	----	----	----	----	----	----	----	----
Teacher Gender	0.04**	0.04*	----	----	----	----	----	----	----	----
Classroom Materials	0.02*	0.02*	----	----	----	----	----	----	----	----
School Variables:										
Avg. education/SES	----	----	0.06**	0.10**	0.05**	0.06**	0.04*	0.07**	0.04	0.04
School head observing	----	----	0.04*	0.08**	0.04**	0.07**	0.02	0.02*	0.05	0.05
Fund. Input Index (FII)	----	----	0.04**	0.07**	0.04**	0.07**	0.06**	0.06**	0.04*	0.05**
Class learning tools	----	----	0.04**	0.05**	----	----	0.05**	0.04**	0.06**	0.06*
Pupil Behavior Probs.	-0.07**	-0.06**	----	----	----	----	----	----	----	----

	VHLSS 2006-08 (Dang-Glewwe, 2009)		2007 Supplemental Analysis (Marshall, 2010):			
Independent Variables:	**Whole Sample 9-20**		**Teacher Quality 1:**		**Teacher Quality 2:**	
	Reading	**Maths**	**Reading**	**Maths**	**Reading**	**Maths**
Family-Student Background:						
Kihn-Chinese	0.13	0.05	-0.05**	-0.11**	-0.05**	-0.11**
Family SES	0.11**	0.11**	-0.03	-0.03	-0.03	-0.03
Parent/father education	0.10**	0.12**	----	----	----	----
Student is Female	0.13*	0.06	0.09**	-0.10**	0.09**	-0.10**
Health problems	----	----	0.04**	0.09**	0.04**	0.09**
Age	0.02**	0.02**	-0.02**	-0.02**	-0.02**	-0.02**
Number of meals/day	----	----	0.04**	0.06**	0.04**	0.06**
Number of days absent	----	----	-0.02**	-0.02**	-0.01**	-0.02**
Sum of repeated class	----	----	-0.06**	-0.07**	-0.06**	-0.07**
Sum of learning tools	----	----	0.01	-0.01	0.01	-0.02
Full day schooling	----	----	0.06**	0.10**	0.06**	0.10**
Teacher Variables:						
Teacher feedback	----	----	0.04**	0.06**	---	----
Time for plan/mark	----	----	----	----	0.01	0.01
Level of excellence/ Province excellence	----	----	----	----	0.07**	0.11**
Teacher Education	----	----	0.03**	0.04**	0.03**	0.03
Teacher Experience	0.10**	0.12**	----	----	0.02*	0.02
Teacher Knowledge	----	----	----	----	----	----
Teacher Gender	----	----	----	----	0.06*	0.04
Classroom Materials	----	----	----	----	----	----
School Variables:						
Avg. education/SES	----	----	0.03**	0.05**	0.03**	0.05**
School head observing	----	----	----	----	0.01	0.02*
Fund. Input Index (FII)	----	----	0.06**	0.07**	0.05**	0.06**
Class learning tools/ textbooks	0.05**	0.06*	----	----	----	----
Pupil Behavior Probs.	----	----	----	----	----	----

*Note: ** p<0.01; * p<0.05.*

What factors are the most important? Table 7.4 provides a summary of the significant predictors of achievement by year of survey. These include the 2001 and 2007 grade five survey results for the whole samples, the 2007 results by Remote, Rural and Ethnic Minority status, the 2007 grade five survey results of Marshall supplemental analysis, and the 2006-08 VHLSS results for young people aged 9-20. In each column the five largest standardized effects are highlighted in grey. Almost all of the variables are statistically significant. There are some differences by study in terms of variables and, to a less degree, methodology; this is especially the case with the VHLSS data, which are included mainly for reference since the sample is kind of small. Overall the summary provides some context for evaluating the most important predictors of student achievement.

The results show that the largest predictors of achievement are generally in the top half of Table 7.4, which covers student and family background characteristics such as SES and parental education. As a result there are comparatively fewer shaded results in the bottom half for school and teacher characteristics; this is not an unusual finding. But as noted in previous sections there are some important school and teacher influences. For teacher variables this includes feedback (2007 survey) and teacher knowledge (2001 survey). School level factors include observations of teaching by Head Teacher, the FII, classroom materials and Full Day Schooling. The results also show that Ethnic minorities appear to be especially affected by school/teacher quality instead of family background, although for Remote school students the same is not true.

7.2. Equity and Interaction

Chapters 4 and 6 identified concerns about equity in Vietnamese education in relation to school attendance outcomes like primary completion and secondary enrollment. But equity concerns are not restricted to attendance. Student achievement is another outcome that can have very large differences between certain groups of students, as confirmed by the descriptive analysis of Chapter 4. These differences can in turn act in the same way that inequalities in access and completion do. Simply stated, if some students are completing primary school but learning very little then in reality they have not completed primary school.

This section summarizes the main findings from a series of results that are related to equity. These include calculations of inequality between and within schools (and provinces) using the Rho statistic (defined earlier) together with a slopes as outcomes analysis of within school inequality based on the achievement statistical analyses described above.

Achievement Inequalities Summary

The rho measure was already introduced in Chapter 5 for the summary of school quality distribution in Vietnam. In this chapter it is used to indicate the percentage of variation in the test score results that is attributable to between group differences.[129] In highly segregated school systems classmates will be very similar within schools (either poor or wealthy, ethnic minority or non-minority, etc), but there will be large differences between school settings in contextual features like poverty, as well as outcomes like student achievement. This means that high values of rho are associated with greater inequality, while lower values of Rho mean that schools (or provinces) have similar outcomes overall and that most of the variation is attributable to differences within schools or provinces. As noted above a low rho does not mean everyone has the same test score outcome; there can still be big differences between students in the same classroom. But it does suggest that there is equity between schools and communities on average.

Because of differences in sampling strategies between the 2001 and 2007 grade five surveys the comparisons of rho across years is somewhat complicated. For the province comparisons (presented below) the authors had to first undertake an adjustment and then make comparisons based on residuals. For the 2007 results the national average rho was 0.42 in Mathematics, and 0.41 in Reading. This is substantially lower than in 2001, when the rhos were 0.62 (mathematics) and 0.58 (Reading). Again, these figures are not strictly comparable because of sampling differences, but the large differences suggest that equity is improving.

The rhos results indicate that most of the variation in student achievement (about 60 percent) comes from differences between students within schools, and a relatively smaller percentage (about 40) is attributable to differences between schools. The rhos of about 0.40 are generally

129 A detailed description of the use of the rho statistic for describing inequality in achievement outcomes is included in Griffin and Cuc (2009).

higher than what studies have found in other countries, and demonstrates that more work remains to insure equality of opportunities to learn in Vietnam. In other words, this finding confirms that student achievement-related inputs are still fairly inequitably allocated across schools in Vietnam. On the other hand, it also confirms improvement in time with a higher share of the inequity now within the school.

Griffin and Cuc (2009) compared rhos in 2001 and 2007 by province to identify which provinces had experienced decreasing inequality, and which provinces had experienced increases. Tables I1 and I2 in Appendix I present the results for all provinces. The main results are summarized below in Tables 7.5 and 7.6.

Table 7.5. Provinces with 2007 Rho higher than expected.

Math	Vietnamese
Lai Chau	**Dien Bien**
Khanh Hoa	Lao Cai
Tuyen Quang	Quang Ngai
Dien Bien	Phu Yen
Lao Cai	Lai Chau

Source: Griffin and Cuc, 2009.

Table 7.6. Provinces with 2007 Rho lower than expected.

Math	Vietnamese
Thai Binh	Hau Giang
Nam Dinh	Thai Binh
Ha Tay	Tien Giang
Vinh Long	Bac Lieu
Long An	Binh Phuoc

Source: Griffin and Cuc, 2009.

These are the provinces that experienced a worsening and improvement in terms of student achievement equity between 2001 and 2007. The implications from a policy standpoint are somewhat uncertain. Inequality is affected by the makeup of the cohort, and during this period there were differences in student participation rates between these provinces. These differences can affect measure of inequality for outcomes like achievement.

Inequality within Schools

The rho calculations are useful for understanding inequality at a macro level. Equity can also be examined using statistical modeling that treats the school-level variation in equity as an outcome in the same way as a student test score. This approach, known as a random coefficient or "slopes as outcomes" model, makes it possible to analyze the micro-dynamics of equity. However, it should be noted that there are some limits to this kind of multivariate extension. First there is the difficulty of defining the dimension along which equity in learning outcomes are measured. SES is the most common measure, but there is also student health, age, previous learning outcomes, etc. The extent to which each measure is associated with variation within the school can in turn be related to different dynamics within the school

There is also the larger question of how important within-school equity is. A lot of policy lever analysis is geared towards reducing differences between schools. However, the results from

multivariate (especially multilevel) analyses commonly show that much more variation comes from within schools (see rho discussion above). And, in fact, in Vietnam, between school inequity, reflecting more equitable resource distribution across communes and schools, has been decreasing in time. Ideally classrooms will have high levels of learning for all students. But a classroom can still have a relatively high average while also having relatively high levels of inequality. This is especially true if there are high performers who are pulling both the mean and measure of inequality upwards. In other words, high levels of inequality within the classroom do not automatically mean low levels of overall achievement.

Table I3 in Appendix H presents the results for the slopes as outcomes models using the Hierarchical Linear Modeling (HLM) program for Vietnamese reading and mathematics in 2007. The models include a reduced set of the main student-family background characteristics included in the 2007 statistical analyses described above. Three level 1 variable slopes are modeled: Pupil Health, Family SES

Box 7.3: Slopes as Outcomes Analysis

Table 7.7. summarizes the main results for analysis of slopes as outcomes, for two potential "differentiator" variables (Family SES and the Grade 4 average in the school). Negative coefficients mean that increases in the independent variable are associated with less inequality in student achievement between students within the classroom. Examples include: availability of benches, frequency get homework, and frequency study in library. Positive coefficients are variables that are positively associated with inequality; these include total enrollment and teacher education.

Table 7.7. Summary of HLM Slopes as Outcomes Models, by Subject (t-statistics)

Variable	Reading:		Mathematics:	
	Family ses	Grade 4 result	Family ses	Grade 4 result
School /Teacher Characteristics:				
National Standard School	5.48	2.38	10.19	4.62
	(0.95)	(1.60)	(1.28)	(2.47)
Average G5 Class Size	-0.05	0.15	-0.07	0.29
	(-0.18)	(1.88)	(-0.20)	(2.76)
Total Enrollment	0.03	0.005	0.02	0.005
	(3.08)	(1.66)	(2.00)	(1.36)
Head Teacher Experience	-0.52	-0.05	-0.15	-0.06
	(-1.74)	(-0.61)	(-0.37)	(-0.51)
Availability of Benches	-5.76	-2.39	-2.93	-1.67
	(-1.03)	(-1.66)	(-0.40)	(-0.92)
Average Teacher with 12+	24.25	10.29	9.25	18.69
Years Education	(2.56)	(3.70)	(0.76)	(5.44)
Frequency get homework	-2.90	-4.20	-8.83	-4.74
	(-0.50)	(-2.69)	(-1.23)	(-2.67)
Frequency get feedback on tests	4.53	-0.39	-0.96	2.40
	(0.57)	(-0.18)	(-0.10)	(0.88)
Frequency observes pictures/ maps	-14.07	-4.15	-6.08	-6.51
	(-1.74)	(-2.03)	(-0.62)	(-2.57)
Frequency do work in study notes	-0.36	-3.78	5.05	-2.65
	(-0.06)	(-2.26)	(0.63)	(-1.26)
Frequency study in library	7.11	-4.28	1.66	-5.18
	(0.87)	(-2.13)	(0.17)	(-2.09)
Random Effect P-Value	0.00	0.00	0.00	0.00
Sample Size (schools)	47,993	47,993	47,993	47,993
	(3,424)	(3,424)	(3,424)	(3,424)

and Grade 4 Outcome. In each case most of the school and teacher covariates included in the achievement model (i.e. the level two estimation for the school intercept) are included in the slopes as outcomes extension, together with a random effect. The three variables were chosen because together they capture three of the main "differentiators" in learning outcomes in the sample, and each one touches on a slightly different dimension with which to understand equity.

For the school characteristics there are a handful of significant results, although some inconsistency across the three slope variables. National Standard schools are associated with higher levels of inequality based on the grade 4 result. This means that the student's previous year's performance is a stronger predictor of doing well (or poorly) in these schools. One possibility is that student assessment practices in these schools are more aligned with what is covered on the tests that were applied. But there is also the possibility that the National Standard schools are generating inequality, either through exceptional growth at the top or a (relative) failure to bring up students at the bottom (or some combination of the two).

There is some evidence that larger classes and larger schools lead to more intra-school inequality. For class size the results are inconsistent, as larger classes have less inequality related to the student's health, but more based on the previous year's result. The school size effect is consistently positive and significant in a couple of models. These results are to be expected, as with more students, ceteris paribus, it is likely that a wider range of abilities will be encountered. Another school characteristic that is moderately significant is for the availability of two person benches (versus 4-5 person benches). This variable is associated with lower levels of inequality in reading achievement.

Higher levels of teacher education are associated with generally higher levels of inequality within schools. Since this variable is also significantly associated with higher test scores, once again there is the possibility that the best teachers are increasing inequality primarily through a small group of high achievers. In other words, given the positive effects of teacher education on the mean score, the positive effect on inequality may be a not-so-serious side effect. For the teacher excellent classifications there are no significant coefficients.

Head teacher experience is marginally associated with lower levels of inequality in family SES for Vietnamese. This is an interesting finding given the fact that teacher experience does not have much of an effect on inequality, or even has an opposite effect. This highlights the potential importance of management regimes in these dynamics. More experienced head teachers may be more attuned to issues related to equality.

The teaching conditions variables reported by teachers are generally insignificant. However, the classroom averages reported by students show some significant results. One finding is that when homework is assigned more frequently there is less inequality related to the grade four result. This suggests that homework is a potential vehicle for low performing students to catch up with others. Also the impact of the frequency of getting feedback from the teacher on inequality is mostly negative, and in the case of Pupil Health in Vietnamese is significant. The more consistent methodology variable, however, is for the frequency students report observing pictures and maps. The use of this teaching segment is associated with significantly lower levels of inequality in the four of the six estimations.

7.3. School and Systemic Improvement 2001-2007

This section summarizes the results from two sets of analyses that take advantage of the roughly 1,000 "common schools" that have data in both the 2001 and 2007 grade five surveys. The availability of such a large pool of schools with test score (and other) information in two points

in time is unusual in the developing world, and facilitates the work of analyzing systemic improvement, while controlling for fixed unobservable factors which often make cross-section analyses difficult to interpret. This is not to say that the common schools are the only available source for measuring change; as noted above, both the 2001 and 2007 samples are large enough to be able to speak confidently about average achievement levels in Vietnam, and the results show there has been significant improvement in student test scores. The availability of so many common schools simply makes it possible to deepen this line of analysis, while confirming some of our results in a more demanding setting.

The first activity[130] involves a comparison of "value added" (VA) versus "non value added" (NVA) schools. The second activity is a decomposition, or simulation, that is taken from Marshall's (2010) supplementary analysis of the 2007 data.

Value Added Versus Non Value Added Schools

This first approach[131] uses regression analysis to identify schools that score above (VA) or below (NVA) their expected value of achievement, according to their scores in 2001.

Table 7.8 provides a summary of the school classification for results in 2007 in comparison with the expected results (based on 2001 results). The distribution of schools is only slightly different between the two subjects. 4.7% and 8.5% of the common schools performed more than one standard deviation lower than expected in reading and mathematics, respectively. About 6% and 9.5% performed more than one standard deviation higher than expected in reading and mathematics respectively. About one third of the common schools performed 20 points less than expected and almost 30% of them performed 20 points better than expected in reading and mathematics. About 22.7% of the schools were in the middle categories where the differences were less than 20 points.

Table 7.8. The number of schools in each of the categories

Value added category (Actual scores-expected scores)	Reading		Mathematics	
	N	Percentage	N	Percentage
-200 score points or less			3	0.3
-199.99 to -100 score points	48	4.7	83	8.2
-99.99 to -20 score points	349	34.3	322	31.7
-19.99 to 0 score points	136	13.4	109	10.7
0.01 to 19.99 score points	131	12.9	122	12.0
20 to 99.99 score points	292	28.7	283	27.8
100 to 199.99 score points	59	5.8	83	8.2
Higher 200	2	0.2	12	1.2
	1017	100.0	1017	100.0

Source: Griffin and Cuc, 2009.

There were 26 schools that performed more than 100 score points lower than expected in both subjects. Similarly there were 36 schools that performed more than 100 score points higher than expected in both subjects. Griffin and Cuc (2009) then made detailed comparisons between these 26 NVA and these 36 VA schools. The results are summarized in Table 7.9. For each variable the Maximum, Minimum and the Mean of the 26 VA and NVA schools are presented. This is

130 Completed by Griffin and Cuc (2009).

131 Described in more detail in Griffin and Cuc (2009).

followed by the overall standard deviation and the difference between the VA and NVA averages for that variable. Differences larger than one standard deviation are denoted by three diamonds (♦♦♦); for half a standard deviation two diamonds (♦♦); and where the difference was greater than one quarter of a standard deviation but less than half a standard deviation, one diamond (♦). When the difference was smaller than one quarter of a standard deviation, the difference cell has been left blank. When the difference was negative, i.e., the mean of the VA schools were lower than that of the NVA schools, a dot ● has been used.

Table 7.9. The difference between the most NVA and VA schools

	Non-value added (n=26)			Value added (n=36)			All		
Variable	**Minimum**	**Maximum**	**Mean**	**Minimum**	**Maximum**	**Mean**	**SD**	**Difference**	
Reading 2001	317.0	869.6	555.8	292.9	793.0	504.8	79.6	-51.0	●●
Math 2001	348.9	710.2	574.5	351.4	757.7	508.8	86.8	-65.7	●●
Reading 2007	368.2	504.6	413.3	611.7	818.5	672.1	66.2	258.8	♦♦♦
Math 2007	368.0	471.8	407.6	611.8	803.1	694.4	81.2	286.8	♦♦♦
Fundamental school resources	43.0	73.6	59.3	45.3	91.8	76.2	10.7	16.8	♦♦♦
Places to study at home	0.0	93.3	59.6	46.7	100.0	92.3	19.4	32.7	♦♦♦
Ecozone	2.0	5.0	4.0	1.0	5.0	2.4	1.4	-1.7	♦♦♦
Percentage of Kinh	0.0	100.0	29.9	0.0	100.0	90.0	33.1	60.1	♦♦♦
Sum of home items	2.9	8.4	6.0	5.8	13.4	10.0	1.9	4.0	♦♦♦
Home chores	0.9	1.8	1.2	0.8	1.3	1.0	0.2	-0.2	♦♦♦
Minutes to school	17.0	39.5	29.8	15.0	39.3	23.6	5.2	-6.2	♦♦♦
Day of absent	0.7	3.2	1.5	0.0	2.2	0.9	0.6	-0.6	♦♦♦
Sum of study materials	4.8	7.0	6.2	6.0	7.0	6.7	0.6	0.5	♦♦
Sum of books	3.8	11.0	7.2	6.0	12.3	10.0	2.0	2.7	♦♦
Private class	0.0	84.6	19.7	0.0	93.3	12.1	24.2	-7.5	♦
Time studying at home	0.4	2.2	1.4	0.5	2.5	1.8	0.4	0.4	♦♦♦
Regularity of assigning home work for math	0.9	2.0	1.5	0.0	2.0	1.5	0.4	0.0	
Regularity of assigning home work for reading	0.6	2.0	1.4	0.0	2.0	1.4	0.4	0.0	
Checking home work for Math	0.9	2.0	1.5	0.0	2.0	1.6	0.4	0.0	
Checking home work for reading	1.0	2.0	1.5	0.0	2.0	1.5	0.4	0.0	
Feedback after testing	0.8	2.0	1.4	1.2	2.0	1.8	0.3	0.4	♦♦♦
Interest in math	0.0	0.8	0.3	0.0	0.7	0.2	0.2	-0.1	♦♦
Interest in reading	0.0	0.9	0.3	0.0	0.9	0.4	0.2	0.1	♦♦
Like school	3.1	4.0	3.8	3.5	4.0	3.9	0.2	0.0	
Like teachers	3.3	4.0	3.9	3.5	4.0	3.9	0.2	0.0	

Time spent on making lesson plan	3.0	7.0	4.7	2.0	7.0	4.4	1.1	-0.3	●
Number of exercises given to students - math	0.0	3.0	1.7	0.0	5.0	2.0	1.2	0.3	♦
Number of exercises given to students - reading	0.0	2.7	1.5	0.0	4.0	1.4	0.9	-0.1	
Highest pedagogical level	2.0	4.0	2.6	1.5	4.0	3.1	0.7	0.5	♦♦
Do extra work	0.0	77.8	18.4	0.0	100.0	21.0	33.8	2.6	
teacher award	0.0	2.3	1.2	0.0	4.0	2.0	0.7	0.8	♦♦♦
PD training	1.0	2.0	1.9	1.0	2.0	1.9	0.4	0.0	
Sum of class items	2.0	7.0	4.4	3.1	9.0	5.8	1.3	1.4	♦♦♦
Principal observation of Grade 5 teaching	1.0	4.0	3.2	1.0	4.0	3.8	1.0	0.6	♦♦
Principal sum of home times	3.0	19.0	11.9	6.0	20.0	16.4	3.0	4.5	♦♦♦
Principal observation of teacher teaching per year	26.0	180.0	64.3	36.0	203.0	90.2	41.5	26.0	♦♦
Percentage of teacher with University degree	0.0	68.0	14.6	0.0	77.8	22.4	17.3	7.8	♦
Principal Number of year teaching	3.0	34.0	17.4	5.0	38.0	21.3	9.0	3.9	♦
Teacher/class ratio	0.3	1.6	1.0	0.3	1.6	1.3	0.4	0.3	♦♦
Parent average year of education	0.7	8.6	4.3	4.1	15.5	10.0	3.4	5.6	♦♦♦
SES mean	-1.4	0.8	-0.4	-1.8	1.1	0.2	0.8	0.6	♦♦
Full day class	1.0	2.8	1.2	1.0	2.5	1.7	0.5	0.5	♦♦♦

Source: Griffin and Cuc, 2009.

The results in Table 7.9 show that, on average, the 26 NVA schools performed better than the 36 VA schools in 2001, but in 2007 the VA schools outperformed the NVA schools by an average of more than 250 point scores. Several results stand out in Table 7.9.[132] The first is that the VA schools have substantially favorable endowments of family resources like parental education and home possessions.

However, there are also some significant differences in terms of the school endowments. The VA schools have more resources, but also have teachers that provide more feedback to students, have higher teacher excellence awards, have principals that spend more time visiting classrooms,

132 Although it should be noted that there is a possibility of a school-wide "regression to the mean" effect. This is only possible if for some reason the students in the school in 2001 had an especially good or bad day; this is easily understandable for individual students, but a little more complicated for clusters of students. Examples include disturbances during the testing process, or a test application procedure that deviated from the intended or official guidelines.

and have more teachers per class, among other differences. So the explanation for why these schools experienced the most improvement is not related solely to family and SES endowments. These schools are more likely to have characteristics that have been associated with higher achievement levels (see 7.1).

Table 7.10. Variables having more than one SD difference between VA and NVA

	Non-value added (n=26)			Value added (n=36)			All		
Variable	**Minimum**	**Maximum**	**Mean**	**Minimum**	**Maximum**	**Mean**	**SD**	**Difference**	
Fundamental school resources	43.0	73.6	59.3	45.3	91.8	76.2	10.7	16.8	♦♦♦
Places to study at home	0.0	93.3	59.6	46.7	100.0	92.3	19.4	32.7	♦♦♦
Ecozone	2.0	5.0	4.0	1.0	5.0	2.4	1.4	-1.7	♦♦♦
Percentage of Kinh	0.0	100.0	29.9	0.0	100.0	90.0	33.1	60.1	♦♦♦
Sum of home items	2.9	8.4	6.0	5.8	13.4	10.0	1.9	4.0	♦♦♦
Home chores	0.9	1.8	1.2	0.8	1.3	1.0	0.2	-0.2	♦♦♦
Minutes to school	17.0	39.5	29.8	15.0	39.3	23.6	5.2	-6.2	♦♦♦
Day of absent	0.7	3.2	1.5	0.0	2.2	0.9	0.6	-0.6	♦♦♦
Time studying at home	0.4	2.2	1.4	0.5	2.5	1.8	0.4	0.4	♦♦♦
Feedback after testing	0.8	2.0	1.4	1.2	2.0	1.8	0.3	0.4	♦♦♦
Teacher award	0.0	2.3	1.2	0.0	4.0	2.0	0.7	0.8	♦♦♦
Sum of class items	2.0	7.0	4.4	3.1	9.0	5.8	1.3	1.4	♦♦♦
Principal sum of home times	3.0	19.0	11.9	6.0	20.0	16.4	3.0	4.5	♦♦♦
Parent average year of education	0.7	8.6	4.3	4.1	15.5	10.0	3.4	5.6	♦♦♦
Full day class	1.0	2.8	1.2	1.0	2.5	1.7	0.5	0.5	♦♦♦

Source: Griffin and Cuc, 2009.

Table 7.10 provides a summary of the variables that are at least one standard deviation different between VA and NVA schools. The list is dominated by family background indicators, but it bears restating that there are substantial differences in school characteristics as well. These include several variables that have come up throughout this chapter, such as: Fundamental Input Index (FII), teacher feedback, teacher excellence award, and Full Day Schooling. From a policy standpoint the existence of these differences is important because it suggests that these kinds of variables played a role in the very different improvement trajectories experienced between 2001 and 2007.

2001-2007 Decomposition

The second method for assessing systemic improvement between 2001 and 2007 is called a decomposition.[133] The strategy is similar to the VA-NVA comparisons summarized in the previous section. The main difference is that the decomposition brings in the results from statistical analyses of student test scores to provide a more exact summary of how measurable differences

133 Oaxaca, 1974; Blinder, 1973. Marshall (2010) provides more details about the methodology.

in student and school characteristics translate into differences in average achievement within the common schools during this period. This is done for *all* of the common schools, not just a comparison of schools that made substantial progress versus those that did not, which makes it possible to address the question of why did test scores in the average school improve?

The critical question is to what degree are scores higher on average in 2007 as a result of improvements in the schools? This is a difficult question to address because of dynamic changes that may be taking place in the production of achievement. Nevertheless, by comparing endowments across the two periods, and using regression coefficients from achievement production functions, it is possible to decompose the observed differences in achievement into different categories, including potential policy levers.

Table 7.11 begins the work with a stepwise regression approach that pools the data across the two years and uses a dummy variable for 2007 to capture the achievement difference in each subject between the two years of data for the common schools. The results show that the large "raw" difference in Vietnamese reading is substantially reduced by including student and family background characteristics (Estimation 2). This means that the gains in reading are driven mainly by improvements in the general living conditions in the country between 2001 and 2007. Nevertheless, there is some part of the gain that is attributable to school and teacher variables. This corresponds to as much as 9.64 points in the random effects maximum likelihood (REML) model.

Table 7.11. Stepwise Regression Results for 2001-2007 Comparison

ESTIMATION	2007 STUDENTS VERSUS 2001:		
	FE	FE WEIGHT	REML
	Vietnamese Achievement		
(1) Empty Model	30.16	28.04	30.96
	(11.29)	(9.88)	(33.69)
(2) Add Family Background	5.45	2.43	9.64
	(1.90)	(0.82)	(8.62)
(3) Add School/Teacher Variables	-7.77	-6.65	-2.89
	(-1.22)	(-0.96)	(-1.04)
	Mathematics Achievement		
(1) Empty Model	49.75	50.79	51.08
	(16.17)	(15.24)	(51.14)
(2) Add Family Background	23.32	23.53	27.49
	(7.30)	(6.65)	(22.68)
(3) Add School/Teacher Variables	9.27	13.49	12.41
	(1.34)	(1.75)	(4.12)

Source: Marshall, 2010.

Notes: A total of 9 models were estimated for each subject. In each model the year control (2007) is interpreted in relation to 2001. The three main models begin with the Empty Model that only includes the shift controls and then add more variables until the full model (number 3). Each of these models is estimated using three specifications: Province Fixed Effects, Province Fixed Effects with Weights, and Province and School Random Effects. T-statistics (in parentheses) correct for clustering of students at school level.

For mathematics the story is somewhat different (bottom half Table 7.11). Here there is a much larger residual effect after controlling family background (about 25 points). This effect is substantially reduced by including the school and teacher variables. This is important for

two reasons. First, a substantial part of the average gain in mathematics from 2001 to 2007 is attributable to changes in school and teacher characteristics. And second, the data in grade five survey are able to capture a substantial part of this change. However, there is still some residual gains in mathematics that cannot be explained by the variables in the grade five surveys (especially in the REML model in Column 3).

Table I4 in Appendix I provides more variable-by-variable detail on these differences. For each subject there are five columns to consider. The first two present the pooled regression model (with fixed effects and weighting and random effects) using the common dependent variable, common independent variables, and the 2007 year dummy (first variable at top of table). Then come the means for each (presented) independent variable; the number in parentheses below the 2007 mean is the t-statistic for the t- test for differences by year. Then in the fifth column comes the decomposition result. Positive coefficients mean that the 2007 scores are higher because of more favorable endowments of the independent variables; negative coefficients correspond to areas where there has been a deterioration. The t-statistics for the individual decomposition components are also presented; t-statistics that are larger than 2.0 are statistically significant.

Table 7.12. Largest Differences for 2001-2007 Comparison

	Reading:			Mathematics:		
Variable	**Means 2001**	**Means 2007**	**Decomp. (3)**	**Means 2001**	**Means 2007**	**Decomp. (6)**
Student-Family Characteristics:						
Student Age	11.91	11.57	1.54**	11.91	11.57	1.00*
Family SES	0.60	0.69	1.48*	0.60	0.64	1.79**
Student no. of meals	2.75	2.81	1.64**	2.75	2.81	1.62**
Student repeating:						
1 Time	0.15	0.05	2.97**	0.15	0.05	2.25**
2 or more Times	0.03	0.01	0.54	0.03	0.01	0.68**
Full Day Schooling	0.19	0.40	3.92**	0.19	0.40	2.29**
School Characteristics:						
Average Family SES	0.60	0.69	9.13**	0.60	0.69	6.59**
Head Teacher Female	0.36	0.43	1.05*	0.36	0.43	0.79*
Average Teacher SES	0.50	0.75	9.73**	0.50	0.75	8.95**
Excellent Teacher:						
District	0.09	0.23	3.01**	0.09	0.23	2.54**
Province	0.03	0.08	1.12**	0.03	0.08	1.09**

Source: Marshall, 2010.

The decomposition results are summarized in Table 7.12. As individual differences the impact of 1-2 points may seem small. But these can add up. And in some cases the changes in average student achievement between 2001 and 2007 that can be linked to an individual variable are substantial. Among student-family background the Full Day Schooling, number of times the student has been repeating, and access to school materials (provided by family) - see Table I.4- account for the largest differences. For the grade repetition variables it is important to point out that there is a systemic component to the improvement in addition to a family background one. Schools have an influence over progress, so the fact that repetition is much less likely in 2007

versus 2001 is in part due to school policies and other improvements in quality, and not just because of less poverty, etc.

Another variable related to both family background and policy is school shift. Between 2.3 and 4 points of the advantage in 2007 is attributable to more students enrolling in full day schooling (FDS). This effect is significant.

Among the remaining school characteristics the largest effects are associated with improvements in average teacher SES and the teacher excellence categories. The issue of teacher SES is an important one, and has not been discussed so far (in part because of missing data for teachers). The higher SES for teachers in 2007 may be a result of more educated and affluent individuals entering the profession, or it may be that teachers overall are better off because of salary improvements and other changes in Vietnamese society/economy. The important point is that with better off teachers student achievement appears to increase.

7.4. Conclusions

This chapter, like Chapter 6, has covered a lot of ground. Four main findings stand out. The most important is a restatement of the main conclusion from Chapter 6: schools, and policy, matter. Despite the limitations of the cross sectional achievement data that are available, the evidence consistently points to characteristics of schools, teachers and classrooms that are significantly related to student achievement. In other words, it is not the case that the student's family background is the only predictor of how he or she will do on an exam. This in turn opens the door for policymakers to make a real difference in the lives of Vietnamese children by equipping schools with the kinds of resources that are most likely to raise achievement levels. This is further discussed in the overview/policy report.

Second, the statistical results for student achievement make a clearer case (compared with the analysis of attendance outcomes) for why teachers are so important in this process. The results don't necessarily provide a checklist of things that effective teachers need (or do). But the results for content knowledge and pedagogical choices reinforce the need to go far beyond measures of training and education to understand teacher effectiveness. These are very plausible predictors of student performance, and this is an area with great potential for Vietnamese policymakers to improve schools via programs that impact teacher pre-service training, in-service training and support, and school management.

Third, the results in this chapter shed some light on why student achievement appears to be improving in Vietnam. Part of the explanation is simply that poverty has been reduced, and as a result children are healthier and more likely to receive help on homework from educated parents. But once again it is important to highlight the systemic improvements that have taken place as well, as teacher certification levels and school resources have improved and children (at least the wealthier ones) have more opportunities for full day schooling. These factors associated with improvement between 2001 and 2007 on the grade five standardized tests are also potential policy entrance points for the future.

Fourth, the achievement analyses largely confirm the substantial gaps that exist between the different groups, but also provide some clues about ways to address these gaps. Of particular importance is the finding that ethnic minorities' achievement appears to be more affected by school and teacher features. This is similar to one of the main findings from Chapter 6 that vulnerable populations' attendance and completion is more related to school features. The analysis of differences in this chapter was augmented by work focusing on differences between high and low scoring schools, as well as within school comparisons of equity. The results provide

some additional validation of the importance of improving school quality in order to pull up the lowest scoring schools as well as reduce within school inequalities.

Despite the quantity of useful and interesting information provided by the studies summarized in this chapter, clearly more work remains going forward. First there is the need to update these student achievement analyses at the lower and upper secondary levels, beyond the illustrative VHLSS analysis. The lack of this kind of information at this critical level is a significant research gap in Vietnam.

There is also a need to probe deeper to establish more strictly causal relations between potential policy interventions and student achievement. Controlled experiments should be considered to improve the knowledge base about what really works, and what doesn't.[134] And while such evaluations can examine only one, or at most a few, policy options at time, and may not provide clear results until 2-3 years later, in the long run they are probably the best type of evidence for the purpose of making specific policy recommendations.

More work also remains to consider the institutional dynamics of improving school quality. The evidence in this chapter has identified a (tentative) set of factors that appear to improve student achievement, overall and by population sub-group; these should be considered together with those identified in Chapter 6 for attendance. But building effective policy around these findings will require further understanding about their current distribution by school location and community, the costs of increasing their reach into every school, and the potential costs and tradeoffs of scaling up.

In sum, the results from Chapters 6 and 7 clearly show that the push to provide research-based evidence for improving policymaking is beginning to pay off in Vietnam. A substantial amount of data now exists, and the results of the various analyses provide a lot of insights into how outcomes like test scores and school attendance are determined. But there is clearly more to be done to fully take advantage of these research resources.

134 Dang & Glewwe, 2009.

REFERENCES

Abraha, S., B. Assefa, D. Tesfaye, B. Fuller, S. Holloway & E. King. 1991. "What Factors Shape Girls' School Performance? Evidence From Ethiopia." *International Journal of Educational Development* 11: 107-118.

Anderson, J.B. 2008. "Principals' Role and Public Primary Schools' Effectiveness in Four Latin American Cities." *The Elementary School Journal* 109 (1): 36-60.

Ball, D. L., Hill, H. C. & Bass, H. 2005. "Knowing Mathematics for Teaching: Who Knows Mathematics Well Enough to Teach Third Grade, and How Can We Decide?" *American Educator* Fall 2005: 14-22.

Bedi, A.S. & J.H. Marshall. 2002. "Primary School Attendance in Honduras." *Journal of Development Economics* 69: 129-153.

Behrman, J. R., & Knowles, J. C. 1999. "Household Income and Child Schooling in Vietnam." *World Bank Economic Review,* 13 (2): 211-256.

Birdsall, N. 1985. "Public Inputs and Child Schooling in Brazil." *Journal of Development Economics* 18: 67-86.

Blinder, A.S. 1973. "Wage Discrimination: Reduced Form and Structural Estimates." *The Journal of Human Renguồns* 8: 436-455.

Boero, P., Dapueto, C. & Parenty, L. 1996. "Didactics of Mathematics and the Professional Knowledge of Teachers." In A. J. Bishop, M. A. Clements, C. Keitel, J. Patrick, & F. K. S. Leung eds., *International handbook of mathematics education* (pp. 1097 – 1121). Dordrecht: Kluwer.

Carnoy, M., A. Gove, & J.H. Marshall. 2007. *Cuba's Academic Advantage: Why* S*tudents in Cuba Do Better in School*. Stanford, California: Stanford University Press.

Case, A. & A. Deaton. 1999. "School Inputs and Educational Outcomes in South Africa." *The Quarterly Journal of Economics* 114: 1047-1084.

Coleman, J.S., Campbell, E.Q., Hobson, C.J., McPartland, J., Mood, A.M., Weinfall, F.D. & York, FR.L. 1966. *The Equality of Educational Opportunity*. Washington DC: US Government Printing Office.

Đặng, H.A. 2009. *An Analysis of Educational Outcomes at the Primary School Level for Vietnam.* Washington DC: The World Bank.

Đặng, H.A. & P. Glewwe. 2009. *An Analysis of Learning Outcomes for Vietnam.* Washington DC: The World Bank.

Edwards, J.H.Y., B. Fuller, & S. Parandekar. 1996. "Primary Education Efficiency in Honduras: What Remains to be Done?" Tegucigalpa, Honduras: USAID.

Filmer, D. & N. Schady. 2008. "Getting girls into school: Evidence from a scholarship program in Cambodia." *Economic Development and Cultural Change* 56: 581-617.

Fuller, B. & P. Clarke. 1994. "Raising School Effects While Ignoring Culture? Local Conditions and the Influence of Classroom Tools, Rules and Pedagogy." *Review of Educational Research* 64: 119-157.

Fuller, B., J. Singer, & M. Keiley. 1995. “Why Do Daughters Leave School in Southern Africa? Family Economy and Mother’s Commitments.” *Social Forces* 74: 657-680.

Glewwe, P. 2002. “Schools and Skills in Developing Countries: Education Policies and Socioeconomic Outcomes.” *Journal of Economic Literature* 90: 436-482.

Glewwe, P., Agrawal, N., & Dollar, D. 2004. *Economic Growth, Poverty, and Household Welfare in Vietnam.* Washington, DC: The World Bank.

Glewwe, P. & Jacoby, H. 1994. “Student Achievement and Schooling Choice in Low-Income Countries: Evidence From Ghana.” *Journal of Human Renguồns* 29 (3): 843-864.

Griffin, P. & N.T.K. Cúc. 2009. *Secondary Analyses of Data on Education Outcomes in Vietnam*. Assessment Research Centre: University of Melbourne and World Bank.

Hamilton, L.S., & Guin, K. 2005. “Understanding How Families Choose Schools.” In J. R. Betts & T. Loveless eds., *Getting Choice Right: Ensuring Equity and Efficiency in Education Policy* (pp.40-60). Washington, DC: Brookings.

Harbison, R., & Hanushek, E.A. 1992. *Educational Performance of the Poor: Lessons From Rural Northeast Brazil*. New York: Oxford University Press.

Heyneman, S. & W. Loxley. 1983. “The Effect of Primary School Quality on Academic Achievement Across Twenty-Nine High- and Low-Income Countries.” *American Journal of Sociology* 88: 1162-1194.

Hanushek, E.A & V. Lavy. 1994. “School Quality, Achievement Bias, and Dropout Behavior in Egypt.” Working Paper Series No. 107. Washington DC: World Bank Living Standards Measurement Study.

Hill, H., Rowan, B., & Ball, D.L. 2005. “Effects of Teachers’ Mathematical Knowledge for Teaching on Student Achievement.” *American Educational Research Journal* 42: 371-406.

Hill, H. & Ball, D.L. 2004. “Learning Mathematics for Teaching: Results From California’s Mathematics Professional Development Institutes.” *Journal for Research in Mathematics Education* 35 (5): 330-351.

Ilon, L. & P. Moock. 1991. “School Attributes, Household Characteristics, and Demand for Schooling: A Case Study of Rural Peru.” *International Review of Education,* 37*:* 429-451.

Jamison, D.T. & M.E. Lockheed. 1987. “Participation in Schooling: Determinants of Learning Outcomes in Nepal.” *Economic Development and Cultural Change* 35: 279-306.

Kremer, M., N. Chaudhury, F.H. Rogers, K. Muralidharan, & J. Hammer. 2005. “Teacher Absence in India: A snapshot.” *Journal of the European Economic Association* 3: 658-667.

Lavy, V. 1996. “School Supply Constraints and Children’s Educational Outcomes in Rural Ghana.” *Journal of Development Economics* 51: 291-314.

_____. 2007. “Using Performance-Based Pay to Improve the Quality of Teachers.” *Future of Children* 17 (1): 87–109.

Lloyd, C.B., S. el Tawila, W.H. Clark, & B.S. Mensch. 2003. “The Impact of Educational Quality on School Exit in Egypt.” *Comparative Education Review* 47: 444-467.

Marshall, J.H. 2009. “School Quality and Learning Gains in Rural Guatemala.” *Economics of Education Review* 28 (2): 207-216.

_____. 2010. “School Quality Signals and Attendance in Rural Guatemala.” Unpublished manuscript.

Marshall, J.H. and M.A. Sorto. 2010. “Making a Difference in Difficult Conditions: Teachers and Mathematics Learning Gains in Rural Guatemala.” Unpublished manuscript.

Nores, M. 2008a. *Vietnam Schools: Access, Progression and Attainment.* Report prepared for the World Bank.

_____. 2008b. *Vietnam: Private Expenditures and Opportunity Costs of Schooling.* Report prepared for the World Bank.

_____. 2008c. *Quantity and Quality of Primary Schools in Vietnam: An Analysis of Distribution.* Report prepared for the World Bank.

_____. 2009a. *The Impact of Liquidity Constraints in Educational Choices. A Case Study of Vietnam.* Report prepared for the World Bank.

_____. 2009b. *The Determinants of Secondary Completion and Achievement in Vietnam.* Report prepared for the World Bank.

_____. 2009c. *The Determinants of Primary Completion and Achievement in Vietnam.* Report prepared for the World Bank.

Oaxaca, R. 1973. “Male-Female Wage Differentials in Urban Labor Markets.” *International Economic Review*, 14, 693-709.

Passos, A., Nahara, T., Magaia, F., & Lauchande, C. 2005. *The SACMEQ Project II in Mozambique: A Study of the Conditions of Schooling and the Quality of Education*. Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) and Ministry of Education and Culture, Mozambique.

Riddell, A.R. 1997. “Assessing Designs for School Effectiveness Research and School Improvement in Developing Countries.” *Comparative Education Review* 41: 178-204.

Sawada, Y. & Lokshin, M. 2000. *Household Schooling Decisions in Rural Pakistan.* Washington, DC: World Bank.

Shulman, L.S. 1986. “Those Who Understand: Knowledge Growth in Teaching.” *Educational Researcher* 15: 4-14.

Sorto, M.A., J.H. Marshall, T.F. Luschei & M. Carnoy. 2009. “Teacher Knowledge and Teaching in Panama and Costa Rica: A Comparative Study.” *Revista Latinamericana de Investigación en Matemática Educativa* 12 (2): 251-290.

Swinkels, R., & Turk, C. 2006. *Explaining Ethinic Minority Poverty in Vietnam: A Summary of Recent Trends and Current Challenges.* Washington, DC: The World Bank.

Truong, S. A., Knodel, J., & Friedman, J. 1998. “Family Size and Children’s Education in Vietnam.” *Demography* 35 (1): 57-70.

UNICEF. 2008. *Education Indicators in Cambodia: DHS 2000-2005.* Phnom Penh, Cambodia: UNICEF.

Vietnam Development Report 2007: “Aiming High.” Joint Donor Report to the Vietnam Consultative Group Meeting, 2006.

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JUNE 2011

VOLUME III: APPENDIX

THE BELGIAN DEVELOPMENT COOPERATION .be

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APPENDIX A: SUMMARY OF DATABASES USED IN BACKGROUND PAPERS

Phụ lục 1: Phụ lục về số liệu

	Year	Unit of Analysis	Sample Size	Link between	Basic identifiers
2001 Grade 5	2001	School, teachers	3,639 schools	1,054 schools in common	Region/province/district
Assessment		pupils	72,660 pupils	between 2001 and 2007	urban/rural/remote
			7,178 teachers		school id
2007 Grade 5	2007	School, pupils,	4,000 schools	1,054 schools in common	Region/province/district
Assessment		teachers	60,000 pupils	between 2001 and 2007	urban/rural/remote
					school id
VHLSS	1992,1998	Households (all years),	1992:4,800 households	Half of the 2006 households	Khu vực/ Tỉnh/ Huyện
	2002, 2004, 2006	Schools (1998, 2006)	1998:6,002 households	also in 2004; one-fourth of the 2006 households also in 2004 and 2002	Region/province/district
		Communities (all years)	2002: 30,000 households		urban/rural
			2004: 9,189 households		
			2006: 9,189 households		
			2006: 7,504 schools		
Household Testing and	2007	Households,	1,373 households	1,373 Households in common	Region/province/district

additional VHLSS 2006		schools		with VHLSS 2006;	urban/rural household id
questions				638 households in common	school id
				with VHLSS 2006 and 2004	
Primary School	2003-2007	Provinces,	census	All schools also covered in Grade 5 and VHLSS datasets	Region/province/district
Database (DFA)		districts, schools			urban/rural
					school id

	Instrument	Tests and or other measures of learning outcomes	Measures of educational a attainment
2001 Grade 5 Assessment	pupil, teacher,	Pupil test, reading and math	repetition
	school head	Teacher test	
	questionnaire		
2007 Grade 5 Assessment	pupil, teacher,	Pupil test, reading and math	repetition
	school head		
	questionnaire		
VHLSS	household questionnaire	N/A	grade completed
	school questionnaire	academic record, reading and math tests	highest diploma achieved
	(1998, 2006)	N/A	school attendance
	community questionnaire	N/A	repetition
	(all years)	academic record in 2005-2006	
Household Testing and additional VHLSS2006 questions	household and school questionnaires	All members of household currently	
		in school from grade 3 onwards	
		or with at least three years of schooling	
		tested with exam comparable to 2001 test	
		Academic scores from 2003 to 2007	
Primary School	District Survey	Measures of academic scores	enrollment rates
Database (DFA)			primary completion
			survival rate, drop-out rate
			repetition, attendance

	Main Independent Variables			
	Pupil/Household variables	Teacher/Principal Variables	Pedagogical Practices Variables	Conditions of classrooms and schools
2001 Grade 5 Assessment	Pupil age, sex, ethnicity	age, ethnicity, education, experience	allocation of teacher	textbooks, supplies,
	household education and wealth,	level of satisfaction, living	and principal time,	facilities, infrastructure,
	family practices (work at home, help with homework)	conditions, teacher subject	teaching methods,	teachers' characteristics,
		knowledge, teaching loads	lessons taught in ethnic language	class size, shifts,
				HDS/FDS, community
				contribution, school activities (including feeding)
2007 Grade 5 Assessment	Pupil age, sex, ethnicity	age, ethnicity, education, experience	allocation of teacher	textbooks, supplies,
	household education and wealth,	level of satisfaction, living	and principal time,	
	family practices (work at home, help with homework)	conditions, teaching loads	teaching methods	facilities, infrastructure,
			lessons taught	teachers' characteristics,
				class size, shifts,
				HDS/FDS, community
				contribution, school activities (including feeding)
VHLSS	In 2006:	In 2006:	In 2006:	In 2006:
	Pupil age, sex, ethnicity	Education, experience,	lessons taught in ethnic language	Private costs to education,
	household composition	in-service training, rewards for performance		fee exemptions, scholarships
	household education, wealth,			opinion of school performance college/university major

	employment			extra classes, shifts
	health status of students			vocational training
				main school or satellite school
				teachers' characteristics
				infrastructure, facilities, textbooks
Household Testing and additional VHLSS2006 questions	Education level of grandparents	age, gender, family status, income,		extra classes (subject, number of students, reasons, fees, time, teachers, satisfaction)
	Composition of parents' household	extra-classess taught, education		distance to school, health checks
Primary School	gender, ethnicity, poor students,	education, in-service training,		FSQL, National Standards, main campus/satellites shifts, HDS/FDS, facilities, supplies, infrastructure
Database (DFA)	disabled students,			textbooks, parent association, parental support, measures of school access, class size
	disadvantaged children (districts)			school days closed

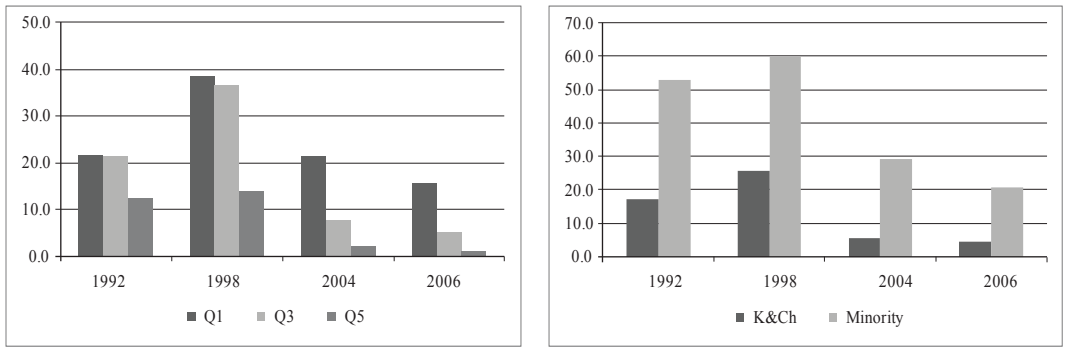
APPENDIX B: ADDITIONAL SCHOOL ATTENDANCE TABLES

Table B1: Quintile distributions across regions and years

Year /Region	Red River Delta	North east	North west	North Central Coast	South Central Coast	Central Highlands	South east	Mekong Delta
1992								
Q1	18.6	31.1	33.2	28.6	19.0	25.5	11.1	13.5
Q2	21.4	28.6	22.3	23.7	15.7	15.8	14.0	17.0
Q3	22.7	20.3	28.1	25.0	15.8	21.7	16.0	17.8
Q4	19.8	14.0	10.7	16.2	21.1	14.9	21.3	26.3
Q5	17.4	6.0	5.7	6.6	28.4	22.1	37.7	25.4
Total	100	100	100	100	100	100	100	100
1998								
Q1	14.1	38.5	52.8	31.1	21.1	45.4	8.0	19.2
Q2	22.6	26.4	26.1	25.3	17.9	18.9	6.8	26.1
Q3	21.5	15.4	12.3	21.7	21.5	14.9	14.6	23.1
Q4	22.0	12.5	7.5	14.0	22.0	14.4	24.5	19.2
Q5	19.8	7.2	1.2	7.9	17.5	6.4	46.2	12.5
Total	100	100	100	100	100	100	100	100
2004								
Q1	13.8	34.9	66.0	35.5	21.0	40.1	6.7	18.1
Q2	21.6	23.8	16.1	25.6	20.4	18.1	9.0	25.2
Q3	22.9	16.8	8.9	18.5	25.6	18.9	14.9	22.3
Q4	23.1	14.7	5.5	13.3	18.0	15.1	21.8	21.1
Q5	18.6	9.8	3.5	7.1	14.9	7.8	47.6	13.4
Total	100	100	100	100	100	100	100	100
2006								
Q1	12.6	31.4	56.9	34.4	16.5	33.2	6.5	14.4
Q2	21.0	22.6	18.8	25.9	24.5	14.2	9.7	21.7
Q3	22.9	18.1	8.8	19.3	21.2	19.3	15.0	23.9
Q4	20.9	14.8	9.1	12.7	21.8	20.6	23.3	24.9
Q5	22.6	13.1	6.4	7.7	16.1	12.8	45.5	15.0
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

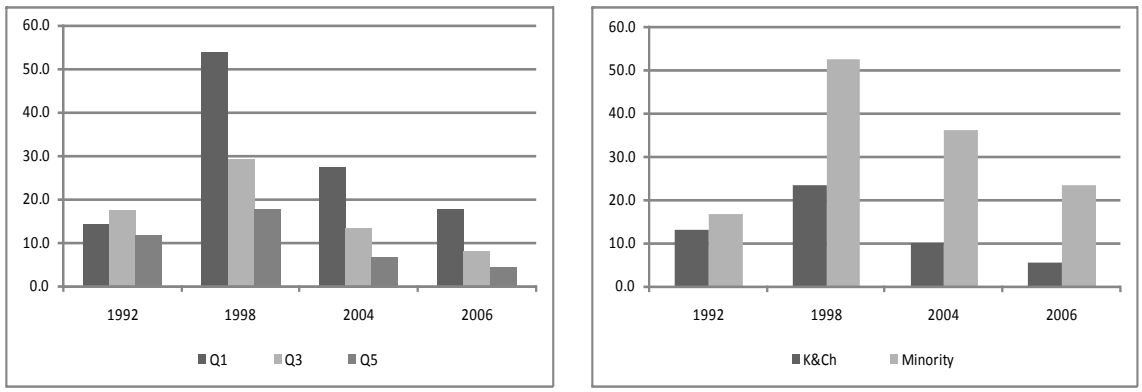
Source: Nores, 2008a.

Figure B1: Overage in lower secondary across income quintiles, ethnicity and years



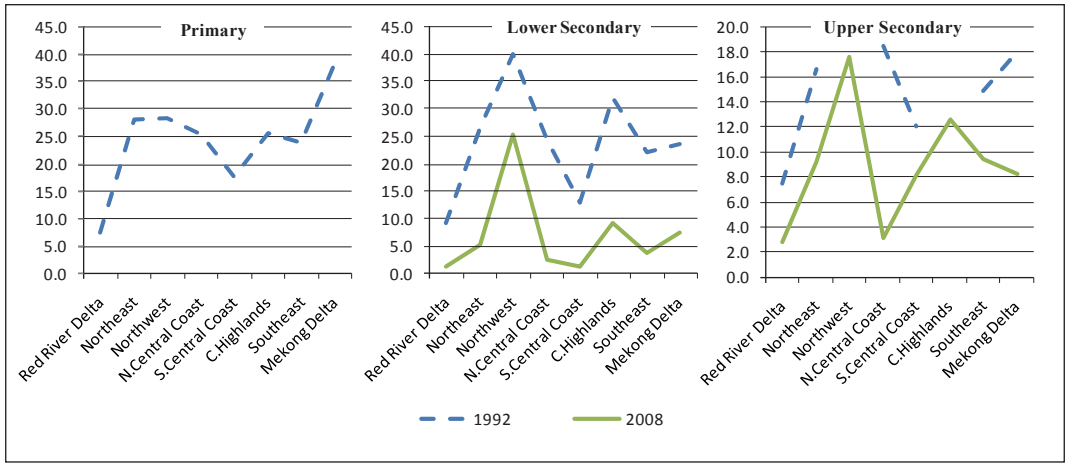
Source: Nores, 2008a.

Figure B2: Overage in upper secondary across income quintiles, ethnicity and years.



Source: Nores, 2008a.

Figure B3: Over-age rates across regions and years.



Source: Nores, 2008a.

Table B2: Completion rates by gender and ethnicity

	Primary					Lower Secondary					Upper Secondary				
	'92	'98	'04	'06	'08	'92	'98	'04	'06	'08	'92	'98	'04	'06	'08
Male															
Kinh & Chinese	45.6	47.2	89.1	87.8	92.4	26.9	31.1	67.9	74.9	75.3	13.5	15.8	39.4	46.5	52.9
Minority	10.0	16.1	53.1	68.7	74.3	5.6	1.6	35.9	44.0	51.2	3.6	3.9	9.5	16.6	16.6
Female															
Kinh & Chinese	52.1	55.4	89.0	91.4	91.5	28.2	31.8	71.1	78.3	85.0	12.7	15.1	38.2	52.3	59.4
Minority	16.9	27.7	59.8	67.2	81.5	4.7	11.5	35.0	46.9	53.6	2.0	1.1	19.1	21.5	26.8

Source: Nores, 2008a

Table B3: Completion rates by rural/urban location and ethnicity

	Primary					Lower Secondary					Upper Secondary				
	'92	'98	'04	'06	'08	'92	'98	'04	'06	'08	'92	'98	'04	'06	'08
Rural															
Kinh & Chinese	44.0	47.1	88.3	88.9	90.9	22.0	27.4	67.1	74.8	78.6	9.5	10.4	32.5	43.9	50.5
Minority	12.9	21.1	55.1	68.3	78.0	5.4	6.1	35.3	44.3	51.4	3.0	1.7	12.0	16.9	20.5
Urban															
Kinh & Chinese	69.2	71.2	91.5	92.2	94.7	48.3	46.2	76.9	81.8	84.0	25.1	31.0	57.5	64.6	70.4
Minority	28.6	41.1	75.8	58.9	81.4	-	-	-	60.1	66.7	-	-	-	41.9	33.8

Source: Nores, 2008a.

Table B4: Completion rates by income quintile[1] and ethnicity

	Primary				Lower Secondary			Upper Secondary		
	1992	1998	2004	2006	1998	2004	2006	1998	2004	2006
1st Quintile										
Kinh & Chinese	-	35.7	84.5	81.3	- 16.7	43.5	52.4	- 3.7	10.1	19.3
Minority	-	14.7	49.0	62.0	- 1.7	25.4	35.5	- 0.0	5.6	7.3
2nd Quintile										
Kinh & Chinese	-	44.5	85.9	89.8	- 19.2	64.0	73.1	- 1.5	22.8	36.9
Minority	-	26.9	63.1	71.3	- 9.4	48.0	49.4	- 0.0	16.2	24.7
3rd Quintile										
Kinh & Chinese	-	50.7	91.5	91.4	- 24.5	75.1	78.6	- 8.5	38.5	43.5
Minority	-	26.4	87.0	91.7	- 15.2	51.7	56.8	- 3.2	28.9	27.2

Source: Nores, 2008a.

1 Beyond the third income quintile, within minority, within quintile observations are too few and standard errors blow up in the estimations of cross-tabulations. Similarly, for 1992 observations are too few.

APPENDIX C: SUMMARY OF TEST EQUATING PROCEDURES, 2001-2007 GRADE 5 SURVEYS

Summary of Test Equating Procedures, 2001-2007 Grade 5 Surveys

This edited summary is taken from Griffin and Cuc's (2009) report. For more complete tables and analyses this report should be consulted.

Linking the reading tests

Tests were administered to students at grade 5 throughout Vietnam, measuring both reading comprehension and mathematics ability. The tests differed from 2001 to 2007. In the reading test, 12 items were repeated from 2001 to 2007. These 12 items were proposed as an anchor or link set for the equating exercise between the tests used in 2001 and 2007. The national report prepared by the National Institute for Educational Sciences (NIES) in Hanoi used the 12 items as anchor items in a common item equating exercise. The 12 items are referred to as link items.

In order to evaluate the link between 2001 and 2007 in the reading test a differential item function analysis was undertaken on the link items. Eight of the link items demonstrated a very large differential item function or evidence that they had behaved differently in the two surveys, possibly as a result of the changed curriculum. Regardless of the reason, the differential function was so great that these eight items had to be discarded as link items. This left four items only as suitable for equating purposes. The process of identifying the suitable link was detailed and rigorous and a separate report can be prepared on this issue.

Given the weakness of this link several approaches to the equating were undertaken in order to identify the best method of linking the two tests. A total of eight different approaches to the equating exercise were used in order to finalise the best and the most stable link set of items and their characteristics that would enable a comparison of 2001 and 2007 achievement data. Differences in difficulties greater than 0.3 logits are generally regarded as unsuitable for link items.

If the full 12 linked items had been used in equating the two tests, the errors associated with the linking would be extremely large. The average difference in the difficulty estimates of the 12 items when they were included in the equating set was calculated. The standard error of the link is calculated by computing the mean squared difference between the parameters. The square root of this is known as the standard error of the link or the *linking error*. When all 12 items were included in the link set of items, the linking error was 10.3 score points. Despite the fact that a small number of link items creates a more unstable link, the linking error of the four remaining link items (after the eight seriously differential items were removed) was reduced to 6.8 points. Consequently, equating the 2001 to 2007 reading tests used just the four stable items.

After selecting for link items, four approaches to estimating the link were undertaken:

1. The 2001 published difficulties of the 2001-2007 link items were used as an anchor set. This enabled the 2007 data to be uniformly calibrated using these anchor item difficulty value.
2. The 2007 link item set was transformed to have the same mean and standard deviation as in the 2001 data.
3. The 2007 link item set was shifted to have the same mean as in the 2001 data.1
4. The 2007 link item set was adjusted to have the same mean and standard deviation using regression..

The impact of the linking error can be illustrated when student scores, based on the transformed test estimates are calculated. Table C1 below illustrates these scores when the 12 link items were used. The mean scores vary between 518 and 542. It illustrates that there has been a considerable rise in reading comprehension level from 2001 to 2007. However it also illustrates that the amount of gain is difficult to calculate accurately. The table also illustrates the mean scores for reading when the four acceptable link items were used. A much more stable estimate was obtained. The mean reading achievement score now ranges between 522 and 525. Hence we can conclude that it is likely that reading comprehension has improved by approximately one quarter of a standard deviation over the period from 2001 to 2007.

Table C1. Student ability estimates using different methods for 12 link items and 4 link items

Number of link items	Methods of equating	Minimum	Maximum	Mean	Std. Deviation
12 link items	A1_anchor	29.93	861.99	523.66	98.66
	A2_Mean and SD	29.02	899.89	542.46	108.11
	A3_shift	33.84	855.06	518.77	97.24
	A4_reg	32.10	879.23	532.05	102.88
12 link items	A1_anchor	36.8	858.7	522.2	97.3
	A2_Mean and SD	34.24	866.09	525.4	99.4
	A3_shift	36.06	858.53	521.7	97.4
	A4_reg	34.92	863.17	523.9	98.6

Source: Griffin và Cúc, 2009.

In addition to the ability measures and the transformed school (the 500/100) score reported in the NIES report and discussed in the equating section above, other measures relating to educational outcomes were derived from the data. One measure that was not derived from the Vietnam report for 2007 study is referred to as the competency levels, and these relate directly to the definition of criterion referenced interpretation of tests. Glaser (1963) first defined criterion referenced interpretation in terms of the tasks to be performed. This definition lost the idea of multiple tasks that form a cohesive developmental continuum, and a misinterpretation of the concepts in the 1970s led to a distortion of the idea of criterion referencing. Glaser clarified criterion referenced interpretation as… *"the development of procedures whereby assessments of proficiency could be referred to stages along progressions of increasing competence."* (1981, p935).

The words "stages along progressions of increasing competence" are of great importance in test design, calibration and interpretation. However, criterion referencing is regarded now as a means of interpretation rather than as a means of test design. 'Criterion referenced interpretation' is the correct term, rather than 'criterion referenced testing'. It is also an excellent framework within which to use item response modelling. Combining the ideas of criterion referenced interpretation with item response modelling directly links the position of the person or an item on the variable. This also enables a direct interpretation of what people, or groups of pupils, can do, rather than focusing on a score or the performance relative to a percentage or a group. It also ends the use of the test data towards substantive interpretation of the measurement rather than reporting a score or grade. The procedure gives meaning to test scores. It is this application that is used here, and the substantive interpretation of the levels of increasing competence that is addressed now. The underlying constructs were hypothesised in the 2001 reading and mathematics surveys. They were documented in those reports. Several items were usually grouped together at different points along the unidimensional scale. An important question was whether these clusters of items

could be interpreted as having something in common, and something different to other clusters. Each item was reviewed for the skills involved in responding to the item and it was a matter of substantive interpretation. The process requires an understanding or empathy with how students think and their procedures when they are responding to test items. Experienced teachers are very good at this and those dealing with the Vietnamese language instruction, and who are accustomed to dealing with the marking scheme, were readily able to identify the levels within the test set for the 2001 study. In this instance, (2007 tests) a group of Vietnamese postgraduate education students at the University of Melbourne working with native speakers of Vietnamese language worked through the reading test items to identify the skills inherent in each of the items. The data analysis shows that items can be grouped according to different clusters with similar difficulty levels. Given that the ability of the pupils is matched to the difficulty of the items on the items and pupils are mapped onto the same scale, the pupils can also be grouped within the same "ability"/"difficulty" range as the items that have the similar difficulty levels. This grouping of items (and pupils) identifies a kind of "transition point", where an increase of item difficulty is associated with a change in the kind of cognitive skill required to achieve the correct answer.

When the ability and difficulty approximately equal the odds of success are approximately 50/50 it can be deduced that if the people were to improve a little, he or she would have a better than even (50/50) chance of succeeding items in this group. It could then be argued that the main task of the teacher is to increase the odds of success in each of these competency levels to a value greater than 50/50. If this improvement is close to the transition point, then the pupils will begin to exhibit ability associated with a change in the cognitive skill. The skill level demonstrated by the pupil was defined by the set of cognitive skills demanded by the group of items. Curriculum and teaching specialist panels appointed by the Ministry of Education and Training need to undertake such a content analysis of skills/competency in any test in order to identify the skills needed to complete successfully a test consisting of a cohesive set of items. It should lead to an understanding of the kinds of skills being demonstrated, or required, by pupils at each level on the continuum underpinning the pattern of item difficulty estimates. Moreover the odds of 50/50 at the transition point could be linked to a change in the required cognitive skill and this could be directly translated into an application for teaching. If the skill changes, this has an implication for a change in teaching and ought to lead to discussions with curriculum specialists. They need to identify the kind of instruction required to progress a pupil along the continuum of development and increasing competence. A summary of these skills can then be assigned to each item and pupil group. The first point (item grouping) is justified on statistical and conceptual grounds. If the items have behaved in a cohesive manner, that enables interpretation of the variable underpinning the test. This is sometimes described as a Rasch-like manner because it is also a requirement of the Rasch model analysis. The second point (labelling the skills) is based on a conceptual rather than on statistical grounds. If the items within a group do not suggest a meaningful and unifying set of skills of competencies, the set may need to be "adjusted" to make the interpretation more clear. That is, some items may need to be omitted because, despite statistically appropriate qualities, they may not be conceptually relevant to the underlying construct or to identifiable and comprehensible levels within a construct. This is a far more powerful reason for omitting items from a test that show misfit statistics or, in this case, a differential item function analysis. Under these circumstances, they might not belong in the test at all. These procedures can, at times, also identify gaps in a test item set. There is a further advantage to this procedure. If the content analysis *back translates* to match or closely approximate the original hypothesised construct as set out in the test blueprint used to design and construct the test, it can also be used as evidence of construct validity. In this case if the items *back translate* and construct a variable based on and underpinning the 2007 test that closely matches the construct underpinning the 2001 test, it can be argued that the two tests measure the

same construct and that the measurement of change and comparison of performances over the seven years is a valid and legitimate strategy. When this back translation procedure is linked to statistical evidence, such as the item separation index, there are two pieces of evidence for the construct validity of the test. The construction of levels is now becoming increasingly common in large scale testing studies, and levels of competence are commonly being used as the major focus of reporting achievement studies.

To assist in this procedure the logits values of the item difficulties were ordered according to increasing item difficulty. Each item was also analysed for the underpinning cognitive skill involved in obtaining the correct answer. The results of these analyses are presented and discussed in Griffin and Cuc (2009).

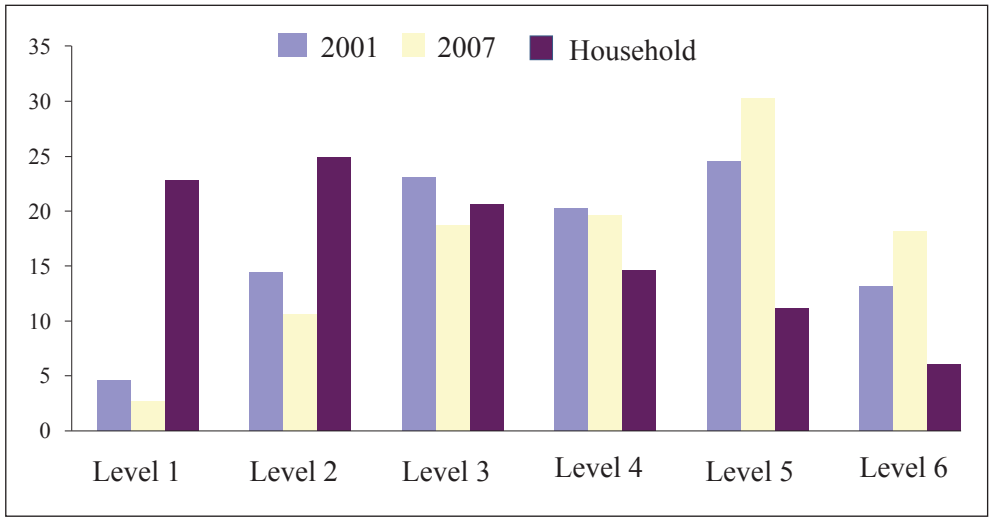
The difficulty estimates of the test items were also plotted in increasing order of difficulty and sets of items were examined to identify specific clusters of groupings. The two criteria described above were used. First, they had to be identifiable sets of items and these sets needed to have a common substantive interpretation of the underpinning skills. Grouping items on the difficulty continuum was the first step. The process demonstrated that the relative difficulty of anchor items had changed over the period of time between the two studies. The question then arose that if the difficulty altered within the anchor sets of items, did the nature of the underpinning skill also alter? The two sets of information were explored in unison. Natural breaks in item difficulty were identified among the items and cognitive descriptions examined to determine if a common substantive interpretation could be found. The panel of postgraduate Vietnamese students from the University of Melbourne undertook this exercise. Together they identified breaks in the variable and then offered substantive interpretation of the levels of competence. The similarity of the developmental continuum defined by the items was reassuring. The conclusion was that the tests were substantially measuring the same variable and that levels of competence would be similar.

Cut points in the 2007 data were then fixed at the same positions on the variable as those established in the 2001 test. This enabled a direct comparison of the distribution of students across the six levels of competence defined by the test of reading comprehension. The summary of the reading competency levels is presented in Figure C1. (also see Figure XX in the main body of the report) and the distribution over the three populations (2001 grade 5, 2007 grade 5, and 2007 Household survey data) is presented in Figure C2.

Figure C1: The reading competency levels

Level 1	Matches text at word or sentence level aided by pictures. Restricted to a limited range of vocabulary linked to pictures
Level 2	Locates text expressed in short repetitive sentences and can deal with text unaided by pictures. Type of text is limited to short sentences and phrases with repetitive patterns.
Level 3	Reads and understands longer passages. Can search backwards or forwards through text for information. Understands paraphrasing. Expanding vocabulary enables understanding of sentences with some complex structure.
Level 4	Links information from different parts of the text. Selects and connects text to derive and infer different possible meanings.
Level 5	Links inferences and identifies an author's intention from information stated in different ways, in different text types and in documents where the message is not explicit.
Level 6	Combines text with outside knowledge to infer various meanings, including hidden meanings. Identifies an author's purposes, attitudes, values, beliefs, motives, unstated assumptions and arguments.

Figure C2: Comparing reading competence levels from Years 2001, 2007 and household



Source: Griffin and Cuc, 2009.

It can be seen that there has been a uniform growth and development between 2005 and 2007 in the reading comprehension of Vietnamese students in grade 5. The shift was persistent across provinces. Reading levels in Vietnam are rising and school education is having an apparent profound effect on the improvement of reading achievement given the difference between the 2007 achievement levels and the overall household results.

Linking the mathematics tests

In equating the mathematics tests, a common sample of 700 students took both the 2001 test and the 2007 test approximately one week apart. The assumption was made that the ability of the students had not changed over that period. This essentially meant that the students took a single test that consisted of all of the items of the 2007 test combined with all of the items of the 2001 test. It enabled the items of the 2001 test to form an anchor set, fixed in difficulty according to published difficulty estimates in the 2001 study report. This anchor set of items was then used to adjust the difficulty parameters of the 2007 items onto the same scale as the 2001 test items. The adjusted set of item parameters for 2007 were then used to obtain the student ability parameter estimates, which were also directly comparable to the student values from the 2001 test. It meant that both students and items were compared directly on the same variable, regardless of whether they undertook the 2001 test or the 2007 test. It was a matter of indifference whether they were the 2001 sample of students or the 2007 sample of students.

Hence it was possible to directly compare the 2007 cohort with the 2001 grade 5 cohort of students on the 500/100 score scale. Because it was not possible to guarantee the accuracy of the data, which is an absolute requirement of equating, several examinations of the data had to be undertaken and a range of approaches to equating were explored. In all, eight different approaches were attempted:

1. The anchoring approaches used all published 2001 item parameters to calibrate 2001-2007 item parameters obtained in the mathematics test equating exercise, yielding what is now described as the 2008 test data. This would be the standard approach if data quality were to be assured. Only the published item difficulty estimates were used in order to be able to map the 2007 test questions on the same scale as that which was reported in 2001. This

enabled the pupil ability estimates also to be mapped on to exactly the same scale as were the student and teacher estimates in 2001, and direct comparisons can be made regarding student performances from 2001 to 2007.

2. In a second equating strategy, we used published 2001 item parameters (items that were identified as fitting the Rasch model over the 2001-2007 period) to calibrate 2001-2007 item parameters of the 2008 test data.
3. In a third approach, the 2001 item parameters of the 2008 cohort were transformed to the same mean and standard deviation as the items in the 2001 test data from the published item parameters. The 2007 test item parameters for 2008 cohort were transformed using the same algorithm. The 2001 test and the 2007 test parameters were calibrated and coded as P01_08 and P07_08 respectively. These were then transformed into the same scale (the same Mean and SD) of P01_01 using all 2001 items. The P07_08 items parameters were then transformed onto the same scale of the adjusted P01_01 (2001 test administered in 2001) to score the 60,000 students of the 2007 cohort.
4. With this fourth exploratory approach, the 2001 item parameters of the 2008 cohort (P01-08) were transformed into the same mean and standard deviation of the 2001 published item parameters. The 2007 item parameters of the 2008 cohort (P07_08) were then transformed using the same algorithm. One more step made this method different from method 3: the 2007 item parameters from the test administered to the 2007 (P07_07) cohort were transferred into the same scale with the same mean and SD of the transformed 2007 items administered to 2008 cohort (P07_08).
5. Given the problems of fit and differential item functioning, items that met the criterion less than 0.3 logits difference in difficulty across the two tests (the 2001 test administered in 2001 and 2001 test administered in 2008) were selected for anchor purposes. Step 1 was repeated with this reduced set.
6. The criteria for selecting items or the anchor set were tightened to reduce the effects of the differential item functioning.
7. The means and standard deviations in both the anchor and the target sets of items were made equivalent and the criteria for selecting the link items remained stringent.
8. Stringent differential item functioning conditions were also set in the selection of items. This was necessarily restricted to those items located on the identity line of the two administrations of the anchor set.

The most effective method was the last. A smaller but stable set of anchoring items could be identified that would produce consistent estimates of item difficulties for the 2007 test, and there was reduced misfit amongst the items in the 2007 test after the equating process. There was also greater stability of the person ability estimates when they were mapped onto the 2001 scale. The process of identifying an adequate and accurate set of items to enable direct comparisons of 2001 and 2007 data occupied a great deal of time. However the investment of time was both necessary and valuable because it enabled a consistent and reliable dependent variable of mathematics achievement to be developed for comparisons of 2001 and 2007. The estimates of the item parameters are illustrated in the table below for each of the eight methods.

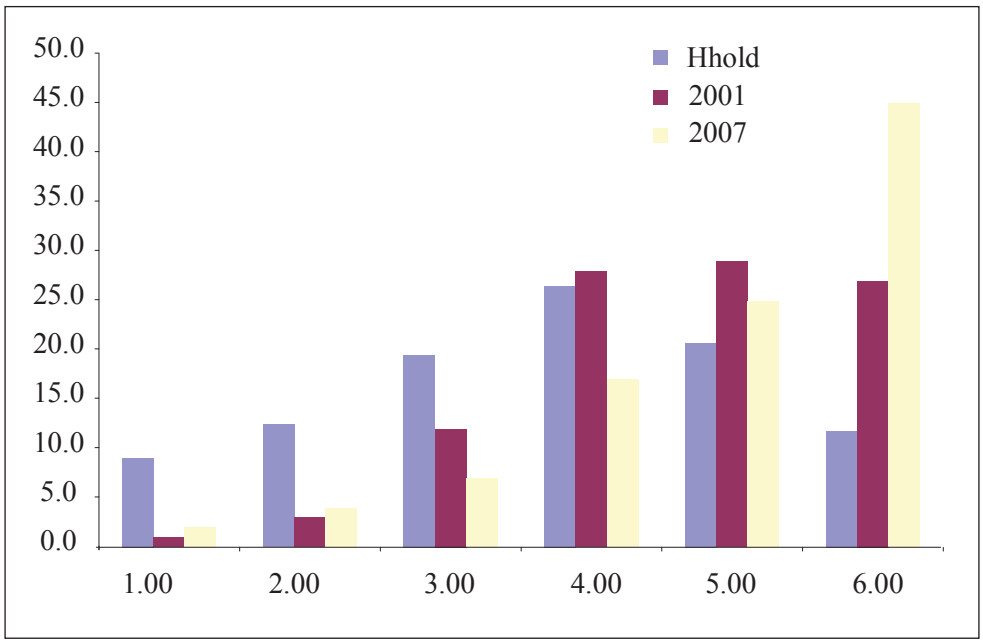
The stability offered by this approach gave more accurate estimates of difficulties for the 2007 test items mapped onto the 2001 scale. It also meant that it was possible to establish a stable estimate of the student achievement levels in mathematics on the 2007 test mapped directly

on to the 2001 scale. The mean of the 2007 cohort varied to a small extent across different methods but the mean achievement in mathematics was approximately 540 on the 500/100 score scale. This indicated that there was a large improvement in mathematics competence from 2001 to 2007. The difference was almost half a standard deviation. In international terms on such a 500/100 scale this could be interpreted as an improvement of just under one full year of education. This is a considerable change in performance in mathematics. Whether this is attributable to the changing curriculum, students with greater familiarity with multiple-choice testing or other factors is unable to be determined at this point. However the exercise in equating the tests has identified a considerable change in performance. The change is educationally important.

The same process of interpreting the nature of the change in student performance was undertaken as was undertaken for the reading test. Each of the items was reviewed by mathematics teachers and the underpinning skill demanded by each of the items was identified. The ordering of the underlying skills made it clear that here was an emerging or development competency framework underpinning the student performance. Levels of competence were formed by identifying the point at which the levels altered in nature and sophistication. In the case of the 2007 test however, it was necessary to do two things. The first was to make sure that the nature of the variable underpinning the tests had remained the same from 2001 to 2007. This was done by auditing the test items and ordering them in terms of difficulty and comparing the nature of the changing item descriptions as the skill demanded became more sophisticated. A comparison of the skills associated with each item between 2001 and 2007 according to item difficulty was then undertaken. Once this had been established, the second step was to establish the levels. It was necessary to compare the levels using the same equated difficulty estimates as were used for 2001. The cut points for the levels were therefore fixed according to the 2001 scale. This allowed the interpretation of the clusters and the competence levels to be directly compared between 2001 and 2007, despite the fact that completely different tests were used. That is to say that the 2007 test has now been mapped onto the 2001 competence levels. This enabled a direct comparison of the distribution of competencies of the two testing years. Figure C3 illustrates that there has been a significant and important growth in mathematics achievement from 2001 to 2007. It also illustrates the importance of the ceiling effect on the test administration. The 2007 test was relatively easy for the students and it was not possible to extend the top end of the scale based on the analysis of the teacher test items as was the case in 2001.

The equating procedure meant that all reading and all mathematics tests could be mapped onto the 2001 mathematics and reading scale. Once the underlying scale was determined the same cut scores for the competency levels could be identified for each of the three populations. The results of these calibrations are illustrated in Figure C3.

Figure C3: Comparison of the three populations in mathematics – all anchored on the 2001 scale



Source: Griffin and Cuc, 2009.

It can be seen in Figure 1.9 that Year 5 mathematics achievement levels have improved from 2001 to 2007. Moreover, there are more Year 5 students in the upper levels than there are in the household survey sample. It is for others to interpret this for the Vietnam adult or household population. Given that this analysis was undertaken without information on the household sampling, we report only the distribution.

In the national report on mathematics achievement the gain in mathematics performance by the student was reported to be only five points, or less than 1% of the mean score. But this was attributable to the equating procedure used in that analysis. It was based upon the idea of "parallel items" rather than on the relative difficulty and Rasch model equating. This in turn meant that the relative easiness of the 2007 test hid the gains made by the students and this is illustrated in the table below. Of perhaps more importance is the difference between the school population and the apparent gains made there, contrasted with the general population through the household analysis. Others will take the task of further analysis of the household study and its implications.

Finalising the test equating

The original equating method by VNIES based on "parallel items" lead to serious underestimates in the gains in mathematics. But this was caused by the lack of common items in the tests. The general principle of using common items to compare performance across times was not properly implemented by the test development team for the 2007 study. This in turn placed the NIES team in a difficult position and then there appeared to be inadequate supervision of the data. Similar deficiencies can be assumed for the 2007 data overall.

a. Data collectors appeared to have failed to check the instruments before leaving the school;

b. Data enterers were not adequately supervised in data entry and perhaps inappropriate data entry software was used. It is not sufficient to use spreadsheet programs as a data entry process. Checking procedures were inadequate;
c. Data checking was not undertaken against hard copies of the completed test instruments;
d. Kiểm tra mẫu không được thực hiện

These steps are critical and the impact of the data quality shortcomings and on the advice that can be given to government is immense. In some cases, and possibly in this study the data are flawed and hence so too may the advice be less than reliable. However, the complexity of the process of data cleaning, checking, imputing and then equating unstable tests accommodating large Differential Item Functions (DIF) and Item Parameter Drift (IPD) was problematic.

These caveats must be taken into account in the interpretation and the advice given based on the 2007 grade five survey data.

APPENDIX D: ADDITIONAL ACHIEVEMENT SUMMARY TABLES

Table D1: Percentages and sampling errors of pupils at different skill levels in reading by province and region

		Reading											
	Province	Level 1		Level 2		Level 3		Level 4		Level 5		Level 6	
		%	se	%	se	%	se	%	se	%	se	%	se
	Ha Noi	0.81	0.312	4.68	1.049	7.55	1.162	13.49	1.677	36.17	1.585	37.31	2.918
	Vinh Phuc	0.56	0.289	5.2	1.045	12	1.655	16.1	1.594	36.26	2.452	29.87	3.569
	Bac Ninh	0.58	0.331	2.52	0.597	6.62	0.99	12.45	1.474	34.07	2.367	43.76	3.503
	Ha Tay	1.78	0.611	7.1	1.387	16.58	1.551	16.82	1.331	35.97	2.155	21.76	2.578
	Hai Duong	0.19	0.135	3.06	0.726	9.46	1.301	14.02	1.324	32.59	1.927	40.68	3.188
	Hai Phong	1.06	0.389	4.67	1.008	9.24	1.353	20.5	2.222	35.95	2.255	28.58	3.419
	Hung Yen	0.89	0.294	5.8	0.818	14.98	1.685	17.55	1.616	37.04	1.9	23.74	2.708
	Thai Binh	0.48	0.247	4.02	0.604	16.32	1.293	21.36	1.419	39.38	1.718	18.44	1.885
	Ha Nam	1.47	0.477	7.25	1.302	12.84	1.595	20.33	1.874	35.71	2.535	22.4	3.245
	Nam Dinh	0.26	0.185	3.73	0.874	11.88	1.539	18.26	1.784	40.52	2.392	25.34	2.751
Red River Delta	Ninh Binh	0.67	0.288	5.69	0.956	11.79	1.742	16.94	1.617	34.24	2.518	30.67	3.167
	Ha Giang	12.23	1.959	26.13	2.868	24.22	1.892	16.44	1.938	15.85	2.087	5.13	1.695
	Cao Bang	4.93	0.834	17.5	1.793	28.64	1.86	21.59	1.766	22.62	2.587	4.71	1.156
	Bac Kan	4.6	0.86	20.94	2.146	24.11	1.773	18.3	1.417	23.89	2.257	8.16	1.548
	Tuyen Quang	3.36	1.003	6.57	1.419	13.97	2.098	17.95	2.113	30.77	2.513	27.38	3.731
	Lao Cai	6.92	1.713	17.71	2.451	23.6	2.312	18.7	1.931	22.56	2.455	10.51	2.674
	Yen Bai	4.42	1.281	13.09	1.869	20.95	1.854	22.04	1.824	26.52	2.519	13	2.378
	Thai Nguyen	4.44	1.304	8.84	1.429	15.91	1.748	20.53	1.795	29.02	2.289	21.27	2.808
	Lang Son	6.09	1.061	17.47	1.744	28.51	2.062	20.12	1.647	22.11	1.849	5.71	1.467
	Quang Ninh	1.35	0.39	6.29	0.99	12.83	1.558	19.38	1.608	30.12	1.992	30.02	3.198
	Bac Giang	2.82	0.812	11.36	1.853	17.57	1.825	21.51	1.71	31.46	2.081	15.28	2.474
Northeast	Phu Tho	0.78	0.323	4.36	0.99	9.28	1.474	14.97	1.694	31.13	2.204	39.47	4.149
	Dien Bien	9.19	2.164	20.52	3.008	20.44	2.687	14.99	2.089	20.31	2.828	14.56	3.402
	Lai Chau	6.96	1.601	18.75	2.706	23.17	2.541	21.17	2.421	22.7	3.07	7.26	2.109
	Son La	6.54	1.124	28.51	2.786	27.88	1.905	17.31	1.801	15.46	2.298	4.3	1.058
Northwest	Hoa Binh	4.07	0.968	15.6	1.994	22.5	2.208	19.35	1.48	25.31	2.611	13.17	2.352
	Thanh Hoa	2.01	0.485	8.8	1.481	21.25	1.904	20.29	1.744	31.15	1.975	16.5	2.338
	Nghe An	3.11	0.972	10.88	1.338	18.98	1.614	18.06	1.543	29.29	2.08	19.68	2.547
	Ha Tinh	0.45	0.218	4.18	0.949	11.01	1.377	17.22	1.673	34.45	2.323	32.69	3.721
	Quang Binh	2.37	0.705	7.11	1.43	10.78	1.394	18.87	1.636	35.46	2.31	25.4	2.953
	Quang Tri	1.09	0.417	6.61	1.079	14.51	1.419	21.45	1.665	34.6	1.901	21.73	2.975
North Central	Thua Thien Hue	2.09	0.55	9.53	1.185	21.32	1.769	20.62	1.552	28.85	1.857	17.58	2.362
	Da Nang	1.77	0.467	6.64	1.174	15.14	1.668	18.78	1.302	35.7	2.095	21.98	2.547
	Quang Nam	2.6	0.685	10.07	1.762	20.28	1.709	21.44	1.713	31.48	2.161	14.14	2.431
	Quang Ngai	5.89	1.628	15.97	1.91	21.01	1.791	20.98	1.556	25.91	1.914	10.24	1.829
	Binh Dinh	1.15	0.382	7.16	1.037	14.4	1.734	19.1	1.607	33.95	2.108	24.25	2.719
	Phu Yen	3.23	1.081	11.04	1.972	20.57	2.002	17.08	1.892	31.76	2.67	16.31	2.852
Central Coast	Khanh Hoa	2.88	0.943	12.33	2.069	18.73	2.176	17.59	1.903	30.04	2.39	18.42	3.49
	Kon Tum	4.4	0.85	20.74	2.472	22.55	2.043	15.83	1.63	24.9	2.377	11.57	2.034
	Gia Lai	5.03	0.989	15.43	1.745	18.26	1.68	21.32	1.653	25.34	2.146	14.63	2.68
	Dak Lak	3.09	1.062	12.93	1.83	23.46	2.02	21.16	1.574	26.35	2.308	13.01	2.442
Central Highland	Dak Nong	1.18	0.417	10.77	1.701	22.87	2.065	21.93	1.503	32.73	2.296	10.51	1.892
	Lam Dong	1.33	0.462	8.13	1.632	15.74	1.825	19.19	2.019	33.53	2.406	22.08	2.696
	Ninh Thuan	4.19	1.201	15.68	2.357	24.6	2.253	22.46	1.762	24.57	2.672	8.49	1.793
	Binh Thuan	1.9	0.455	12.93	1.372	26.43	1.624	25.99	1.467	25.19	1.722	7.56	1.356
	Binh Phuoc	3.06	0.755	11.28	1.496	28.38	2.061	24.94	1.669	25.3	1.744	7.05	1.344
	Tay Ninh	2.11	0.605	9.75	1.086	25.2	1.999	23.41	1.658	27.2	2.039	12.33	2.433
	Binh Duong	0.41	0.301	7.9	1.349	17.12	2.077	18.43	1.915	38.24	2.542	17.9	3.084
	Dong Nai	1.07	0.438	7.5	1.156	17.62	1.741	20.01	1.53	37.58	2.004	16.23	2.393
	Ba Ria Vung Tau	1.07	0.352	6.72	1.348	14.01	1.769	15.76	1.805	32.96	2.314	29.48	3.838
Southeast	Ho Chi Minh	0.83	0.376	3.05	0.832	10.64	1.62	14.55	1.829	42.05	1.809	28.87	2.712
	Long An	1.13	0.424	9.74	1.768	18.75	1.786	24.71	1.92	32.87	2.195	12.8	2.347
	Tien Giang	2.48	0.536	10.18	1.391	23.35	1.957	22.49	1.512	30.97	1.801	10.53	1.582
	Ben Tre	2	0.637	8.39	1.236	19.14	1.741	26.43	2.196	32.44	2.18	11.61	1.677
	Tra Vinh	4.86	0.863	22.51	2.498	25.12	1.843	22.16	2.083	16.97	1.858	8.38	2.223
	Vinh Long	3.52	0.93	16.24	1.715	23.9	1.811	22.16	1.413	26.31	2.073	7.88	1.511
	Dong Thap	1.8	0.448	10.3	1.437	23.33	2.053	26.01	1.543	29.25	2.391	9.32	2.128
	An Giang	4.37	0.768	17.59	2.007	25.69	1.749	22.87	1.747	23.63	2.151	5.84	1.115
	Kien Giang	4.04	0.656	17.94	1.9	29.18	2.057	20.91	1.638	21.67	2.267	6.25	1.377
	Can Tho	3.22	0.625	16.25	1.776	22.37	1.916	22.54	1.811	23.3	2.249	12.31	2.498
	Hau Giang	4.25	0.673	19.39	1.465	27.9	1.619	22.53	1.508	21.36	1.715	4.56	0.925
	Soc Trang	7.06	1.171	21.79	2.145	28.74	1.922	22.05	1.555	17.34	2.273	3.02	0.781
	Bac Lieu	3.17	0.685	20.46	1.44	30.41	1.481	23.07	1.249	17.52	1.481	5.37	1.11
Mekong Delta	Ca Mau	3.51	0.645	17.1	1.668	25.17	1.817	24.25	1.827	21.36	1.947	8.63	2.403
Vietnam		2.63	0.102	10.63	0.21	18.69	0.25	19.62	0.245	30.31	0.3	18.12	0.365

Source: Griffin and Cuc, 2009.

Table D2: Percentages and sampling errors of pupils at different skill levels in mathematics by province and region

		Mathematics											
	Province	Level 1		Level 2		Level 3		Level 4		Level 5		Level 6	
		%	se	%	se	%	se	%	se	%	se	%	se
	Ha Noi	0.14	0.14	0.54	0.32	2.17	0.71	7.04	1.29	18.32	1.76	71.80	3.21
	Vinh Phuc	0.11	0.11	1.88	0.48	2.44	0.63	10.19	1.64	22.48	2.02	62.89	3.37
	Bac Ninh	0.10	0.10	0.79	0.26	0.93	0.31	4.09	0.89	11.31	1.30	82.79	2.04
	Ha Tay	0.11	0.11	1.23	0.34	4.99	1.00	12.43	1.37	19.75	1.61	61.48	2.76
	Hai Duong	0.09	0.09	1.14	0.33	1.43	0.38	7.95	1.32	20.86	1.81	68.53	2.58
	Hai Phong	0.40	0.29	1.33	0.50	2.04	0.62	7.08	1.42	19.20	1.88	69.95	2.71
	Hung Yen	0.11	0.11	2.01	0.51	3.91	0.70	13.99	1.70	24.70	1.90	55.28	3.18
	Thai Binh	0.09	0.10	1.06	0.40	2.98	0.58	10.11	1.20	21.69	1.59	64.06	2.35
	Ha Nam	0.13	0.13	1.75	0.54	2.28	0.68	8.29	1.32	20.14	1.68	67.41	2.93
	Nam Dinh	0.40	0.23	1.06	0.44	2.25	0.59	9.14	1.38	21.52	2.01	65.64	2.86
Red River Delta	Ninh Binh	.	.	1.77	0.51	2.43	0.69	10.49	1.59	23.13	1.61	62.19	2.99
	Ha Giang	2.54	0.62	16.94	2.57	18.19	1.69	27.69	2.14	19.43	2.00	15.20	2.88
	Cao Bang	0.25	0.14	6.48	1.06	12.46	1.41	28.62	1.97	28.89	1.95	23.30	2.94
	Bac Kan	0.35	0.18	8.98	1.26	15.81	1.58	26.64	1.83	21.96	1.48	26.25	2.94
	Tuyen Quang	0.12	0.12	1.73	0.60	7.08	1.73	14.10	2.04	24.33	2.35	52.65	4.10
	Lao Cai	1.13	0.40	9.82	2.12	11.31	1.79	25.28	2.26	21.68	2.28	30.77	3.96
	Yen Bai	0.84	0.33	7.04	1.44	11.10	1.40	24.29	1.96	27.96	2.06	28.76	3.10
	Thai Nguyen	0.39	0.19	2.84	0.69	4.92	1.05	14.48	1.65	22.28	1.68	55.09	3.47
	Lang Son	1.07	0.30	8.65	1.24	15.46	1.58	30.94	2.03	25.08	1.65	18.80	2.34
	Quang Ninh	0.38	0.20	2.34	0.53	4.37	0.93	13.99	1.63	23.86	1.76	55.06	3.06
	Bac Giang	0.14	0.14	2.67	0.68	5.85	1.02	17.45	2.06	23.04	1.84	50.87	3.79
Northeast	Phu Tho	0.11	0.11	0.57	0.24	1.67	0.52	8.56	1.66	17.84	2.22	71.26	3.39
	Dien Bien	1.23	0.34	13.11	2.54	12.83	1.67	27.34	2.53	22.12	2.56	23.36	4.00
	Lai Chau	1.05	0.62	9.89	1.66	18.06	2.51	25.97	2.29	24.23	2.81	20.80	3.50
	Son La	1.29	0.46	14.93	1.93	20.54	1.93	27.54	2.13	20.70	2.27	15.01	2.65
Northwest	Hoa Binh	0.67	0.24	6.53	1.22	12.09	1.25	28.19	2.32	21.15	1.50	31.37	3.51
	Thanh Hoa	0.45	0.22	4.81	0.96	7.34	1.37	20.97	1.89	25.05	1.75	41.39	3.53
	Nghe An	0.33	0.16	4.48	0.98	6.21	0.98	17.41	1.70	21.63	1.67	49.94	3.07
	Ha Tinh	0.35	0.20	0.45	0.22	2.34	0.57	10.23	1.65	20.74	1.82	65.89	2.91
	Quang Binh	0.29	0.21	2.17	0.63	3.93	0.88	15.15	1.92	23.64	1.80	54.81	3.40
	Quang Tri	0.11	0.11	2.63	1.23	4.30	0.92	15.27	1.75	25.24	2.01	52.45	3.41
North Central	Thua Thien Hue	0.76	0.29	2.67	0.65	6.54	1.01	20.41	1.65	26.73	1.66	42.90	2.72
	Da Nang	0.41	0.23	1.92	0.56	3.71	0.88	13.91	1.62	25.19	2.51	54.86	3.31
	Quang Nam	.	.	3.20	0.85	7.39	1.27	22.88	2.11	25.61	2.05	40.91	3.11
	Quang Ngai	0.81	0.29	5.69	1.04	10.38	1.46	25.99	1.96	24.08	1.63	33.06	2.89
	Binh Dinh	.	.	1.77	0.61	4.65	0.97	16.12	1.73	28.16	1.84	49.30	3.12
	Phu Yen	0.53	0.26	5.26	1.53	7.19	1.36	20.36	2.17	23.38	2.11	43.28	3.92
Central Coast	Khanh Hoa	0.28	0.28	3.84	1.46	5.32	1.27	16.76	2.17	24.55	2.29	49.25	4.08
	Kon Tum	0.62	0.28	7.41	1.12	13.24	1.48	25.51	2.13	25.97	1.93	27.25	3.11
	Gia Lai	0.50	0.21	4.90	0.95	9.78	1.36	25.28	1.95	25.12	1.81	34.43	3.41
	Dak Lak	0.45	0.22	6.58	1.61	9.90	1.50	24.16	2.20	23.84	1.67	35.07	3.50
Central Highlanc	Dak Nong	0.36	0.20	2.73	0.85	7.68	1.26	22.97	1.97	31.22	2.18	35.04	3.47
	Lam Dong	0.33	0.19	2.57	0.58	6.38	1.29	19.02	2.19	22.05	1.74	49.65	3.69
	Ninh Thuan	0.27	0.19	5.74	1.85	9.69	1.22	28.05	2.20	31.85	2.38	24.40	2.87
	Binh Thuan	0.67	0.35	2.79	0.60	6.44	1.01	23.68	1.98	35.01	1.82	31.41	2.39
	Binh Phuoc	0.41	0.23	3.90	0.72	7.72	1.19	27.12	2.00	29.60	1.99	31.25	2.75
	Tay Ninh	.	.	2.42	0.60	6.99	1.10	21.37	2.38	29.27	2.44	39.95	3.93
	Binh Duong	0.13	0.13	1.21	0.41	4.02	0.79	19.45	2.26	29.43	1.84	45.75	3.42
	Dong Nai	0.54	0.32	1.07	0.40	4.21	0.92	19.07	1.99	29.44	2.08	45.68	3.48
	Ba Ria Vung Tau	0.26	0.19	1.46	0.47	2.44	0.64	10.50	1.77	22.36	2.16	62.98	3.95
Southeast	Ho Chi Minh	.	.	0.54	0.33	2.95	0.79	8.14	1.42	20.14	2.08	68.23	3.12
	Long An	0.13	0.13	3.49	0.76	5.44	0.95	20.75	2.19	28.96	1.88	41.23	3.40
	Tien Giang	0.11	0.11	2.34	0.63	5.12	1.01	21.13	1.94	29.86	1.75	41.45	3.06
	Ben Tre	.	.	2.18	0.60	3.81	0.74	18.15	2.12	32.52	2.10	43.34	3.21
	Tra Vinh	0.23	0.16	6.88	1.02	13.32	1.72	29.46	2.10	24.21	1.82	25.90	2.82
	Vinh Long	0.68	0.31	3.23	0.75	9.19	1.16	25.08	1.82	29.16	1.80	32.65	2.69
	Dong Thap	0.11	0.11	3.01	0.65	7.45	1.13	24.24	2.08	30.58	2.23	34.61	3.11
	An Giang	0.57	0.30	6.44	1.36	12.00	1.36	29.56	2.17	25.70	1.97	25.73	3.01
	Kien Giang	0.19	0.13	6.84	1.11	17.90	1.78	32.02	2.13	20.53	1.54	22.52	2.99
	Can Tho	0.33	0.19	5.42	1.13	10.29	1.40	22.89	2.01	27.17	1.88	33.90	3.37
	Hau Giang	0.39	0.19	7.95	1.01	16.94	1.40	33.87	1.62	24.19	1.72	16.66	1.89
	Soc Trang	0.50	0.22	8.85	1.26	14.30	1.59	32.88	1.96	25.70	1.92	17.77	2.39
	Bac Lieu	0.47	0.19	10.06	1.10	20.50	1.67	30.46	1.36	22.64	1.64	15.88	1.88
Mekong Delta	Ca Mau	0.29	0.17	4.27	0.77	14.75	1.68	31.82	2.18	24.55	1.91	24.32	3.15
Vietnam		0.36	0.03	3.84	0.13	7.23	0.16	18.99	0.26	24.08	0.27	45.49	0.46

Source: Griffin and Cuc, 2009.

Table D3: Percentages and sampling errors of pupils at different skill levels in reading by region and school location

		Reading											
		Level 1		Level 2		Level 3		Level 4		Level 5		Level 6	
Region	Location	%	se	%	se	%	se	%	se	%	se	%	se
	Isolated	1.5	1.02	5.5	2.65	12.6	4.09	17.9	3.3	37.9	6.06	24.6	7.33
	Rural	0.9	0.15	5.4	0.41	13.6	0.55	18.3	0.6	36.5	0.79	25.3	0.99
	Urban	0.6	0.22	3.2	0.56	6.4	0.73	12.7	1.09	36	1.28	41.1	2.1
Redriver Delta	Total	0.8	0.12	4.9	0.34	11.8	0.46	16.9	0.52	36.4	0.67	29.3	0.94
	Isolated	7.8	0.76	19.9	1.08	25.4	1.01	19.6	0.94	19.6	1.05	7.8	1.05
	Rural	2.8	0.4	9.7	0.81	17.2	0.87	20.9	0.84	31	1.05	18.4	1.4
	Urban	1.6	0.48	4.6	0.6	8.6	0.89	13.4	1.11	31.1	1.65	40.7	2.62
Northeast	Total	4.5	0.35	12.7	0.57	18.9	0.58	19.2	0.56	26.7	0.7	17.9	0.9
	Isolated	8.5	1.02	26.8	1.84	25.6	1.45	18	1.33	14.6	1.35	6.5	1.23
	Rural	2.8	0.68	15.1	2.58	24.4	2.28	18.2	1.64	28	3.12	11.6	2.29
	Urban	2.7	1.43	11.2	3.93	15.3	3.74	15.5	2.69	35.3	5.28	20	3.14
Northwest	Total	6.5	0.72	22.5	1.46	24.4	1.16	17.8	1	19.8	1.36	8.9	1.04
	Isolated	4.9	1.37	12.2	1.72	22.4	1.92	23.6	1.79	25	2.14	11.9	2.57
	Rural	1.6	0.29	8.7	0.8	18.2	1.01	19.5	0.95	33.2	1.17	18.8	1.33
	Urban	0.6	0.29	3.5	0.66	10.5	1.37	11.9	1.63	30.8	2.57	42.7	3.2
North Central	Total	2.1	0.33	8.6	0.64	17.9	0.81	19.2	0.78	31.3	0.96	20.8	1.22
	Isolated	9.2	2.15	23.8	3.16	24.7	2.87	13.9	1.89	17.4	2.68	10.9	2.81
	Rural	2.3	0.43	10.1	0.8	19.3	0.97	20.7	0.96	31.1	1.15	16.4	1.53
	Urban	1.3	0.29	5.4	0.67	13.1	1.17	19	1.19	38.2	1.49	23	1.94
Central Coast	Total	2.9	0.4	10.6	0.7	18.3	0.77	19.4	0.71	31.3	0.92	17.5	1.12
	Isolated	3.6	0.64	18	1.56	24.7	1.4	21.3	1.43	22.7	1.52	9.8	1.85
	Rural	3.1	1.05	11.8	1.5	21.3	1.77	20.8	1.3	28.9	2.09	14	2.03
	Urban	2.2	0.83	6.3	1.16	12.4	1.63	18.5	1.74	35.9	2.46	24.6	2.69
Central Highlands	Total	3.1	0.48	13	0.91	20.5	0.97	20.4	0.85	28.1	1.16	15	1.28
	Isolated	2.1	0.47	10.6	1.02	24.7	1.97	22.2	1.22	29.3	1.77	11.2	2.43
	Rural	2.2	0.38	10.7	0.98	22.4	1.3	21.1	1.25	30.6	1.55	13.1	1.71
	Urban	0.8	0.26	4.4	0.64	12.2	1.07	16.8	1.32	39.7	1.31	26.3	1.9
Southeast	Total	1.4	0.19	7.4	0.46	17.6	0.76	19.1	0.78	35	0.84	19.5	1.16
	Isolated	4.8	0.41	19.3	0.92	28.1	0.87	23.4	0.8	19.6	0.98	4.8	0.56
	Rural	3	0.27	14.8	0.77	24.2	0.82	23.8	0.79	26	0.88	8.2	0.72
	Urban	2	0.35	10.2	1.02	20	1.28	21.8	1.08	31.6	1.56	14.4	1.54
Mekong delta	Total	3.5	0.2	15.6	0.52	24.8	0.54	23.3	0.5	24.7	0.62	8.2	0.49
	Isolated	5.3	0.29	18.1	0.53	25.5	0.53	21.3	0.45	21.5	0.57	8.3	0.58
	Rural	2	0.12	9.6	0.29	18.6	0.35	20.3	0.33	31.9	0.42	17.6	0.49
	Urban	1.2	0.14	5.4	0.32	12.1	0.48	16.6	0.56	35.9	0.64	28.8	0.91
Vietnam	Total	2.6	0.1	10.6	0.21	18.7	0.25	19.6	0.24	30.3	0.3	18.1	0.37

Source: Griffin and Cuc, 2009.

Table D4: Percentages and sampling errors of pupils at different skill levels in reading by region and school location

Region	Location	mathemathics											
		Level 1		Level 2		Level 3		Level 4		Level 5		Level 6	
		%	se	%	se	%	se	%	se	%	se	%	se
	Isolated	1.1	1.11	0.9	0.66	2.8	1.64	5.5	2.37	16.3	2.43	73.5	4.51
	Rural	0.2	0.06	1.5	0.17	3	0.27	10.3	0.54	21.8	0.66	63.1	1.07
	Urban	0	0.05	0.4	0.14	1.6	0.48	6.2	0.79	15.6	1.14	76.1	1.8
Redriver Delta	Total	0.2	0.05	1.2	0.13	2.7	0.23	9.2	0.44	20.1	0.57	66.6	0.93
	Isolated	1.3	0.19	10.2	0.86	14.7	0.82	26.8	1.06	23.7	0.96	23.4	1.63
	Rural	0.3	0.12	3.4	0.43	5.8	0.5	17.3	0.91	23.8	0.98	49.3	1.71
	Urban	0.2	0.1	1.6	0.35	4	0.72	11	1.29	18.7	1.32	64.6	2.67
Northeast	Total	0.7	0.09	5.7	0.39	8.9	0.4	19.9	0.62	23	0.62	41.9	1.08
	Isolated	1.5	0.33	15	1.39	18.6	1.21	29.5	1.52	21.4	1.64	14	1.71
	Rural	0.5	0.21	6.8	1.56	13.5	1.98	25.5	2.28	21.9	1.87	31.9	3.68
	Urban	.	.	3	1.55	10	4.28	17.2	4.23	21.7	3.64	48.1	7.81
Northwest	Total	1.1	0.23	11.9	1.04	16.6	0.99	27.5	1.22	21.6	1.21	21.4	1.69
	Isolated	0.7	0.28	8.7	1.66	8.7	1.35	22.9	2.18	30	2.28	29	3.66
	Rural	0.3	0.1	2.6	0.38	5.8	0.67	17.7	1.01	22.7	0.92	50.8	1.73
	Urban	0.6	0.33	0.7	0.39	1.6	0.43	9.6	1.34	19	1.69	68.5	2.5
North Central	Total	0.4	0.09	3.5	0.43	5.8	0.54	17.6	0.84	23.6	0.81	49.1	1.54
	Isolated	1.3	0.49	10.6	2.46	15.8	2.42	26	2.6	18.3	2.43	28	4.26
	Rural	0.1	0.06	2.9	0.37	6.1	0.58	21.4	1.12	26.8	1.08	42.8	1.82
	Urban	0.2	0.11	1.8	0.52	3.5	0.55	13	1.25	25.7	1.55	55.8	2.22
Central Coast	Total	0.3	0.08	3.5	0.42	6.6	0.51	19.7	0.83	25.4	0.84	44.4	1.4
	Isolated	0.7	0.2	6.6	1.14	12.6	1.24	28.3	1.57	25.1	1.48	26.8	2.26
	Rural	0.2	0.14	4.5	0.96	8.9	1.11	24.5	2	26.2	1.51	35.7	3.12
	Urban	0.4	0.21	3.2	1.43	4.2	1.05	13.7	1.64	21.8	1.57	56.8	3.31
Central Highland	Total	0.4	0.11	5.1	0.67	9.2	0.72	23.3	1.08	24.6	0.88	37.3	1.78
	Isolated	0.2	0.14	2.7	0.47	6.1	0.9	22.7	1.7	31.5	1.82	36.7	2.57
	Rural	0.5	0.22	2.5	0.46	6.2	0.66	21.2	1.39	32.1	1.58	37.6	2.68
	Urban	0.1	0.07	0.9	0.25	3.2	0.56	11.1	1.12	21.2	1.36	63.5	2.19
Southeast	Total	0.2	0.08	1.7	0.2	4.6	0.38	16.3	0.74	26.3	0.93	50.9	1.42
	Isolated	0.4	0.12	7.2	0.62	15	0.74	30.3	0.94	25.6	0.92	21.5	1.27
	Rural	0.3	0.08	4.7	0.39	10.4	0.63	26.8	0.98	27.5	0.86	30.3	1.34
	Urban	0.1	0.05	3	0.4	6.4	0.69	21.5	1.3	26.6	1.2	42.4	2.19
Mekong delta	Total	0.3	0.06	5.3	0.29	11.3	0.4	27	0.6	26.6	0.55	29.5	0.87
	Isolated	0.8	0.08	8	0.39	13	0.41	27	0.56	25.5	0.56	25.7	0.85
	Rural	0.3	0.04	2.9	0.14	6.2	0.22	18.4	0.38	24.8	0.36	47.3	0.65
	Urban	0.2	0.04	1.5	0.17	3.5	0.26	12.2	0.51	21.2	0.59	61.4	1
Vietnam	Total	0.4	0.03	3.8	0.13	7.2	0.16	19	0.26	24.1	0.27	45.5	0.45

Source:Griffin and Cuc, 2009.

Table D5: Percentages of pupils in different functionality levels in mathematics and reading in 2007

Region	Reading						Mathematics					
	pre-funtional		funtional		Independent		pre-funtional		funtional		Independent	
	%	Se	%	Se	%	Se	%	Se	%	Se	%	Se
Red River Delta	2.6	0.28	20	0.65	77.4	0.77	1.1	0.13	3.7	0.29	95.1	0.34
Northeast	9.6	0.58	33.6	0.83	56.8	1.04	5.4	0.4	11.7	0.48	82.9	0.71
Northwest	16.8	1.45	43.8	1.62	39.4	2.06	11.2	0.99	21	1.14	67.8	1.8
North Central	5.3	0.57	30.6	1.13	64	1.34	3.3	0.41	7.9	0.65	88.8	0.9
Central cosast	6.9	0.69	31.3	1.1	61.8	1.37	3.2	0.38	9.1	0.66	87.6	0.89
Central Highland	7.5	0.7	36.8	1.46	55.8	1.79	4.5	0.64	12.3	0.87	83.2	1.28
Southeast	3.9	0.33	28.9	1.06	67.2	1.18	1.5	0.2	6.4	0.47	92.1	0.54
Mekong delta	8.7	0.4	44.2	0.73	47.1	0.87	4.4	0.26	15.4	0.5	80.2	0.64
Vietnam	6.5	0.18	32.5	0.35	61	0.42	3.5	0.12	9.8	0.2	86.7	0.27

Source:Griffin and Cuc, 2009.

Table D6: Percentages and sampling errors of pupils at different functionality levels in reading by region and province

		Reading						Mathematics					
		pre-funtional		funtional		Independent		pre-funtional		funtional		Independent	
Region	Province	%	Se	%	Se	%	Se	%	Se	%	Se	%	Se
	Ha Noi	2	0.64	15.1	1.95	82.9	2.23	0.7	0.34	3.2	1.01	96.1	1.18
	Vinh Phuc	2.6	0.59	20	2.46	77.5	2.75	1.8	0.47	3.5	0.79	94.7	1.07
	Bac Ninh	2	0.61	11.8	1.64	86.2	1.9	0.5	0.22	1.4	0.38	98.1	0.46
	Ha Tay	4.9	1.47	25.6	2	69.5	2.65	1	0.31	5.9	1.07	93.1	1.21
	Hai Duong	1	0.37	15.3	1.84	83.6	1.98	0.6	0.29	2.7	0.53	96.6	0.62
	Hai Phong	3	0.85	18.5	2.13	78.5	2.57	1.7	0.56	3	0.8	95.3	1.09
	Hung Yen	2.9	0.58	23.7	2.21	73.4	2.41	1.7	0.49	6.3	1.06	92.1	1.27
	Thai Binh	2.1	0.42	25.5	1.58	72.4	1.7	1	0.42	3.7	0.68	95.2	0.74
	Ha Nam	3.9	0.81	23.9	2.54	72.2	2.91	1.5	0.52	3	0.79	95.6	1.1
	Nam Dinh	1.6	0.56	20.4	2.05	78	2.36	1.3	0.53	3.2	0.82	95.5	0.93
Red River Delta	Ninh Binh	2.1	0.55	20.7	2.59	77.1	2.73	1.3	0.43	4.2	0.94	94.5	1.05
	Ha Giang	23.7	2.85	45.3	2.52	31	3.52	17	2.76	24.5	2	58.4	3.66
	Cao Bang	12.2	1.75	47.7	2.34	40.1	3.27	5.2	0.92	16.9	1.81	77.9	2.34
	Bac Kan	12.5	1.68	42.5	2.41	45	3.23	7.6	1.09	20.7	1.89	71.6	2.63
	Tuyen Quang	6.4	1.79	23.7	3	69.9	3.76	1.3	0.5	8.4	2.02	90.3	2.3
	Lao Cai	15	3.18	41.4	3.17	43.6	4.06	9.6	2.19	13.8	2	76.6	3.62
	Yen Bai	9.8	2.09	36.4	2.86	53.7	3.64	7.1	1.49	14.2	1.75	78.7	2.69
	Thai Nguyen	8.2	1.9	29	2.53	62.7	3.09	2.6	0.57	6.7	1.28	90.7	1.66
	Lang Son	11.7	1.67	48.8	2.47	39.5	3.02	8.5	1.2	20.5	1.83	71.1	2.51
	Quang Ninh	3	0.64	23.6	2.37	73.4	2.63	2.4	0.54	6.1	1.13	91.5	1.41
	Bac Giang	7.1	1.6	32.2	2.68	60.7	3.43	2.1	0.61	8.2	1.34	89.6	1.61
Northeast	Phu Tho	2.5	0.67	16.6	2.21	81	2.52	0.6	0.24	2.2	0.61	97.2	0.72
	Dien Bien	19.8	3.71	36.4	3.64	43.8	4.86	12.6	2.42	17.4	2.17	70	3.96
	Lai Chau	15.5	2.92	40.4	3.48	44.1	4.41	9.7	1.84	22	2.88	68.3	3.98
	Son La	19.9	2.61	50.8	2.71	29.3	3.37	13.7	1.84	25.4	2.12	60.9	3.36
Northwest	Hoa Binh	9.6	1.65	39.6	3.09	50.8	3.82	6.3	1.13	16	1.62	77.6	2.23
	Thanh Hoa	5.2	0.97	35.3	2.66	59.5	3.1	4.1	0.87	10.1	1.65	85.8	2.15
	Nghe An	7.2	1.54	32.9	2.19	59.9	2.65	4.4	0.99	8.5	1.19	87	1.88
	Ha Tinh	2	0.54	19.2	2.22	78.8	2.44	0.8	0.37	2.9	0.66	96.3	0.84
	Quang Binh	5.3	1.2	22.1	2.2	72.6	2.82	1.8	0.66	6.4	1.18	91.8	1.61
	Quang Tri												
North Central	Thua Thien Hue	5.1						0.91		34.8		2.18	
	Da Nang	4.4						1		25.2		2.34	
	Quang Nam	6.1						1.27		34.8		2.39	
	Quang Ngai	12.7						2.61		36.4		2.24	
	Binh Dinh	2.9						0.62		26.7		2.58	
	Phu Yen	7.9						1.9		32.7		2.85	
Central Coast	Khanh Hoa	9.2						1.96		30.1		3.24	
	Kon Tum	12.4						1.89		42		2.8	
	Gia Lai	11						1.64		37.1		2.58	
	Dak Lak	6.7						1.37		40.5		2.98	
Central Highlanc	Dak Nong	4.0						0.83		39.4		2.79	
	Lam Dong	4.1						1.01		26.6		2.89	
	Ninh Thuan	11						2.43		42.3		2.83	
	Binh Thuan	6						1.01		43.9		2.13	
	Binh Phuoc	6.5						1.11		44.2		2.47	
	Tay Ninh	5						0.9		41.3		2.69	
	Binh Duong	2.7						0.66		29.1		2.89	
	Dong Nai	3.1						0.83		30.8		2.72	
	Ba Ria Vung Tau	3.8						0.75		22.9		2.6	
Southeast	Ho Chi Minh	2						0.55		16.7		2.23	
	Long An	4.8						1.15		34.2		2.52	
	Tien Giang	6.5						0.89		39.4		2.62	
	Ben Tre	4.7						1.07		34.3		2.12	
	Tra Vinh	13.0						2		47.5		2.53	
	Vinh Long	9.7						1.73		42.8		2.32	
	Dong Thap	4.5						0.9		41.6		2.76	
	An Giang	11.2						1.75		45.7		2.41	
	Kien Giang	8.5						1.19		50.9		2.75	
	Can Tho	8.9						1.33		41.1		2.78	
	Hau Giang	11.7						1.26		49		1.98	
	Soc Trang	15.1						1.79		51.3		2.31	
	Bac Lieu	9.0						1.25		53.9		2.04	
Mekong Delta	Ca Mau	7.9						0.99		46.3		2.4	
Vietnam		6.5						0.18		32.5		0.35	

Source: Griffin and Cuc, 2009.

APPENDIX E: ADDITIONAL ANALYSES FROM NORES (2008C)

Additional Analyses From Nores (2008c)

This section provides a summary of the multilevel nested analyses of the distribution of school quality completed by Nores (2008c).

Estimation methods

Rho or the Intraclass Correlation is a measure of homogeneity among units (regions, provinces or communes). When analyzing resources using rho, we are looking at whether differences in resources are fundamentally resources between communes or within communes, or any unit of analyses preferred (provinces, regions). Because we are looking at resources at the school level (rather than the student level) we do not inquire into what occurs within schools versus between schools (we do not have information at the student level to inquire into within school differences). The intraclass correlation measures the homogeneity of the different measures of resources at the primary level at different levels in the Vietnam educational system. By understanding where inequalities reside to potentially address disparities.

As a population attribute, the intraclass correlation offers a measure of equity, or disparity, of learning opportunity (Foy, 2004)[2]. Systems with low intraclass correlation have achieved higher equity of the resource at the level measured. That is, all communes have similar levels of a resource on a given year. On the other hand, systems with high intraclass correlations demonstrate disparities of learning opportunity as measured through disparities in resources. Depending on the resources and the disparities, and how do these evolve over time, inequities may be increasing or decreasing. The Intraclass Correlation is a simple case of variance decomposition that provides us with a means to explain where differences in resources are most prominent (which resources) and whether these are defined by regional differences and inequalities, or across lower levels of governments.

Additionally, nested models are a more complex form of variance decomposition (mixed models or multi-level anovas) that take into account the "nesting" of schools within communes, communes within provinces and provinces within regions. This type of variance decomposition is analogous to estimations of rho, as the percentage of variance in the resources due to each of these additional level of government can be estimated interdependently.

Multilevel analysis of variance

We analyzed nested models to decompose variance into the amount of variance between schools within communes, between communes within provinces, between provinces within regions and between regions. The methodology is analogous to estimations of rho, although we used mixed models estimations and estimate variances in a 'nested' model..

For example, the fraction explained by Between-commune variance would be estimated as:

2 Foy, P. (2004) P25: Intraclass Correlation and Variance Components as Population Attributes and Measures of Sampling Efficiency in Pirls 2001. Hamburg, Germany: IEA Data Processing Center.

$$\frac{\sigma^2_{com}}{\sigma^2_{schools} + \sigma^2_{com} + \sigma^2_{prov} + \sigma^2_{reg} + \sigma^2_{res}},$$

where $\sigma^2_{schools}$ is the between-school within commune variance,

σ^2_{com} is the between-communes within province variance,

σ^2_{prov} is the between provinces within regions variance,

σ^2_{reg} is the between-region variance and

σ^2_{res} is the residual/unexplained variance.

The total variance is the sums of these four variance components, and each variance component is a percentage of such sums of variances.

The following sections summarize the results from the multilevel variance decomposition using the same variable categories that are included in the main text (see Chapter 4).

Complete and satellite availability

Table E1 and Figure E1 present estimates of variance components for nested models of satellites and complete schools. The main source of variance in term of the number of satellites schools have is between communes (41 percent), with between-school within commune variance explaining 17 percent, between-province within region variance 19 percent, and between-region variation another 19 percent. On the other hand, distance between a main site and its satellite varies strongly between-regions, between communes, and between schools within communes.

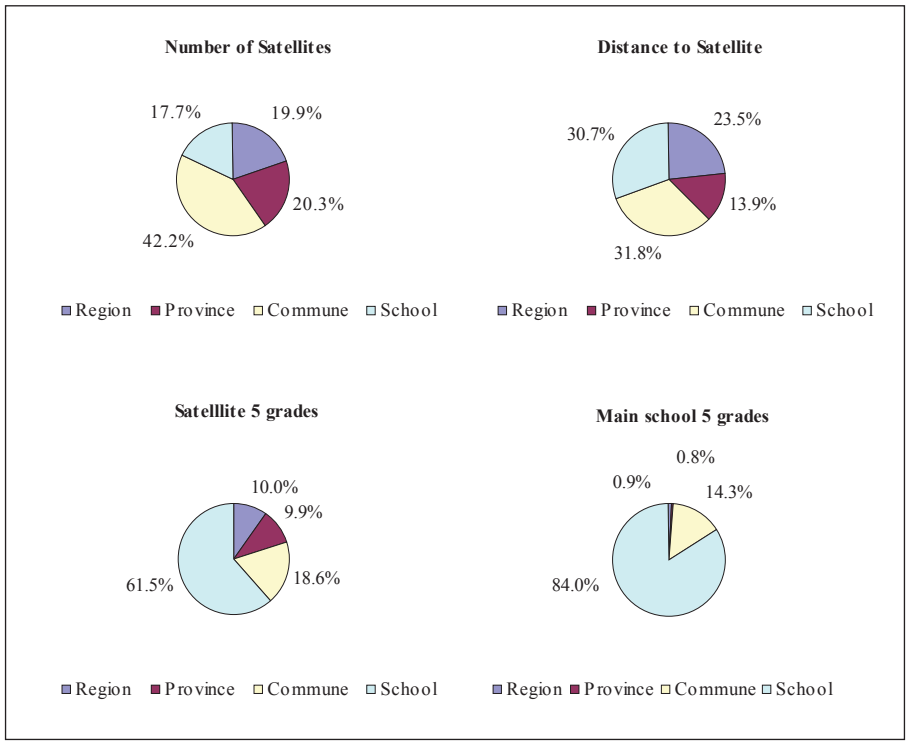
Unlike the use of satellites to increase supply, the availability of complete versus incomplete satellites is predominantly explained by within-commune across school variation (around 60 percent) and slight by between-commune variation (20 percent).

Table E1: Variance Decomposition by Government level for Satellites and Distance

%	Variance Components			
	Region	**Province**	**Commune**	**School**
Number of Satellites	19.2	19.5	40.7	17.0
Distance to Satellite	22.5	13.3	30.4	29.4
% Car to satellite	16.1	14.5	24.6	40.0
% Bike to satellite	7.1	4.9	21.5	60.7
% Walk to satellite	4.9	7.4	23.4	64.3
% Oth. to satellite	13.3	10.0	20.4	51.2
Satellite 5 grades	10.0	9.9	18.6	61.5
Satellite incomplete	10.0	9.9	19.8	54.9
Main school 5 grades	0.8	0.8	13.5	79.2

Note: Region, Province, Commune and School levels do not add to 100 percent because of unexplained variance (residuals) which is not reported.

Figure E1: Variance Decomposition by Government level for Satellites and Distance.

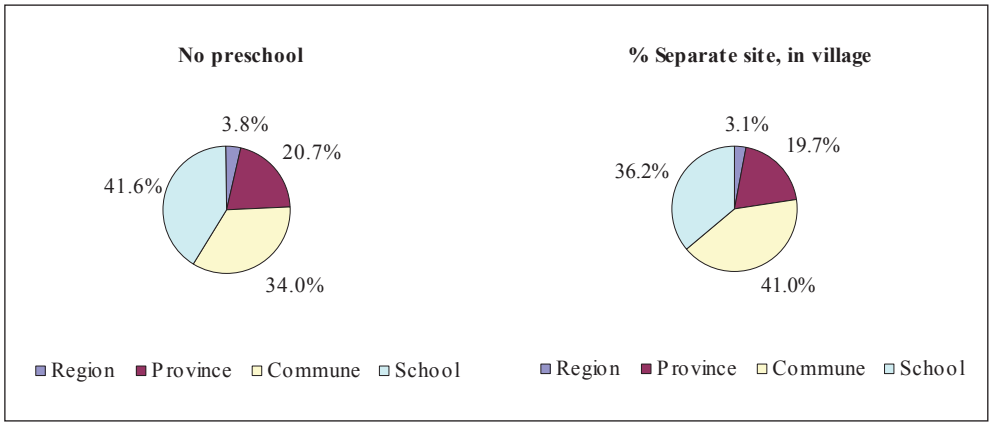


Source: Nores, 2008c.

b) Preschools

Preschool availability (illustrated in Figure E2) variance is mostly explained by between-school within commune variance explaining (42 percent) and between-commune within province variance (34 percent). Regional differences only account for 4 percent of the variance in the availability of preschools (either at the main site or at a separate site). Among sites that actually evidence preschools, the percentage of schools (main and satellites) that have their preschools evidence similar variation patterns. In short, most inequality in terms of preschool availability is accounted for by school and communes within provinces and within regions (over 75 percent).

Figure E2: Variance Decomposition by Government level for Preschool Availability



Source: Nores, 2008c.

c) Parental Contributions

Parental contributions evidence some interest patterns in the nested models (Table E2 & Figure E3). Full-time equivalent total contribution variance is comprised largely (64 percent) by between school, within commune differences, and between-commune variance explains a remainder 21 percent. This is consistent with the single-level analyses that showed between commune variance explained 35 percent (therefore leaving a 65 percent to within-commune, across schools). Again, tuition measured as the average tuition of the institution (the main site and its satellites) indicates a larger variance of between-commune, within province variation.

Total variance in exemptions by poverty status show is equally explained by between-commune, within-province variance and by between-schools, within-communes (around 35 percent). For FTE exemptions, variation across communes and across province account for a larger percentage of the total variance in exemptions. Therefore, inequalities in the use of this policy occur within regions across provinces (23 percent), within provinces across communes (34 percent) and even within communes (36 percent). Whether this reflects inequality or good targeting depends on how these match needs.

Lastly, total optional contributions show the highest levels of within-commune, across schools disparities (74 percent). Yet variation in average optional contributions (averaged across the main school and its satellites) are only explained 25 percent by variation between-schools within-communes, and 48 percent by variation between communes, within provinces. This also substantiates what was observed with one-level analyses; that is, that satellites are likely to reduce variance in optional contributions within-communes likely by reducing the importance of the optional contribution. This would only occur if parents in satellites are bringing down the average (that is, satellites are serving lower income parents on average than the main site).

Table E2: Variance Decomposition by Government level for Tuition Contributions and Exemptions

%	Variance Components			
	Region	**Province**	**Commune**	**School**
Full Time Equivalent				
Total	0.2	8.4	21.1	64.3
Average	6.4	22.7	19.7	51.1
Tot. Exempted poor	11.3	13.0	34.3	36.1
Avge. Exempted poor	5.3	34.5	22.2	38.0
Tot., optional	0.0	2.0	17.9	73.9
Avge., optional	1.9	19.5	48.1	25.4

Note: Region, Province, Commune and School levels do not add to 100 percent because of unexplained variance (residuals) which is not reported.

Source: Nores, 2008c.

Table E3 and Figure E3 display parental contributions for construction, insurance and the school's education fund. Again, average indicators evidence lower between-school, within commune variance explaining overall variance in parental contributions across all types of contributions, indicating satellites tend to contribute lower resources on average than the main site (correspondingly serving parents with a lower capacity to contribute). The percentage of

variance in parental contributions explained by variation between-communes, within-provinces is 18 percent for construction contributions, 23 percent for insurance contributions, and 24 percent for education fund contributions. The percentage explained by between-school, within-commune variation is 70 percent, 67 percent and 62 percent, correspondingly. Exemptions variation tends to follow a slightly different pattern. With total exemptions due to poverty being explained at a lower rate by between-school variation. Optional contributions to the educational fund, both average and particularly total, are very highly explained by within commune, across school differences.

Table E3: Variance Decomposition by Government level for Other Parental Contributions and Exemptions

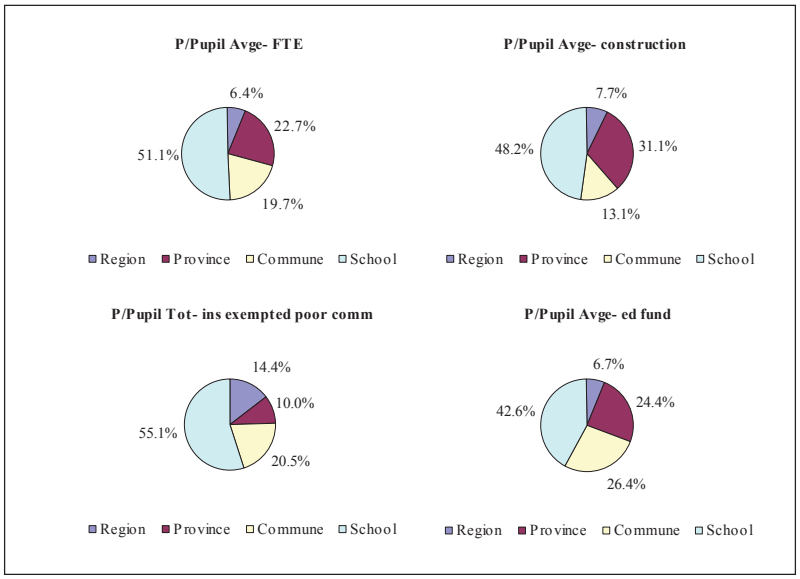
%	Variance Components			
	Region	**Province**	**Commune**	**School**
Construction				
Total	2.9	2.9	17.8	70.4
Average	7.4	29.8	12.6	46.3
Tot. Exempted poor	0.1	23.6	29.6	41.3
Avge. Exempted poor	9.2	48.6	25.4	16.8
Tot., optional*	-	-	-	-
Avge., optional	1.2	55.1	35.9	5.3
Insurance				
Total	1.0	2.8	22.5	67.4
Average*	-	-	-	-
Tot. Exempted poor	0.0	1.0	29.2	63.1
Avge. Exempted poor	41.6	40.9	13.3	3.2
Tot., Exempted poor community	13.7	9.5	19.4	52.2
Avge., Exempted poor community	38.5	9.8	11.6	40.1
Education Fund				
Total	1.2	6.7	23.6	62.3
Average	6.3	23.2	25.1	40.6
Tot. Exempted poor	2.0	15.8	24.4	52.0
Avge. Exempted poor	5.2	20.8	29.8	44.2
Tot., optional	0.0	0.0	3.8	91.9
Avge., optional	0.6	2.3	8.0	85.3

Note: Region, Province, Commune and School levels do not add to 100 percent because of unexplained variance (residuals) which is not reported.

(*) Model did not converge.

Source: Nores, 2008c.

Figure E3: Variance Decomposition by Government level for Parental Contributions.



Source: Nores, 2008c.

Infrastructure

Unlike parental contributions, infrastructure resources evidence different patterns of variation. Table E4 and Figure E4 show variance decomposition patterns for different infrastructure indicators in a nested configuration. Overall variation in access to basic infrastructure (drink water, toilets and health box) is partially accounted for by regional variation (11-14 percent), by provincial variation within regions (10-13 percent), by between-commune variation within provinces (19-27 percent) and mostly by between-school within-commune variation (47-58 percent).

Differences in learning infrastructure are on the other hand, explained less by regional variation and more by between-school, within commune differences. Average indicators again behave differently, decreasing the component of variation due to lower institutional levels and increasing that which is due to higher institutional differences. This again gives support to the idea that satellites have lower indicators (in this case infrastructure) than the main site, satisfying demand likely at a lower quality than if full new sites were actually built.

Table E4: Variance Decomposition by Government level for Infrastructure.

%	Variance Components			
	Region	**Province**	**Commune**	**School**
Basic Infrastructure				
% drinkwater	14.2	12.4	23.9	49.5
% toilet shared for pupils*	-	-	-	-
% toilet for boys	14.5	10.3	19.9	55.4
% toilets for girls	14.4	10.7	19.5	55.5
% toilets for teachers	11.0	13.2	18.7	57.1
% healthbox	14.2	12.2	26.7	46.9
Learning Infrastructure				
Avge class room area	13.1	8.6	12.9	60.6

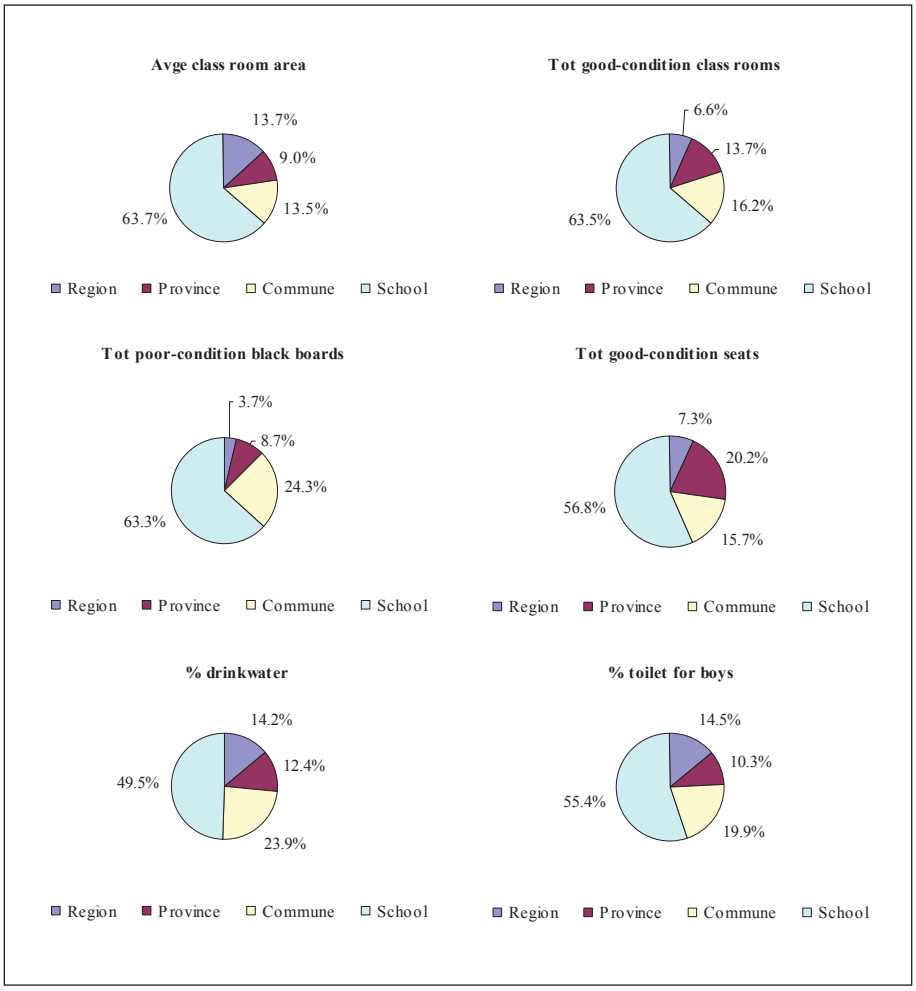
Tot good-condition class rooms	6.3	13.0	15.3	60.2
Tot poor-condition class rooms	4.6	12.9	20.1	56.8
% having library*	-	-	-	-
% having laboratory*	-	-	-	-
Tot good-condition seats	7.3	20.2	15.7	56.8
Tot poor-condition seats	9.4	11.9	16.9	56.6
Avge % of poor-condition seats	12.3	17.4	16.9	53.4
Tot number of seats	5.9	17.4	17.6	53.8
Tot good-condition black boards*	-	-	-	-
Tot poor-condition black boards	3.4	8.2	22.9	59.5
Avge % of poor-condition BBs	3.7	7.4	18.4	64.7
Tot number of black boards	5.9	17.4	17.6	53.8

Note: Region, Province, Commune and School levels do not add to 100 percent because of unexplained variance (residuals) which is not reported.

(*) Model did not converge.

Source: Nores, 2008c.

Figure E4: Variance Decomposition by Government level for Infrastructure.



Source: Nores, 2008c.

Head and Teacher Education and Training

Head and teacher characteristics evidence some particular patterns (reported in Table E5 and Figure E5). For starters, variance in head education level and head training level was estimated as mostly unexplained variance, quite unlike the rest of the nested models estimated (74 and 70 percent, correspondingly)[3]. On the other hand, teacher qualifications evidence a larger percentage of between-region disparities than previous indicators; 37 percent and 33 percent for teachers with lower or higher secondary educational attainment, 22 percent for teachers with a pedagogical college degree, and the opposite for the distribution of teachers with 9 years of formal education and 3 years of incomplete vocational training. Variance in the latter is explained mostly by variation in between-school within-communes. It is difficult to interpret such variation. A possible explanation could be that there is a lot of variation in the availability of teachers with completed levels of education across regions (e.g. urban versus rural areas), yet those with incomplete levels of secondary education and primary are more readily available and then allocation of these are sorted within communes depending on school resources (salaries).

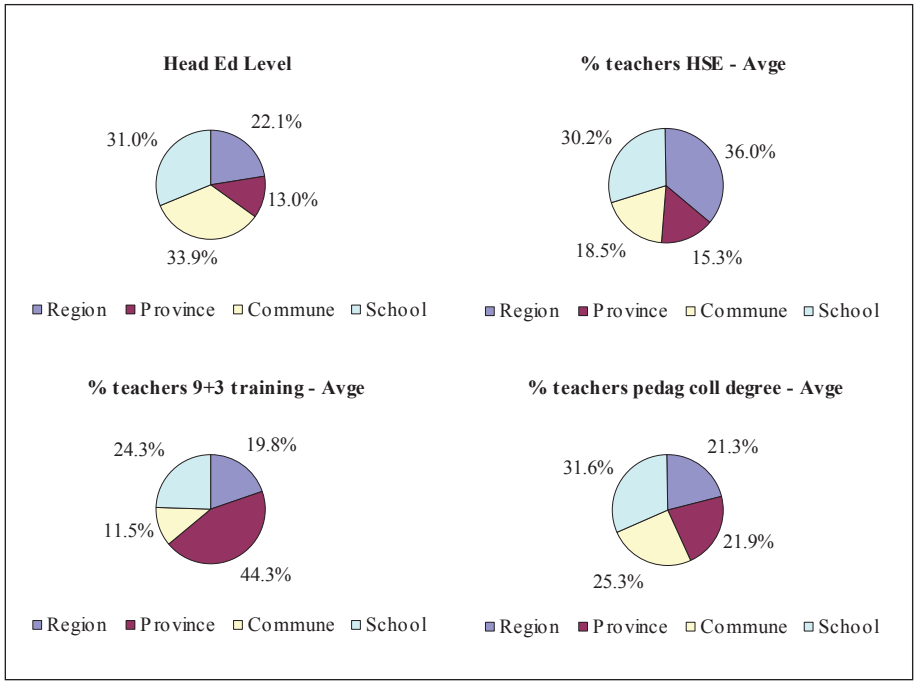
Table E5: Variance Decomposition by Government level for Head and Teacher Qualifications.

%	Variance Components			
	Region	**Province**	**Commune**	**School**
School Head				
Head Ed Level	5.7	3.4	8.8	8.0
Head Training Lev.	1.5	9.0	7.6	12.1
Teacher Education and Training, Percent Average				
Primary	0.5	2.8	26.1	64.1
LSE	37.4	16.9	16.7	25.8
HSE	33.4	15.2	17.8	29.9
9+3 training inc	4.8	5.0	14.4	75.8
12+2 training	0.7	43.9	22.4	28.9
Pedag coll degree	21.8	22.7	25.2	30.3
Pedag univ	0.1	33.6	23.8	37.7
Other training	0.8	3.3	21.8	67.8

Note: Region, Province, Commune and School levels do not add to 100 percent because of unexplained variance (residuals) which is not reported.
Source: Nores, 2008c.

3 Không được thể hiện trong các bảng.

Figure E5: Variance Decomposition by Government level for Head and Teacher Qualifications.



Source: Nores, 2008c.

APPENDIX F: ADDITIONAL TABLES FROM NORES' (2009A) ANALYSIS OF LIQUIDITY CONSTRAINTS

Table F1: Descriptive Statistics

Variables	Aged 11-15		Aged 15-18	
	Has Primary	In LSE	Has LSE	In USE
Dependent Variable (y_t)	0.71	0.69	0.62	0.51
	0.45	0.46	0.48	0.50
Income ($y_{t=1}$)				
P/capita log hh expendit 2004	7.30	7.34	7.45	7.53
	0.81	0.82	0.81	0.78
P/capita log hh expendit 2006	9.93	9.96	10.06	10.13
	0.52	0.53	0.53	0.52
Household Human and Physical Capital ($y_{t=1}$)				
Ed Att hh Primary (highest by adult)	0.27	0.24	0.17	0.14
	0.44	0.43	0.37	0.35
Ed Att hh LSec (highest by adult)	0.34	0.35	0.34	0.32
	0.47	0.48	0.47	0.47
Ed Att hh USec (highest by adult)+	0.29	0.33	0.44	0.51
	0.45	0.47	0.50	0.50
Log price house value	11.13	11.20	11.33	11.45
	0.95	0.95	0.93	0.95
Log value durables	7.22	7.31	7.49	7.65
	1.13	1.11	1.04	0.97
Opp. Cost measured by District Wealth ($y_{t=1}$)				
Log district wealth 2004	10.08	10.09	10.09	10.11
	0.28	0.27	0.27	0.27
Log district wealth 2006	7.54	7.56	7.55	7.58
	0.53	0.53	0.53	0.53
Background				
Age	12.76	12.95	16.28	16.43
	1.21	1.23	1.02	1.01
Female	0.51	0.51	0.47	0.49
	0.50	0.50	0.50	0.50
Minority	0.20	0.18	0.15	0.12
	0.40	0.38	0.36	0.33
Number of children in Household	5.13	5.05	4.96	4.85
	1.55	1.50	1.46	1.35
Rural	0.80	0.79	0.78	0.74
	0.40	0.41	0.42	0.44

Regions ($y_{t=1}$)				
Red River Delta	0.17	0.18	0.23	0.25
	0.38	0.39	0.42	0.43
Northeast	0.16	0.16	0.16	0.16
	0.37	0.37	0.37	0.36
Northwest	0.05	0.04	0.04	0.03
	0.22	0.20	0.19	0.18
North Central Coast	0.15	0.15	0.15	0.15
	0.36	0.36	0.35	0.36
South Central Coast	0.10	0.11	0.12	0.11
	0.31	0.31	0.32	0.32
Central Highlands	0.10	0.10	0.07	0.07
	0.30	0.30	0.26	0.26
Southeast	0.14	0.13	0.13	0.13
	0.34	0.34	0.33	0.33
Observations ($y_t = 1$)	3,094	3,015	2,312	1,897

Note: Standard errors reported below means.

Source: Nores, 2009a.

Table F2: Model for primary attainment and lower secondary enrollment: Full Sample

Variables	**Model I - Base**		**Model II - Dist. Wealth**		**Model III – Durables**	
	Has Primary	**In LSE**	**Has Primary**	**In LSE**	**Has Primary**	**In LSE**
P/capita log hh expendit 2004	0.025		-0.030		-0.083	
	(0.073)		(0.098)		(0.093)	
P/capita log hh expendit 2006		0.091***		0.096***		0.006
		(0.030)		(0.028)		(0.031)
Ed Att hh Primary	0.015	0.139***	0.017	0.137***	-0.003	0.097**
	(0.064)	(0.047)	(0.062)	(0.048)	(0.068)	(0.040)
Ed Att hh LSec	-0.079*	0.241***	-0.074*	0.239***	-0.126**	0.165***
	(0.042)	(0.050)	(0.042)	(0.049)	(0.059)	(0.037)
Ed Att hh USec+	-0.452***	0.041	-0.444***	0.040	-0.492***	-0.047
	(0.086)	(0.073)	(0.088)	(0.072)	(0.101)	(0.059)
Log price house value					0.053	0.114***
					(0.057)	(0.032)
Log value durables					0.084***	0.116***
					(0.023)	(0.030)
Log district wealth 2004			0.160		0.186*	
			(0.109)		(0.107)	
Log district wealth 2006				-0.022		-0.006
				(0.027)		(0.033)

Age	-0.384***	-0.165***	-0.385***	-0.165***	-0.405***	-0.176***
	(0.062)	(0.039)	(0.062)	(0.039)	(0.060)	(0.039)
Female	0.007	0.076***	0.008	0.076***	0.007	0.076***
	(0.024)	(0.024)	(0.024)	(0.024)	(0.028)	(0.028)
Minority	-0.335***	-0.317**	-0.337***	-0.318**	-0.244***	-0.215
	(0.091)	(0.141)	(0.091)	(0.142)	(0.088)	(0.147)
Hhchildren	-0.009	-0.048***	-0.018	-0.047**	-0.021	-0.058***
	(0.017)	(0.018)	(0.015)	(0.019)	(0.014)	(0.019)
Rural	-0.003	0.001	0.013	-0.022	0.124**	0.136
	(0.072)	(0.043)	(0.069)	(0.107)	(0.056)	(0.150)
Commune Poverty Rate	-0.209**	-0.194*	-0.163**	-0.196*	-0.171**	-0.149
	(0.103)	(0.106)	(0.079)	(0.106)	(0.077)	(0.106)
Observations	4352	4352	4352	4352	4281	4281

Note: Controls for Regional Price Index and regions. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Nores, 2009a.

Table F3: Model for upper secondary enrollment and lower secondary attainment: Full Sample

Variables	**Model I - Base**		**Model II - Dist. Wealth**		**Model III - Durables**	
	Has LSE	**In USE**	**Has LSE**	**In USE**	**Has LSE**	**In USE**
P/capita log hh expendit 2004	0.053		0.197***		0.096	
	(0.047)		(0.072)		(0.076)	
P/capita log hh expendit 2006		0.132***		0.172***		0.041
		(0.025)		(0.034)		(0.031)
Ed Att hh Primary	0.147*	0.325***	0.131	0.322***	0.072	0.239**
	(0.087)	(0.101)	(0.089)	(0.106)	(0.090)	(0.093)
Ed Att hh LSec	0.632***	0.723***	0.620***	0.719***	0.533***	0.584***
	(0.098)	(0.134)	(0.101)	(0.139)	(0.113)	(0.130)
Ed Att hh USec+	0.651***	0.998***	0.629***	0.990***	0.502***	0.802***
	(0.057)	(0.110)	(0.060)	(0.115)	(0.089)	(0.121)
Log price house value					0.094	0.135**
					(0.061)	(0.065)
Log value durables					0.108***	0.204***
					(0.018)	(0.023)
Log district wealth 2004			-0.384***		-0.347**	
			(0.127)		(0.137)	
Log district wealth 2006				-0.127		-0.113
				(0.094)		(0.084)

Age	-0.261***	-0.021	-0.263***	-0.022	-0.277***	-0.030
	(0.075)	(0.044)	(0.076)	(0.044)	(0.074)	(0.044)
Female	0.037	0.132***	0.035	0.131***	0.029	0.133***
	(0.047)	(0.041)	(0.046)	(0.041)	(0.043)	(0.039)
Minority	-0.209	-0.226*	-0.209	-0.235*	-0.119	-0.101
	(0.149)	(0.126)	(0.149)	(0.125)	(0.140)	(0.117)
Hhchildren	-0.067***	-0.105***	-0.043*	-0.100***	-0.058**	-0.122***
	(0.024)	(0.020)	(0.026)	(0.019)	(0.025)	(0.019)
Rural	0.027	-0.110	-0.012	-0.141	0.131	0.012
	(0.101)	(0.077)	(0.108)	(0.111)	(0.113)	(0.113)
Commune Poverty Rate	-0.092*	-0.391***	-0.201***	-0.399***	-0.152***	-0.303**
	(0.051)	(0.140)	(0.065)	(0.142)	(0.056)	(0.135)
Observations	3709	3709	3709	3709	3651	3651

Note: Controls for Regional Price Index and regions. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Nores, 2009a.

APPENDIX G: FULL TABLES FOR SCHOOL ATTENDANCE ANALYSES

Table G1: Determinants of Primary School Completion for Children Age 7-13, Vietnam, 2006. (Dang, 2009)

Table 2: Determinants of Primary School Completion for Children Age 7- 13, Vietnam 2006												
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Individual & household characteristics												
Age	17.366***	-0.723	11.998**	11.096**	6.903	7.359	8.445	8.578	9.321	9.678	9.447	9.974
	(3.976)	(18.945)	(5.428)	(5.379)	(5.664)	(5.917)	(6.095)	(6.161)	(6.645)	(6.710)	(6.696)	(6.666)
Age squared	-0.690***	0.106	-0.445*	-0.408*	-0.234	-0.255	-0.299	-0.304	-0.334	-0.349	-0.339	-0.360
	(0.166)	(0.804)	(0.229)	(0.227)	(0.239)	(0.249)	(0.256)	(0.259)	(0.280)	(0.282)	(0.282)	(0.281)
Female	0.250*	0.202	0.258	0.298*	0.040	-0.033	-0.023	-0.043	-0.050	-0.045	-0.036	0.008
	(0.135)	(0.475)	(0.165)	(0.162)	(0.201)	(0.204)	(0.208)	(0.208)	(0.214)	(0.217)	(0.219)	(0.225)
Ethnic minority	-0.491**	0.564	-0.557*	-0.699**	-0.399	-0.312	0.039	-0.004	-0.018	-0.046	-0.018	-0.037
	(0.249)	(1.085)	(0.318)	(0.313)	(0.313)	(0.329)	(0.345)	(0.354)	(0.356)	(0.361)	(0.364)	(0.365)
Log of pc. Expenditure	0.948***	1.630***	0.677***	0.708***	0.889***	0.856***	0.784***	0.823***	0.797***	0.825***	0.804***	0.810***
	(0.202)	(0.620)	(0.243)	(0.235)	(0.273)	(0.275)	(0.280)	(0.273)	(0.277)	(0.277)	(0.277)	(0.276)
No of children age 0-18	-0.110*	0.012	-0.127*	-0.126*	-0.136	-0.135	-0.107	-0.100	-0.106	-0.118	-0.126	-0.123
	(0.066)	(0.298)	(0.071)	(0.071)	(0.085)	(0.087)	(0.088)	(0.088)	(0.092)	(0.094)	(0.094)	(0.092)
Urban	-0.219	1.677	-0.093	-0.057	-0.166	-1.004	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	(0.236)	(1.429)	(0.288)	(0.279)	(0.830)	(0.857)						
Parents' yrs of schooling	0.209***	0.159	0.177***	0.184***	0.180***	0.170***	0.162***	0.148***	0.158***	0.149***	0.151***	0.152***
	(0.026)	(0.120)	(0.032)	(0.030)	(0.037)	(0.038)	(0.038)	(0.038)	(0.041)	(0.041)	(0.041)	(0.042)
Reading test score		1.348***										
		(0.423)										
Math test score		-0.731*										
		(0.392)										
GPA score			0.344**									
			(0.152)									
Education subsidy				0.002	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.001
				(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Scholarship				0.005	0.015*	0.016*	0.016*	0.018**	0.017**	0.018**	0.018**	0.017**
				(0.006)	(0.008)	(0.008)	(0.009)	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)
VHLSS school characteristics												
% female teachers					-0.014**	-0.017***	-0.019***	-0.022***	-0.026***	-0.026***	-0.026***	-0.027***
					(0.007)	(0.006)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
Principal management exp.					0.017	0.014	0.008	0.008	0.009	0.008	0.007	0.008
					(0.014)	(0.015)	(0.015)	(0.015)	(0.015)	(0.016)	(0.016)	(0.017)
School offers extra classes					0.403	0.216	0.184	0.136	0.102	0.035	0.033	0.087
					(0.255)	(0.273)	(0.279)	(0.284)	(0.288)	(0.293)	(0.296)	(0.309)
Number of daily shifts						-0.518**	-0.571**	-0.517*	-0.531*	-0.518*	-0.548*	-0.546*
						(0.264)	(0.280)	(0.274)	(0.292)	(0.294)	(0.294)	(0.281)
% leaky classrooms						-0.008	-0.008	-0.008	-0.008	-0.009	-0.009*	-0.008
						(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.005)	(0.005)
% classrooms with working board						0.000	0.000	0.001	0.000	0.000	0.000	-0.000
						(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Number of book sets per students						-0.005	0.038	0.020	-0.003	0.039	0.050	0.072
						(0.092)	(0.102)	(0.101)	(0.094)	(0.128)	(0.141)	(0.152)
School has a library						0.173	0.093	0.084	0.100	0.173	0.186	0.121
						(0.269)	(0.276)	(0.281)	(0.300)	(0.300)	(0.301)	(0.312)
School has a laboratory						1.726***	1.591***	1.590***	1.715***	1.722***	1.712***	1.761***
						(0.359)	(0.355)	(0.357)	(0.361)	(0.369)	(0.373)	(0.356)
School with clean water						0.393	0.287	0.236	0.250	0.177	0.181	0.195
						(0.257)	(0.259)	(0.258)	(0.274)	(0.276)	(0.276)	(0.288)
School with electricity						0.523	0.289	0.190	0.221	0.154	0.138	0.094
						(0.397)	(0.428)	(0.424)	(0.440)	(0.436)	(0.450)	(0.457)
School with clean toilet						0.169	0.114	0.095	0.059	0.014	0.001	-0.013
						(0.227)	(0.235)	(0.236)	(0.244)	(0.250)	(0.257)	(0.265)
DFA school characteristics												
% teachers with upper sec. edu.							0.002	0.002	-0.003	-0.005	-0.005	-0.005
							(0.007)	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
% teachers with 12+2 training							0.008	0.009	0.012*	0.012*	0.011*	0.012*
							(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
% teachers with ped. col. training							-0.001	0.002	0.006	0.005	0.004	0.004
							(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.009)
% teachers with ped. uni. training							0.003	0.004	0.013	0.013	0.012	0.012
							(0.011)	(0.011)	(0.012)	(0.012)	(0.012)	(0.011)
% very active parents							0.007**	0.007**	0.008**	0.007**	0.006*	0.007*
							(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)

% students attending more than 9 sessions/ week								0.000	0.001	-0.000	0.000	-0.003
								(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
% students attending 6-9 sessions/ week								0.008	0.009*	0.007	0.007	0.007
								(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
% students attending grade 5 more than 160 days								-0.003	-0.004	-0.002	-0.002	-0.002
								(0.006)	(0.007)	(0.006)	(0.006)	(0.006)
Student/ teacher ratio								-0.070***	-0.069**	-0.070**	-0.080***	-0.093***
								(0.026)	(0.028)	(0.028)	(0.029)	(0.030)
Class size								0.017	0.019	0.024	0.025	0.027
								(0.022)	(0.023)	(0.024)	(0.028)	(0.030)
% headmasters with upper sec. edu									0.006	0.006	0.006	0.007
									(0.004)	(0.004)	(0.004)	(0.005)
% headmasters with 12+2 training									-0.001	0.000	0.000	0.001
									(0.005)	(0.005)	(0.005)	(0.005)
% headmasters with ped. col. training									-0.007	-0.006	-0.006	-0.007
									(0.005)	(0.005)	(0.005)	(0.005)
% headmasters with ped. uni. training									-0.003	-0.003	-0.003	-0.003
									(0.004)	(0.004)	(0.004)	(0.004)
Distance to main campus										-0.032	-0.031	-0.035
										(0.052)	(0.057)	(0.061)
Distance to upper primary grades										-0.012**	-0.010*	-0.010*
										(0.005)	(0.006)	(0.006)
% schools with math teaching tools for grade 5										-0.002	-0.002	-0.002
										(0.009)	(0.009)	(0.007)
% schools with reading tools for grade 5										-0.002	-0.003	-0.003
										(0.008)	(0.009)	(0.006)
% primary schools over the commune pop age 6-13											-1.287	-1.558
											(1.667)	(1.678)
% sat. schools over the commune pop age 6-13											-0.083	-0.097
											(0.666)	(0.688)
% sat. schools with complete grade 5											0.003	0.005
											(0.006)	(0.006)
Construction fee												-0.009
												(0.006)
Tuition fee												0.009**
												(0.004)
Insurance fee												0.034*
												(0.019)
Education fee												-0.026
												(0.016)
Other fee												-0.010
												(0.012)
% poor hh. in commune							-0.009	-0.011*	-0.011	-0.009	-0.009	-0.010
							(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Red River Delta	0.558*	1.309	0.548	0.486	1.122***	0.868**	0.848*	0.789	0.711	0.809	0.779	0.985*
	(0.332)	(1.238)	(0.402)	(0.391)	(0.408)	(0.422)	(0.459)	(0.502)	(0.514)	(0.522)	(0.528)	(0.538)
North East	1.361***	0.682	1.334***	1.326***	1.636***	1.740***	1.686***	1.489***	1.635***	1.756***	1.755***	1.955***
	(0.346)	(1.230)	(0.424)	(0.410)	(0.434)	(0.481)	(0.496)	(0.495)	(0.513)	(0.530)	(0.541)	(0.554)
North West	0.221	N.A.	0.049	0.051	0.192	0.824	0.683	0.467	0.592	0.911	0.912	1.019
	(0.367)		(0.464)	(0.453)	(0.489)	(0.507)	(0.534)	(0.541)	(0.572)	(0.605)	(0.615)	(0.635)
North Central	0.686**	-0.079	0.659*	0.635*	0.771**	0.689*	0.680	0.513	0.464	0.514	0.497	0.886
	(0.278)	(0.951)	(0.363)	(0.366)	(0.390)	(0.414)	(0.457)	(0.510)	(0.522)	(0.520)	(0.519)	(0.599)
South Central	0.955***	1.231	0.947**	0.885**	0.873*	0.862*	0.804	0.798	1.056**	1.169**	1.198**	1.203**
	(0.311)	(1.601)	(0.384)	(0.382)	(0.461)	(0.501)	(0.533)	(0.512)	(0.536)	(0.553)	(0.564)	(0.578)
Central Highlands	0.403	-0.777	0.334	0.226	0.659	0.948**	0.850**	1.050**	1.082**	1.124**	1.094**	1.133**
	(0.283)	(1.077)	(0.354)	(0.345)	(0.402)	(0.421)	(0.419)	(0.418)	(0.425)	(0.438)	(0.445)	(0.451)
South East	-0.123	-2.406***	0.192	0.103	-0.024	0.046	-0.078	0.041	0.081	0.120	0.097	0.106
	(0.286)	(0.924)	(0.352)	(0.354)	(0.432)	(0.455)	(0.465)	(0.445)	(0.447)	(0.439)	(0.438)	(0.438)
Constant	115.612**	-18.436	-84.506***	-78.496**	-54.298	-56.537	-62.524*	-62.259*	-66.666*	-68.655*	-66.811*	-70.077*
	(23.754)	(109.466)	(32.143)	(31.835)	(33.608)	(35.310)	(36.350)	(36.665)	(39.392)	(39.770)	(39.952)	(39.751)
chi2	366.66	73.41	320.10	329.98	252.85	236.92	231.58	228.36	251.86	274.21	282.06	302.85
Log likelihood	-716.05	-50.49	-517.05	-527.40	-378.82	-355.50	-343.92	-338.94	-323.91	-320.65	-320.16	-313.48
N	2612	288	2441	2452	1672	1672	1625	1623	1581	1578	1578	1578

Note: 1. *p< .1, **p<0.05, ***p<0.01; robust standard errors in parentheses accounts for clustering at the district level.

Table G2: Determinants of Primary Completion (Nores, 2009c)

	2004					2006				
Age	0.063	0.064	0.064	0.065	0.082	0.065	0.064	0.065	0.066	0.085
	(0.007)**	(0.008)**	(0.007)**	(0.007)**	(0.015)**	(0.007)**	(0.007)**	(0.007)**	(0.007)**	(0.018)**
Female	0.017	0.018	0.023	0.024	0.032	0.023	0.023	0.023	0.023	0.037
	(0.012)	(0.012)	(0.012)	(0.012)*	(0.024)	(0.010)*	(0.010)*	(0.010)*	(0.010)*	(0.027)
Minority	-0.107	-0.096	-0.093	-0.084	-0.091	-0.058	-0.054	-0.055	-0.050	-0.014
	(0.023)**	(0.022)**	(0.022)**	(0.023)**	(0.038)*	(0.020)**	(0.021)*	(0.019)**	(0.020)*	(0.032)
Hh children	-0.004	-0.002	-0.002	-0.002	-0.016	-0.006	-0.004	-0.004	-0.003	-0.012
	(0.004)	(0.004)	(0.004)	(0.004)	(0.009)	(0.003)	(0.003)	(0.003)	(0.004)	(0.009)
Rural	-0.014	0.006	0.005	0.008	-0.045	0.010	0.035	0.031	0.029	0.009
	(0.018)	(0.020)	(0.022)	(0.021)	(0.058)	(0.024)	(0.026)	(0.026)	(0.026)	(0.055)
Log pc hh Expendit	0.101	0.102	0.102	0.101	0.110	0.121	0.122	0.122	0.125	0.141
	(0.016)**	(0.016)**	(0.016)**	(0.017)**	(0.035)**	(0.015)**	(0.014)**	(0.014)**	(0.015)**	(0.036)**
Ed Att hh Primary	0.013	0.004	0.005	0.006	0.083	-0.009	-0.023	-0.028	-0.029	-0.015
	(0.018)	(0.024)	(0.023)	(0.023)	(0.038)*	(0.020)	(0.026)	(0.025)	(0.025)	(0.050)
Ed Att hh LSec	0.043	0.024	0.024	0.022	0.073	0.004	-0.005	-0.009	-0.007	0.031
	(0.019)*	(0.014)	(0.015)	(0.015)	(0.029)*	(0.020)	(0.016)	(0.015)	(0.016)	(0.032)
Ed Att hh USec+	0.061	0.020	0.022	0.023	0.054	0.015	-0.001	-0.003	-0.002	0.010
	(0.020)**	(0.009)*	(0.008)*	(0.008)**	(0.013)**	(0.018)	(0.011)	(0.010)	(0.010)	(0.017)
Ed. Att. Hh Junior Coll+	-0.202	-0.247	-0.247	-0.239	-0.178	-0.299	-0.347	-0.347	-0.351	-0.264
	(0.034)**	(0.029)**	(0.031)**	(0.033)**	(0.041)**	(0.051)**	(0.037)**	(0.036)**	(0.037)**	(0.036)**
Commune Poverty Rate	-0.067	-0.050	-0.041	-0.025	0.087	0.027	0.045	0.031	0.053	0.136
	(0.091)	(0.083)	(0.085)	(0.086)	(0.232)	(0.111)	(0.102)	(0.096)	(0.096)	(0.239)
% Pupils 6-9 sessions/ week	-0.000	-0.000	-0.000	-0.000	0.001	0.000	0.000	0.000	0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
% Pupils >9 sessions/ week	0.000	0.000	-0.000	-0.000	0.001	0.001	0.000	0.000	0.000	0.002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)*	(0.000)	(0.000)	(0.000)	(0.001)*
Pupil / Teacher Ratio	0.000	-0.001	-0.001	-0.001	-0.004	-0.001	-0.003	-0.003	-0.003	-0.007
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)
No. Satellites		-0.006	-0.006	-0.005	-0.001		-0.009	-0.011	-0.011	-0.012
		(0.003)*	(0.003)*	(0.003)*	(0.006)		(0.003)**	(0.003)**	(0.003)**	(0.009)
No. Main Schools		-0.004	-0.004	-0.002	0.015		-0.008	0.002	0.003	0.041
		(0.007)	(0.009)	(0.009)	(0.017)		(0.008)	(0.010)	(0.010)	(0.025)
Avge. No. Pupils (all grades)		-0.000	-0.000	-0.000	-0.000		0.000	0.000	0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
Distance Sat., Km (Avge)		-0.006	-0.006	-0.006	0.005		-0.001	-0.000	-0.000	-0.007
		(0.003)*	(0.003)*	(0.003)*	(0.008)		(0.003)	(0.004)	(0.004)	(0.014)
Satellite Complete (%)		-0.000	0.000	0.000	-0.000		-0.000	-0.000	-0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.001)		(0.000)	(0.000)	(0.000)	(0.001)
Avge. Distance to Upper Prim		-0.000	-0.000	-0.000	-0.000		-0.000	-0.000	-0.000	-0.000
		(0.001)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.001)
% with no Preschools		0.000	-0.000	-0.000	0.000		-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
No. Grade 5 Classes		0.001	0.001	0.001	0.002		-0.000	-0.000	-0.001	-0.006
		(0.001)	(0.001)	(0.001)	(0.001)*		(0.003)	(0.003)	(0.003)	(0.008)

% Attend Gr.5 >160 days	-0.001	-0.002	-0.001	-0.001	-0.002	-0.002	-0.002	-0.003
	(0.001)	(0.001)*	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
% Attend Gr.5 140-160 days	-0.001	-0.002	-0.001	0.000	-0.001	-0.001	-0.002	-0.002
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
Avge # gr.5 students w/o txtbooks		-0.000	-0.000	-0.001		-0.001	-0.000	0.001
		(0.000)*	(0.000)*	(0.000)		(0.001)	(0.001)	(0.001)
# Schools w/math teaching tool gr. 5		0.000	0.000	0.001		0.000	0.000	-0.001
		(0.000)	(0.000)	(0.000)*		(0.000)	(0.000)	(0.001)
# Schools w/read teaching tool gr. 5		-0.000	-0.000	-0.001		-0.000	-0.000	0.001
		(0.000)	(0.000)	(0.001)		(0.000)	(0.000)	(0.001)*
Parents Very Active/ Interested		0.000	0.000	0.001		0.000	0.001	-0.000
		(0.000)	(0.000)	(0.001)		(0.000)**	(0.000)**	(0.000)
Avge. % good condition classrooms		-0.000	0.000	-0.000		0.000	0.000	0.001
		(0.000)	(0.000)	(0.001)		(0.000)	(0.000)	(0.001)
% w/Library		-0.000	-0.000	-0.000		-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
% w/Laboratory		0.000	0.000	0.000		0.000	0.000	0.000
		(0.000)	(0.000)	(0.001)		(0.000)	(0.000)	(0.001)
Avge. % good condition seats		-0.000	-0.000	0.001		0.000	0.000	-0.001
		(0.000)	(0.000)	(0.001)		(0.000)	(0.000)	(0.001)
Avge. % good condition boards		0.000	0.000	-0.001		-0.001	-0.001	-0.001
		(0.000)	(0.000)	(0.001)		(0.000)**	(0.000)**	(0.001)
% Drinkwater		0.000	0.000	0.001		0.000	0.000	0.000
		(0.000)	(0.000)	(0.001)		(0.000)	(0.000)	(0.001)
% Toiletshare for pupils		-0.000	-0.000	-0.001		-0.000	-0.000	0.001
		(0.000)	(0.000)	(0.001)		(0.000)	(0.000)	(0.001)
% Toilet for girls		0.000	0.000	0.000		-0.000	-0.000	-0.002
		(0.000)	(0.000)	(0.001)		(0.000)	(0.000)	(0.001)*
% Toilet for teachers		-0.000	-0.000	0.001		0.000	0.000	0.001
		(0.000)	(0.000)	(0.001)		(0.000)	(0.000)	(0.001)
Avge.% Tchrs w/LSE			-0.001	-0.002			-0.002	-0.001
			(0.001)	(0.001)			(0.002)	(0.003)
Avge.% Tchrs w/USE			-0.000	-0.001			-0.002	-0.002
			(0.001)	(0.001)			(0.002)	(0.003)
Avge. % Tchrs w/ 9+3 training			-0.001	-0.000			0.001	-0.000
			(0.001)	(0.002)			(0.001)	(0.003)
Avge. % Tchrs w/ 12+2 training			0.000	0.001			0.001	0.003
			(0.001)	(0.001)			(0.001)	(0.003)
Avge. % Tchrs Pedag. Coll. training			-0.000	0.001			0.000	0.000
			(0.001)	(0.002)			(0.001)	(0.003)
Avge. % Tchrs Pedag. Univ. training			0.000	-0.000			0.001	0.003
			(0.001)	(0.003)			(0.001)	(0.003)

Avge. % Tchrs Other training				-0.000	-0.003				0.002	0.006
				(0.001)	(0.003)				(0.002)	(0.005)
Avge.% Head w/LSE				0.001	0.002				0.000	-0.001
				(0.001)	(0.001)*				(0.001)	(0.001)
Avge.% Head w/USE				0.001	0.002				0.000	0.000
				(0.001)	(0.001)				(0.001)	(0.001)
Avge. % Head Training				0.018	-0.004				-0.004	-0.014
				(0.008)*	(0.016)				(0.006)	(0.015)
Avge. Construct Contrib. (th.vnd)					1.319					1.235
					(0.770)					(1.180)
Avge. Tuition Contrib. (th.vnd)					-0.253					0.103
					(0.453)					(0.276)
Avge. Insurance Contrib. (th.vnd)					-0.655					-0.629
					(0.590)					(1.547)
Avge. Ed. Fund Contrib (th.vnd)					0.666					-0.074
					(0.967)					(0.752)
Avge.Other Contrib. (th vnd)					0.415					-3.763
					(1.207)					(0.722)**
Observations	3017	2986	2913	2831	732	2648	2648	2643	2556	645

Standard errors in parentheses

* significant at 5%; ** significant at 1%

Table G3: Lower secondary enrollment estimations (Nores, 2009b)

	Has Primary	In LSE	Has primary	In LSE	Has primary	In LSE	Has primary	In LSE
Age	0.128***	-0.117**	0.128***	-0.094*	0.130***	-0.122***	0.324***	-0.081
	(0.032)	(0.050)	(0.030)	(0.049)	(0.032)	(0.042)	(0.023)	(0.059)
Female	0.286***	0.155***	0.306***	0.121**	0.303***	0.155***	0.156	0.078
	(0.043)	(0.052)	(0.043)	(0.054)	(0.071)	(0.059)	(0.148)	(0.067)
Minority	-0.276	-0.103	-0.261	0.139	-0.350	0.166	-0.368*	0.019
	(0.231)	(0.227)	(0.217)	(0.196)	(0.257)	(0.234)	(0.206)	(0.257)
Hhchildren	-0.075	-0.116***	-0.075	-0.095***	-0.073	-0.096***	-0.018	-0.055
	(0.051)	(0.031)	(0.049)	(0.034)	(0.045)	(0.034)	(0.080)	(0.037)
Rural	0.401*	0.177	0.403	0.077	0.438	0.134	0.471**	0.130
	(0.238)	(0.201)	(0.251)	(0.221)	(0.284)	(0.265)	(0.240)	(0.279)
Ed Att hh Primary	0.120	0.133	0.109	0.133	-0.057	0.083	0.295	0.109
	(0.170)	(0.115)	(0.173)	(0.123)	(0.238)	(0.176)	(0.217)	(0.132)
Ed Att hh LSec	0.173	0.339***	0.148	0.327**	-0.011	0.207	0.006	0.037
	(0.212)	(0.113)	(0.223)	(0.128)	(0.265)	(0.172)	(0.164)	(0.164)
Ed Att hh USec+	-0.154	-0.003	-0.188	-0.024	-0.301	-0.120	-0.112	-0.318
	(0.174)	(0.136)	(0.156)	(0.150)	(0.213)	(0.201)	(0.167)	(0.203)
Log. House Value	0.092	-0.008	0.090	-0.008	0.025	-0.019	-0.004	-0.050
	(0.130)	(0.029)	(0.127)	(0.041)	(0.117)	(0.048)	(0.117)	(0.083)
Log. Durables	0.236***	0.203***	0.241***	0.186***	0.263***	0.219***	0.144**	0.109*
	(0.055)	(0.046)	(0.057)	(0.044)	(0.069)	(0.047)	(0.058)	(0.056)
Per Cap. Log hh Expendit. 06		0.043		0.026		0.025		0.095
		(0.042)		(0.050)		(0.044)		(0.072)
Paym. Checks		0.104		0.103		0.071		0.042
		(0.215)		(0.207)		(0.242)		(0.285)
Paym. Tuition		-0.000		-0.000		-0.000		-0.000
		(0.000)		(0.000)		(0.001)		(0.001)
Paym. Building		0.002		0.003		0.004		0.003
		(0.002)		(0.002)		(0.003)		(0.004)
Paym. PTA		0.001		0.001		-0.000		-0.001
		(0.001)		(0.001)		(0.001)		(0.001)
Paym. Exams		-0.002*		-0.002		-0.004**		-0.004
		(0.001)		(0.002)		(0.002)		(0.002)
Paym. Textbooks		-0.000		-0.001		-0.001*		-0.002**
		(0.001)		(0.001)		(0.001)		(0.001)
Paym. Uniforms		0.000		0.000		0.001		0.001
		(0.001)		(0.001)		(0.001)		(0.002)
Scholarship				-0.661***		-0.614***		0.180
				(0.135)		(0.122)		(0.120)
Satellite				0.234		0.509*		0.455
				(0.460)		(0.303)		(0.278)
Math Ethnic Classes				0.770		-2.398*		-1.544
				(1.160)		(1.235)		(1.734)
Language Ethnic Classes				-1.253		-1.493**		-1.412*
				(0.866)		(0.752)		(0.846)
Health Checks 1						0.102		-0.173
						(0.242)		(0.179)

Health Checks 2						0.201		-0.032
						(0.208)		(0.136)
Health Checks 3						0.310		0.212
						(0.344)		(0.357)
Check Height (mean)						0.000		0.170
						(0.346)		(0.401)
Check Weight (mean)						-0.099		-0.292
						(0.409)		(0.465)
Check Vision (mean)						0.211*		0.063
						(0.126)		(0.203)
Check Hearing (mean)						0.090		0.110
						(0.153)		(0.144)
Check Dental (mean)						-0.177***		-0.138
						(0.046)		(0.092)
Check Worms (mean)						0.146*		0.169*
						(0.078)		(0.102)
Check Anemia (mean)						0.160		0.003
						(0.146)		(0.217)
Exempt								0.464***
								(0.100)
Observations	1583	1583	1583	1583	1326	1326	1189	1189

Note: Controls are log of household expenditure for 2004, district wealth for 2004, number of sessions and satellites, pupil teacher ratio, mean total parental contributions, average grade 5 children without books and parental care for education in the 1st step equation.

Table G4: Upper secondary enrollment estimations (Nores, 2009b)

VARIABLES	Has LSE	In USE	Has LSE	In USE	Has LSE	In USE	Has LSE	In USE
Age	-0.038	-0.208***	-0.034	-0.093**	-0.021	-0.089**	0.217***	0.000
	(0.036)	(0.042)	(0.034)	(0.040)	(0.035)	(0.043)	(0.037)	(0.059)
Female	0.136***	0.146*	0.141**	0.077	0.148*	0.113	-0.055	0.078
	(0.052)	(0.080)	(0.056)	(0.069)	(0.089)	(0.084)	(0.118)	(0.093)
Minority	-0.126	0.147	-0.124	0.332***	-0.117	0.331**	-0.376**	-0.103
	(0.113)	(0.142)	(0.111)	(0.080)	(0.137)	(0.136)	(0.148)	(0.104)
Hhchildren	-0.103**	-0.144***	-0.091*	-0.113***	-0.109**	-0.107***	-0.044	-0.065*
	(0.048)	(0.022)	(0.053)	(0.025)	(0.049)	(0.027)	(0.069)	(0.037)
Rural	0.161	0.092	0.160	0.069	0.364***	0.326	0.291	0.175
	(0.186)	(0.135)	(0.173)	(0.139)	(0.125)	(0.241)	(0.177)	(0.286)
Ed Att hh Primary	-0.141	0.121	-0.144	0.139	-0.166	0.139	0.050	0.368**
	(0.114)	(0.106)	(0.121)	(0.121)	(0.151)	(0.130)	(0.186)	(0.167)
Ed Att hh LSec	0.775***	0.817***	0.778***	0.896***	0.823***	0.904***	0.385**	0.812***
	(0.255)	(0.176)	(0.258)	(0.165)	(0.282)	(0.180)	(0.170)	(0.215)
Ed Att hh USec+	1.034***	0.950***	1.047***	0.757***	1.060***	0.711***	0.559***	0.484**
	(0.204)	(0.175)	(0.205)	(0.172)	(0.260)	(0.187)	(0.195)	(0.222)
Log. House Value	0.149	0.096	0.145	0.103	0.127	0.115	0.227***	0.080
	(0.172)	(0.104)	(0.170)	(0.103)	(0.169)	(0.115)	(0.071)	(0.114)
Log. Durables	0.209***	0.170***	0.210***	0.108**	0.247***	0.128***	0.152***	0.107***
	(0.030)	(0.039)	(0.031)	(0.042)	(0.027)	(0.048)	(0.052)	(0.040)
Per Cap. Log hh Expendit. 06		0.048		0.016		0.002		-0.036
		(0.045)		(0.055)		(0.054)		(0.045)
Paym. Checks		0.012		-0.134		-0.093		-0.053
		(0.184)		(0.220)		(0.227)		(0.298)
Paym. Tuition		0.000		0.000		0.001		0.001
		(0.000)		(0.000)		(0.000)		(0.001)
Paym. Building		-0.006*		-0.007*		-0.014***		-0.012***
		(0.003)		(0.004)		(0.004)		(0.003)
Paym. PTA		0.001***		0.001		0.001		0.001
		(0.000)		(0.001)		(0.001)		(0.001)
Paym. Exams		0.000		0.001		0.002		0.001
		(0.002)		(0.001)		(0.001)		(0.001)
Paym. Textbooks		-0.001		-0.001		-0.002**		-0.002**
		(0.001)		(0.001)		(0.001)		(0.001)
Paym. Uniforms		0.001		0.000		0.000		-0.000
		(0.001)		(0.001)		(0.001)		(0.002)
Scholarship				-1.447***		-1.571***		0.090
				(0.237)		(0.213)		(0.178)
Satellite				0.225		0.318		0.631
				(0.354)		(0.553)		(0.550)
Math Ethnic Classes				-0.338		-2.932***		21.983***
				(1.096)		(0.963)		(4.363)
Language Ethnic Classes				-0.028		0.838		0.899
				(0.633)		(0.624)		(1.480)
Health Checks 1						0.219*		-0.017
						(0.131)		(0.157)

Health Checks 2						0.216		-0.063
						(0.164)		(0.197)
Health Checks 3						0.298		0.210
						(0.223)		(0.312)
Check Height (mean)						0.487*		0.367
						(0.251)		(0.235)
Check Weight (mean)						-0.332		-0.237
						(0.262)		(0.295)
Check Vision (mean)						-0.086		-0.060
						(0.161)		(0.196)
Check Hearing (mean)						0.166		0.105
						(0.207)		(0.255)
Check Dental (mean)						-0.366***		-0.274
						(0.132)		(0.198)
Check Worms (mean)						0.023		0.003
						(0.113)		(0.112)
Check Anemia (mean)						0.334**		0.219
						(0.143)		(0.179)
Exempt								0.205*
								(0.120)
Observations	1569	1569	1569	1569	1352	1352	842	842

Note: Controls are log of household expenditure for 2004, district wealth for 2004, number of sessions and satellites, pupil teacher ratio, mean total parental contributions, average grade 5 children without books and parental care for education in the 1st step equation.

Table G5: Lower secondary attainment estimations (Nores, 2009b)

VARIABLES	Has primary	Has LSE	Has primary	Has LSE	Has primary	Has LSE
Age	0.169	0.234**	0.174	0.371***	0.086	0.476***
	(0.121)	(0.111)	(0.158)	(0.086)	(0.156)	(0.086)
Female	0.472***	0.213***	0.500***	0.142**	0.608***	0.095
	(0.164)	(0.035)	(0.138)	(0.060)	(0.178)	(0.091)
Minority	-0.542	-0.312**	-0.598	-0.309***	-0.916*	-0.362**
	(0.413)	(0.126)	(0.486)	(0.101)	(0.496)	(0.184)
Hhchildren	-0.015	-0.126***	-0.017	-0.113**	-0.046	-0.109***
	(0.052)	(0.035)	(0.077)	(0.046)	(0.063)	(0.036)
Rural	0.567*	-0.220	0.444	-0.297	0.926***	0.078
	(0.317)	(0.261)	(0.292)	(0.251)	(0.282)	(0.242)
Ed Att hh Primary	-0.467*	0.237***	-0.485*	0.152	-1.123***	0.007
	(0.241)	(0.090)	(0.253)	(0.095)	(0.348)	(0.184)
Ed Att hh LSec	-0.462	0.474*	-0.467	0.406	-1.182**	0.359
	(0.334)	(0.276)	(0.348)	(0.264)	(0.490)	(0.333)
Ed Att hh USec+	-0.534***	0.894***	-0.624***	0.673***	-1.275***	0.593**
	(0.140)	(0.218)	(0.203)	(0.246)	(0.383)	(0.301)
Log. House Value	0.243	0.273*	0.226	0.252*	0.226	0.214
	(0.154)	(0.148)	(0.188)	(0.142)	(0.225)	(0.159)
Log. Durables	0.343***	0.312***	0.319***	0.268***	0.370***	0.346***
	(0.063)	(0.061)	(0.075)	(0.071)	(0.120)	(0.074)
Per Cap. Log hh Expendit. 06		-0.148		-0.136**		-0.153*
		(0.116)		(0.069)		(0.088)
Paym. Tuition		-0.000		-0.001		-0.001
		(0.001)		(0.000)		(0.001)
Paym. Building		-0.003		-0.003		-0.004**
		(0.003)		(0.002)		(0.002)
Paym. PTA		0.003***		0.002**		0.003*
		(0.001)		(0.001)		(0.002)
Paym. Textbooks		0.002		0.001		0.000
		(0.002)		(0.002)		(0.002)
Paym. Uniforms		-0.004		-0.005*		-0.005*
		(0.002)		(0.003)		(0.003)
Scholarship				-0.923***		-1.030***
				(0.189)		(0.158)
Satellite				-0.379		-0.019
				(0.276)		(0.392)
Math Ethnic Classes				0.371		2.510***
				(1.727)		(0.871)
Language Ethnic Classes				-0.046		0.297
				(1.394)		(0.600)
Health Checks 1						0.025
						(0.464)
Health Checks 2						0.057
						(0.454)
Health Checks 3						-0.346
						(0.789)

Check Height (mean)						0.292
						(0.748)
Check Weight (mean)						0.087
						(0.587)
Check Vision (mean)						0.052
						(0.263)
Check Hearing (mean)						0.097
						(0.171)
Check Dental (mean)						-0.097
						(0.276)
Check Worms (mean)						-0.243
						(0.204)
Check Anemia (mean)						-0.524**
						(0.209)
Observations	684	684	684	684	578	578

Note: Controls are log of household expenditure for 2004, district wealth for 2004, number of sessions and satellites, pupil teacher ratio, mean total parental contributions, average grade 5 children without books and parental care for education in the 1st step equation.

Table G6: Upper secondary attainment estimations. (Nores, 2009b)

VARIABLES	Has LSE	Has USE	Has LSE	Has USE	Has LSE	Has USE
Age	-0.322***	0.026	-0.329***	0.185	-0.383***	0.172
	(0.099)	(0.151)	(0.093)	(0.160)	(0.115)	(0.170)
Female	0.130	0.217	0.136	0.192	0.104	0.164
	(0.114)	(0.141)	(0.114)	(0.130)	(0.127)	(0.162)
Minorities	-0.054	-0.433***	-0.021	-0.484***	0.092	-0.328**
	(0.268)	(0.136)	(0.227)	(0.170)	(0.193)	(0.147)
Hhchildren	-0.171**	-0.155***	-0.173***	-0.143***	-0.158**	-0.119***
	(0.074)	(0.037)	(0.063)	(0.038)	(0.070)	(0.036)
Rural	0.581**	-0.050	0.638***	-0.271*	0.605**	-0.144
	(0.269)	(0.117)	(0.212)	(0.147)	(0.237)	(0.190)
Ed Att hh Primary	-0.743**	-0.031	-0.689**	0.005	-0.687*	-0.017
	(0.291)	(0.292)	(0.287)	(0.312)	(0.355)	(0.255)
Ed Att hh LSec	1.009***	-0.010	1.026***	0.010	1.042***	-0.084
	(0.233)	(0.274)	(0.251)	(0.259)	(0.335)	(0.167)
Ed Att hh USec+	1.435***	1.730***	1.448***	1.639***	1.421***	1.533***
	(0.235)	(0.194)	(0.259)	(0.191)	(0.347)	(0.137)
Log. House Value	0.435**	0.053	0.437***	-0.056	0.373*	0.009
	(0.180)	(0.072)	(0.164)	(0.081)	(0.191)	(0.093)
Log. Durables	0.315***	0.279***	0.292***	0.296***	0.322***	0.236**
	(0.059)	(0.100)	(0.066)	(0.109)	(0.075)	(0.116)
Per Cap. Log hh Expendit. 06		-0.041		-0.049		-0.014
		(0.099)		(0.104)		(0.088)
Paym. Tuition		0.000		-0.000		0.000
		(0.001)		(0.000)		(0.001)
Paym. Building		0.001		-0.002		0.005
		(0.005)		(0.005)		(0.006)
Paym. PTA		0.001		0.001		0.002
		(0.001)		(0.001)		(0.002)
Paym. Textbooks		-0.002		-0.001***		-0.002***
		(0.001)		(0.000)		(0.000)
Paym. Uniforms		-0.001		-0.001		-0.001
		(0.002)		(0.003)		(0.002)
Scholarship				-0.736***		-0.713***
				(0.084)		(0.094)
Satellite				-0.674		-0.608
				(0.557)		(0.894)
Math Ethnic Classes				-0.624		-34.672***
				(1.257)		(1.177)
Language Ethnic Classes				0.737		0.968*
				(1.287)		(0.582)
Health Checks 1						0.613***
						(0.207)
Health Checks 2						0.431**
						(0.207)
Health Checks 3						-0.357
						(0.224)

Check Height (mean)						0.230
						(0.710)
Check Weight (mean)						-0.122
						(0.698)
Check Vision (mean)						-0.420
						(0.353)
Check Hearing (mean)						0.180
						(0.178)
Check Dental (mean)						-0.069
						(0.134)
Check Worms (mean)						-0.084
						(0.188)
Check Anemia (mean)						-0.168
						(0.145)
Observations	813	813	813	813	717	717

Note: Controls are log of household expenditure for 2004, district wealth for 2004, number of sessions and satellites, pupil teacher ratio, mean total parental contributions, average grade 5 children without books and parental care for education in the 1st step equation.

APPENDIX H: STUDENT ACHIEVEMENT STATISTICAL ANALYSES

Table H1: Final fixed effects estimates for mathematics and reading from the two- and three-level models

			Mathematics				Reading			
			Two-level		Three-level		Two-level		Three-level	
Level	Variable Name	Code of Variable Included	Coeff.	S.Error	Coeff.	S.Error	Coeff.	S.Error	Coeff.	S.Error
Pupil	Intercept		490.56	1.22	483.81	3.27	490.87	1.18	482.97	3.32
	Age in Month	XPAGEMON	-0.13	0.03	-0.14	0.03	-0.31	0.03	-0.37	0.04
	Meals per Day	PMEAL	2.09	0.80	2.55	1.04				
	Travel Time	PTRAVEL	-0.11	0.03	-0.12	0.03	-0.13	0.03	-0.10	0.04
	Days Absent	PABSENT	-1.96	0.22	-2.47	0.28	-1.72	0.23	-2.19	0.32
	Grade Repetition	XPGREP	-7.18	0.61	-8.73	0.75	-9.44	0.71	-11.03	0.88
	Homework	XPMATHHW/XPREADHW[a]	6.01	0.41*s*	6.58	0.49*c*	3.36	0.44	5.58	0.56*c s*
	interaction with Average Meals	PMEAL_2	3.28	1.16						
	interaction with Average Grade Repetition	XPGREP_2	-4.01	1.58					-4.70	1.91
	Ethnic Background	XCHMETHN	2.30	0.53	1.85	0.59	4.01	0.67	3.50	0.68
	Parental Education and Support	XCEDCARE	6.23	2.18*s*	6.14	2.23*s*	6.04	2.27*s*	6.72	2.39*s*
	interaction with Average Grade Repetition	XPGREP_2	-7.59	2.24	-7.36	2.50	-9.37	2.24	-10.00	2.42
	interaction with Management Course	SMANAG_2[b]	2.59	1.18	2.75	1.22	2.78	1.24	2.95	1.32
	interaction with School Location	XCOMM_2	2.33	0.47	1.65	0.49	2.46	0.51	2.19	0.57
	interaction with Percent Female Teacher	XSFEMT_2			15.45	2.67			12.51	2.92
Class	Teacher Score	TMA500_1/TRD500_1[a]			0.13	0.01			0.10	0.01
	Teacher Gender	TSEX_1_1[b]			3.79	1.73			4.09	1.77
	Excellent Teacher	XTEX_1_1			5.16	1.69				
	Classroom Resources/Materials	XTRESC_1			1.43	0.55			1.44	0.53
	Teacher Possessions	XTHPOS_1			0.51	0.24				
	Average Travel Time	PTRAVE_1							-0.24	0.10
	Average Days Absent	PABSEN_1			-2.51	0.88			-2.02	0.97
	Average Grade Repetition	XPGREP_1							-7.25	2.80
	Average Parental Education & Support	XCEDCA_1			10.57	1.37			9.03	1.48
School	Average Homework	XPMATH_2/XPREAD_2[a]	14.29	2.10	14.65	2.09	13.58	1.87	13.10	1.89
	Average Meals	PMEAL_2	13.15	4.43	15.62	4.53	13.96	4.15	15.32	4.16
	Pupil Behavior	XSPBHP_2	-33.54	7.03	-36.75	7.07	-31.44	6.40	-31.24	6.39
	Average Days Absent	PABSEN_2	-3.82	1.88			-4.36	1.80		
	Average Teacher Score	TMA500_2/TRD500_2[a]	0.21	0.01			0.15	0.01		
	Teacher Training	XSTT_1_2	15.83	4.43						
	Percent Full Day	XSSHFT_2	11.50	4.28	15.16	4.29	11.23	3.82	10.62	3.87
	Percent Female Teachers	XSFEMT_2	22.68	7.60	20.10	7.68	21.83	7.23	18.59	7.53
	Parental Contribution	XSPARC_2	1.23	0.57	1.39	0.58	1.54	0.54	1.51	0.54
	Average Parental Education & Support	XCEDCA_2	10.98	1.97			15.08	1.87		

Notes: a - Variable listed first is included in the mathematics models while the second variable is included in the reading models.
b - Dummy variable not centred, all other variables are grand-mean centred
s - Residual parameter of this coefficient is left to vary at the school-level
c - Residual parameter of this coefficient is left to vary at the class-level
- Only significant coefficients at p .05 are displayed

Điểm giao cắt
Độ tuổi theo tháng
Các bữa ăn trong ngày
Thời gian đi lại
Ngày vắng mặt
Tỷ lệ đúp
Bài tập về nhà
Biến tương tác với bữa ăn trung bình
Biến tương tác tỷ lệ ở lại lớp
Nền tảng dân tộc
Giáo dục và hỗ trợ của cha mẹ
Tương tác với tỷ lệ ở lại lớp
Tương tác với Khóa quản lý
Tương tác với địa điểm trường
Tương tác với tỷ lệ GV nữ

Điểm giáo viên
Giới tính GV
Giáo viên dạy giỏi
Trang thiết bị trong lớp
Các tài sản cho GV
Thời gian đi lại trung bình
Ngày vắng mặt trung bình
Tỷ lệ ở lại lớp trung bình
Tỷ lệ được giáo dục và hỗ trợ của phụ huynh

Bài tập trung bình
Các bữa ăn trung bình
Cư xử của học sinh
Trung bình số ngày vắng
Điểm trung bình của GV
Đào tạo GV
Tỷ lệ dạy cả ngày
Tỷ lệ GV nữ
Đóng góp của phụ huynh
Tỷ lệ được giáo dục và hỗ trợ của phụ huynh

Table H2: The estimated effects from the final three-level models for reading and mathematics – Whole Sample

Factor	Tiếng Việt(n=59,601)			Toán(n=59,601)		
	Standardized	Metric	SE	Standardized	Metric	SE
	(a)	(b)	(c)	(d)	(e)	(f)
Province level						
Intercept		305.14	17.29		261.83	21.50
Leadership						
School head observation of teaching	0.04	0.36	0.15	0.08	0.50	0.19
School level						
School socio-economic background						
School location	0.04	6.23	1.95			2.50
Parent education	0.06	2.31	0.43	**0.10**	2.84	0.55
Teaching and leadership						
Teacher feedback	0.06	21.56	3.70	**0.09**	28.49	3.94
Time for planning and marking			0,81			
Level of excellent teacher award	0.02	3.34	1.54	0.04	4.70	1.82
Grade 5 Periods observed	0.02	1.97	0.77	0.04	3.76	0.89
Fundamental school index	0.04	0.46	0.10	0.07	0.61	0.15
School ReNguồns						
Class learning tools	0.04	3.13	0.72	0.05	3.73	0.97
Student level						
Socio-economic status						
Ethnicity	0.04	11.24	2.19	0.07	16.71	3.17
Family possession	**0.08**	3.28	0.21	**0.13**	4.28	0.26
Parent education	0.07	2.37	0.16	**0.10**	2.57	0.21
Student characteristics						

Gender	**0.08**	18.60	0.90	0.02	3.30	1.08
Health status	-0.06	-6.77	0.49	**-0.09**	-8.38	0.52
Age	-0.04	-0.58	0.06	-0.05	-0.64	0.10
Learning condition						
Number of meals per day	0.04	9.44	1.10	0.06	12.65	1.29
Minutes to school	-0.02	-0.17	0.03	-0.03	-0.28	0.05
Number of days absent from school	-0.03	-1.95	0.26	-0.05	-2.81	0.46
Sum of repeated class	-0.05	-7.28	0.51	-0.06	-7.94	0.67
Sum of learning tools	0.03	4.00	0.38	0.05	4.88	0.49
Hours studying at home	0.02	4.03	0.64	0.05	7.14	0.91
Full day schooling	0.06	12.34	2.14	**0.10**	17.11	2.86
Teacher support						
Teacher feedback	0.03	5.88	0.77	0.04	7.08	1.14

Source: Griffin và Cúc, 2009

Table H3: The estimated effects from the final three-level models for reading and mathematics for remote areas

Factor	Remote							
	N=18,830							
	Reading				Mathematics			
	Standardized	Coefficient	SE	P-value	Standardized	Coefficient	SE	P-value
Intercept		293.25	23.54	0.00		250.14	34.39	0.00
School head observation of teaching (province mean)	0.05	0.20	0.16	*0.22*	0.05	0.22	0.24	*0.38*
Fundamental school index	0.04	0.43	0.21	0.04	0.05	0.64	0.25	0.01
Teacher Feedback school mean	0.12	32.85	6.2	0.00	0.11	35.28	7.72	0.00
Teacher Time for lesson planning school mean	0.00	-0.31	1.73	*0.86*	0.01	0.91	1.82	*0.62*
Teacher award school mean	0.03	3.15	2.55	0.22	0.04	6.13	3.04	0.04
Class learning tools school mean	0.06	3.99	1.47	0.01	0.06	4.23	1.99	0.03
Principal observation of grade 5 class	0.03	2.48	1.71	*0.15*	0.04	4.16	1.59	0.01
Average parent education school mean	0.04	1.51	0.91	0.10	0.04	1.61	1.01	*0.11*
Gender	0.09	16.05	1.16	0.00	0.01	2.53	1.63	*0.12*
Ethnicity	0.07	12.12	2.65	0.00	0.08	16.97	3.79	0.00
Family possession	0.09	2.60	0.32	0.00	0.11	3.79	0.39	0.00
Number of meals per day	0.04	6.66	1.76	0.00	0.05	9.54	1.86	0.00
Minutes to school	0.00	-0.03	0.05	*0.54*	0.00	-0.02	0.06	*0.74*
Number of days absent from class	-0.03	-1.48	0.49	0.00	-0.03	-2.02	0.49	0.00
Sum of repeated classes	-0.08	-7.61	0.84	0.00	-0.06	-7.68	0.99	0.00
Sum of learning tools	0.05	3.87	0.40	0.00	0.06	5.19	0.79	0.00
Hour studying at home	0.04	5.07	1.10	0.00	0.04	6.03	1.35	0.00
Health status	-0.06	-5.11	0.72	0.00	-0.07	-6.58	0.72	0.00
Teacher feedback	0.04	5.77	1.28	0.00	0.04	7.16	2.06	0.00
Age	-0.03	-0.31	0.08	0.00	-0.04	-0.39	0.14	0.01
Full day schooling	0.04	8.83	3.96	0.03	0.05	14.53	2.71	0.00
Average parent education	0.07	2.08	0.23	0.00	0.06	2.09	0.30	0.00

Source: Griffin and Cuc, 2009.

Bảng H4: Tác động ước lượng của mô hình ba cấp độ cho môn Tiếng Việt và Toán cho vùng nông thôn

Các yếu tố	Factor	Rural N=18,830							
		Tiếng Việt				Toán			
		Standardized	Metric	SE	P-value	Standardized	Metric	SE	P-value
Điểm giao cắt	Intercept		331,62	21,83	0,00		97,57	28,52	0,00
Hiệu trưởng dự giờ (trung bình tỉnh)	School head observation of teaching (province mean)	0,04	0,23	0,17	*0,19*	0,05	0,40	0,23	*0,08*
Chỉ số trường cơ bản	Fundamental school index	0,06	0,60	0,15	0,00	0,06	0,69	0,19	0,00
Trung bình các trường có phản hồi của giáo viên	Teacher Feedback school mean	0,06	17,29	4,28	0,00	0,07	26,08	6,28	0,00
Trung bình thời gian giáo viên soạn bài	Teacher Time for lesson planning school mean	0,03	2,13	1,22	*0,08*	0,02	1,95	1,27	*0,13*
Trung bình giáo viên nhận danh hiệu gv giỏi	Teacher award school mean	0,03	3,87	1,85	0,04	0,03	5,22	2,12	0,01
Trung bình các lớp học sạch sẽ	Class learning tools school mean	0,05	3,75	1,28	0,00	0,04	4,12	1,37	0,00
Các quan sát học sinh lớp 5	Principal observation of grade 5 class	0,02	2,33	1,39	*0,09*	0,02	3,19	1,66	*0,05*
Trung bình trình độ cha mẹ	Average parent education school mean	0,04	1,41	0,69	0,04	0,07	2,91	0,94	0,00
Giới	Gender	0,09	17,71	1,33	0,00	0,00	0,83	1,50	*0,58*
Dân tộc	Ethnicity	0,05	12,62	3,47	0,00	0,06	20,59	3,91	0,00
Hoàn cảnh gia đình	Family possession	0,11	3,89	0,27	0,00	0,09	4,15	0,39	0,00
Số bữa ăn trong ngày	Number of meals per day	0,04	8,44	1,16	0,00	0,04	10,75	1,66	0,00
Thời gian đến trường	Minutes to school	-0,02	-0,19	0,05	0,00	-0,04	-0,45	0,07	0,00
Ngày nghỉ học	Number of days absent from class	-0,04	-2,48	0,32	0,00	-0,04	-2,85	0,61	0,00
Tổng số ở lại lớp	Sum of repeated classes	-0,06	-7,82	0,84	0,00	-0,05	-8,86	1,08	0,00
Tổng số dụng cụ học tập	Sum of learning tools	0,04	4,23	0,72	0,00	0,04	5,49	0,73	0,00
Số giờ tự học	Hour studying at home	0,03	3,60	0,90	0,00	0,05	8,13	1,42	0,00
Tình trạng sức khỏe	Health status	-0,08	-7,78	0,67	0,00	-0,08	-10,01	0,80	0,00
Phản hồi của giáo viên	Teacher feedback	0,03	4,78	1,19	0,00	0,04	8,89	1,46	0,00
Tuổi	Age	-0,05	-0,65	0,10	0,00	-0,05	-0,84	0,12	0,00
Học cả ngày	Full day schooling	0,08	13,59	2,86	0,00	0,09	19,81	3,39	0,00
Trình độ cha mẹ	Average parent education	0,08	2,35	0,25	0,00	0,07	2,54	0,31	0,00

Source: Griffin và Cúc, 2009.

Table H5: The estimated effects from the final three-level models for reading and mathematics for urban areas

	Urban							
	N=12,885							
	Reading				Mathematics			
Factor	**Standardized**	**Metric**	**SE**	**P-value**	**Standardized**	**Metric**	**SE**	**P-value**
Intercept		394.74	45.37	0.00		361.40	51.12	0.00
School head observation of teaching (province mean)	0.04	0.19	0.31	*0.54*	0.04	0.26	0.46	*0.57*
Fundamental school index	0.03	0.29	0.20	0.15	0.02	0.28	0.24	0.25
Teacher Feedback school mean	0.04	12.53	6.27	*0.05*	0.05	21.45	11.39	*0.06*
Teacher Time for lesson planning school mean	0.03	2.86	1.61	*0.08*	0.00	0.47	1.95	*0.81*
Teacher award school mean	0.03	3.54	2.93	*0.23*	0.01	2.23	3.18	*0.48*
Class learning tools school mean	0.02	2.21	1.86	*0.23*	0.03	3.29	2.31	*0.16*
Principal observation of grade 5 class	0.02	2.05	2.20	*0.35*	0.04	5.15	2.69	*0.06*
Average parent education school mean	**0.15**	4.04	0.71	0.00	**0.10**	3.40	0.93	0.00
Gender	**0.12**	22.60	1.53	0.00	0.04	8.71	2.63	0.00
Ethnicity	0.04	13.56	3.29	0.00	0.04	14.54	4.93	0.00
Family possession	**0.09**	3.08	0.44	0.00	**0.12**	5.11	0.47	0.00
Number of meals per day	0.07	17.44	2.67	0.00	0.08	25.43	3.39	0.00
Minutes to school	-0.03	-0.34	0.10	0.00	-0.03	-0.41	0.15	0.01
Number of days absent from class	-0.03	-2.00	0.50	0.00	-0.05	-4.00	1.10	0.00
Sum of repeated classes	-0.04	-5.52	1.11	0.00	-0.03	-5.91	1.36	0.00
Sum of learning tools	0.03	4.08	1.37	0.00	0.02	3.40	1.43	0.02
Hour studying at home	0.02	3.37	1.43	0.02	0.04	6.87	2.44	0.01
Health status	-0.06	-6.81	1.37	0.00	-0.06	-7.88	1.66	0.00
Teacher feedback	0.05	8.39	1.81	0.00	0.02	3.68	2.52	*0.14*
Age	**-0.08**	-1.14	0.17	0.00	-0.06	-1.05	0.18	0.00
Full day schooling	**0.09**	12.65	2.93	0.00	**0.08**	14.55	3.58	0.00
Average parent education	**0.12**	2.49	0.28	0.00	**0.10**	2.67	0.29	0.00

Source: Griffin and Cuc, 2009.

Table H6: The estimated effects from the final three-level models for reading and mathematics for Ethnic Minorities

	Ethnic Minorities (non-Kihn, non-Chinese)							
	N=14,644							
	Tiếng Việt				Toán			
Factor	**Standardized**	**Metric**	**SE**	**P-value**	**Standardized**	**Metric**	**SE**	**P-value**
Intercept		359.30	20.59	0.00		294.76	25.52	0.00
School head observation of teaching	0.04	4.93	2.39	0.04	0.07	9.13	2.89	0.00
Fundamental school index	0.09	0.90	0.18	0.00	0.12	1.20	0.22	0.00
Teacher Feedback school mean	0.04	9.82	2.90	0.00	0.07	17.66	3.70	0.00
Teacher Time for lesson planning school mean								
Teacher district excellent award	0.08	7.93	2.62	0.01	0.15	15.30	3.87	0.00
Teacher province excellent award	0.07	7.17	4.38	0.10	0.02	2.24	5.60	0.69
Class learning tools school mean								
Principal observation of grade 5 class								
Average parent education school mean	0.02	6.70	3.63	0.09	0.01	7.13	4.66	0.13
Gender	0.12	12.25	1.25	0.00	0.01	0.60	1.61	0.72
Ethnicity								
Family possession	0.01	1.47	3.90	0.71	0.02	8.32	5.06	0.10
Number of meals per day	0.04	8.26	1.40	0.00	0.05	10.28	1.81	0.00
Minutes to school	-0.04	-2.19	0.52	0.00	-0.04	-2.41	0.68	0.00
Number of days absent from class	-0.04	-3.47	0.73	0.00	-0.05	-4.34	0.94	0.00
Sum of repeated classes	-0.05	-12.15	1.26	0.00	-0.05	-14.36	1.45	0.00
Sum of learning tools	0.01	3.90	4.47	0.38	-0.01	-0.97	-5.78	0.87
Hour studying at home								
Health status	0.06	24.46	2.77	0.00	0.07	29.74	3.58	0.00
Teacher feedback	0.01	2.43	1.51	0.11	0.01	2.13	1.96	0.28
Age	-0.04	-4.53	0.81	0.00	-0.03	-3.77	1.04	0.00
Full day schooling	0.07	7.13	2.66	0.01	0.13	12.71	3.38	0.00
Family possessions school mean	0.02	11.51	7.13	0.11	0.04	20.24	9.21	0.03
Average parent education	0.05	5.23	1.34	0.00	0.06	6.12	1.41	0.00

Source: Supplemental analysis.

Table H7: The determinants of test scores for those with 3 to 12 years of schooling, age 9-20

	Reading			Math			Sum.
	OLS	OLS	OLS	OLS	OLS	OLS	Stat.
	(1)	(2)	(3)	(4)	(5)	(6)	
Have 3 to 7 years of schooling	-0.133	-0.127	-0.050	0.054	0.043	0.198	0.60
	(0.125)	(0.129)	(0.134)	(0.130)	(0.133)	(0.152)	(0.49)
Years of schooling	0.074	0.077	0.114	0.152***	0.134**	0.188**	6.78
	(0.056)	(0.060)	(0.084)	(0.050)	(0.055)	(0.081)	(2.49)
Age (in 2006)	0.668***	0.693***	0.907***	0.415***	0.414***	0.688**	12.84
	(0.196)	(0.194)	(0.330)	(0.156)	(0.158)	(0.268)	(2.53)
Age squared	-0.025***	-0.026***	-0.035***	-0.018***	-0.017***	-0.028***	171.35
	(0.008)	(0.008)	(0.013)	(0.006)	(0.006)	(0.010)	(66.98)
Female	0.148*	0.134*	0.102	0.073	0.061	0.018	0.50
	(0.079)	(0.080)	(0.099)	(0.074)	(0.074)	(0.089)	(0.50)
Ethnic minority	-0.160	-0.132	0.048	-0.081	-0.047	0.074	0.06
	(0.134)	(0.133)	(0.168)	(0.136)	(0.137)	(0.168)	(0.24)
Log of real expenditure per capita	0.228***	0.220**	0.227**	0.226**	0.223**	0.312***	8.27
	(0.087)	(0.090)	(0.111)	(0.089)	(0.089)	(0.119)	(0.49)
Urban	0.174	0.156	0.317*	0.013	0.021	-0.037	0.04
	(0.173)	(0.178)	(0.189)	(0.197)	(0.209)	(0.228)	(0.20)
Father's years of schooling	0.032**	0.030**	0.021	0.047***	0.044***	0.041**	8.19
	(0.013)	(0.014)	(0.015)	(0.014)	(0.014)	(0.017)	(3.33)
Mother's years of schooling	0.024	0.026	0.031*	0.040***	0.038**	0.040**	7.58
	(0.015)	(0.016)	(0.018)	(0.015)	(0.015)	(0.019)	(3.27)
Share of female teachers	0.450*	0.375	0.228	0.337	0.198	-0.282	0.67
	(0.244)	(0.258)	(0.337)	(0.243)	(0.258)	(0.348)	(0.17)
Principal's management experience	0.004	0.004	0.001	0.006	0.005	0.003	10.65
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.007)	(7.72)
Share of teachers with 10 years of experience or more	0.303*	0.304*	0.377*	0.389**	0.361**	0.521**	0.47
	(0.170)	(0.173)	(0.224)	(0.173)	(0.171)	(0.230)	(0.24)

School offers tutoring classes	0.034	0.029	0.060	0.095	0.064	0.147	0.45
	(0.076)	(0.076)	(0.103)	(0.088)	(0.087)	(0.109)	((0.50)
Number of daily shifts		-0.027	0.007		-0.212**	-0.194	1.79
		(0.091)	(0.125)		(0.099)	(0.136)	(0.41)
Share of leaky classrooms		0.265	0.058		0.084	-0.044	0.07
		(0.209)	(0.245)		(0.250)	(0.329)	(0.21)
Share of classrooms with working board		0.223	0.097		0.343	0.336	0.92
		(0.212)	(0.251)		(0.230)	(0.305)	(0.20)
Number of book sets per students		0.216**	0.368**		0.081	0.303*	0.13
		(0.108)	(0.168)		(0.124)	(0.158)	(0.27)
School has a library		0.004	0.101		0.132	0.207	0.85
		(0.135)	(0.151)		(0.126)	(0.171)	(0.36)
School has a laboratory		-0.066	-0.163*		0.010	-0.037	0.44
		(0.086)	(0.098)		(0.090)	(0.105)	(0.50)
School with clean water		0.140	0.152		0.153	0.266	0.92
		(0.145)	(0.187)		(0.157)	(0.210)	(0.27)
School with electricity		-0.115	-0.164		-0.095	0.153	0.98
		(0.218)	(0.284)		(0.313)	(0.368)	(0.13)
School with clean toilet		0.014	0.052		0.068	0.174	0.79
		(0.110)	(0.129)		(0.110)	(0.134)	(0.40)
Share of students passing the school-leaving examinations with excellent or good grades			0.274			0.310	0.40
			(0.284)			(0.277)	(0.21)
Constant	-7.453***	-7.735***	-9.406***	-6.520***	-6.417***	-9.805***	
	(1.449)	(1.453)	(2.481)	(1.258)	(1.284)	(2.098)	
Rho							
R2	0.205	0.215	0.179	0.261	0.280	0.255	
N	529	529	363	525	525	359	415-603

Note: For columns 1 to 6: *p< .1, **p<0.05, ***p<0.01; robust standard errors in parentheses accounting for clustering at the commune level. For column 7, standard deviations in parentheses.

Table H8: The Determinants of Test Scores for Those with 6 to 9 Years of Schooling, Age 11-15

	Reading			Math		
	OLS	OLS	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)	(5)	(6)
Have 3 to 7 years of schooling	0.100	0.050	0.215	0.144	0.012	0.199
	(0.188)	(0.187)	(0.194)	(0.200)	(0.206)	(0.225)
Years of schooling	0.254*	0.254*	0.340**	0.220*	0.147	0.283*
	(0.131)	(0.133)	(0.137)	(0.131)	(0.134)	(0.146)
Age (in 2006)	-0.337	-0.080	0.203	1.638	1.888**	1.952*
	(0.872)	(0.887)	(1.002)	(1.001)	(0.952)	(1.075)
Age squared	0.011	0.000	-0.012	-0.065*	-0.074**	-0.080*
	(0.033)	(0.033)	(0.038)	(0.038)	(0.036)	(0.041)
Female	0.099	0.080	0.072	0.131	0.104	0.080
	(0.103)	(0.106)	(0.105)	(0.112)	(0.110)	(0.115)
Ethnic minority	-0.027	0.058	0.141	0.098	0.247	0.405**
	(0.216)	(0.214)	(0.191)	(0.183)	(0.198)	(0.193)
Log of real expenditure per capita	0.306**	0.239*	0.291**	0.297**	0.254**	0.262**
	(0.127)	(0.129)	(0.128)	(0.137)	(0.126)	(0.128)
Urban	0.268	0.127	0.066	0.029	0.056	0.090
	(0.228)	(0.296)	(0.301)	(0.398)	(0.469)	(0.490)
Father's years of schooling	0.023	0.020	0.027	0.051***	0.044**	0.053**
	(0.015)	(0.016)	(0.016)	(0.018)	(0.019)	(0.021)
Mother's years of schooling	0.020	0.027	0.021	0.052**	0.056**	0.045*
	(0.017)	(0.017)	(0.016)	(0.024)	(0.024)	(0.024)
Share of female teachers	-0.139	-0.152	-0.287	-0.226	-0.521	-0.739
	(0.454)	(0.464)	(0.481)	(0.469)	(0.461)	(0.487)
Principal's management experience	0.004	0.000	0.001	0.004	-0.003	-0.004
	(0.006)	(0.006)	(0.006)	(0.008)	(0.008)	(0.008)
Share of teachers with 10 years of experience or more	0.206	0.329	0.428	0.180	0.161	0.178
	(0.291)	(0.316)	(0.315)	(0.304)	(0.296)	(0.300)

School offers tutoring classes	0.018	0.037	0.079	0.128	0.061	0.176
	(0.109)	(0.107)	(0.114)	(0.137)	(0.135)	(0.134)
Number of daily shifts		-0.021	-0.026		-0.350**	-0.292*
		(0.138)	(0.151)		(0.140)	(0.152)
Share of leaky classrooms		-0.118	-0.114		-0.200	-0.269
		(0.264)	(0.273)		(0.344)	(0.358)
Share of classrooms with working board		-0.070	-0.099		0.397	0.284
		(0.310)	(0.309)		(0.345)	(0.335)
Number of book sets per students		0.551***	0.756**		0.450**	0.649**
		(0.200)	(0.350)		(0.174)	(0.326)
School has a library		0.185	0.158		0.212	0.187
		(0.182)	(0.164)		(0.160)	(0.183)
School has a laboratory		-0.095	-0.160		0.135	0.078
		(0.105)	(0.107)		(0.123)	(0.124)
School with clean water		0.431	0.439		0.391	0.511
		(0.297)	(0.321)		(0.300)	(0.360)
School with electricity		-0.391	-0.342		-0.097	-0.134
		(0.334)	(0.359)		(0.383)	(0.433)
School with clean toilet		0.006	0.082		0.130	0.235
		(0.141)	(0.133)		(0.148)	(0.146)
Share of students passing the school-leaving examinations with excellent or good grades			0.436			0.783**
			(0.280)			(0.352)
Constant	-2.026	-3.134	-6.143	-15.211**	-15.975***	-17.365**
	(5.915)	(6.041)	(6.852)	(6.364)	(6.100)	(6.931)
Rho						
R2	0.176	0.226	0.289	0.206	0.287	0.335
N	233	233	208	231	231	206

*Note: For columns 1 to 6: *p< .1, **p<0.05, ***p<0.01; robust standard errors in parentheses accounting for clustering at the commune level.*

Table H9: The Determinants of Test Scores for Those with 3 to 12 Years of Schooling for Different Age Groups (Age 10 to 59)

	Reading			Math			Sum.
	OLS	OLS	FE	OLS	OLS	FE	Stat.
	(1)	(2)	(3)	(4)	(5)	(6)	
Have 3 to 7 years of schooling	0.034	0.006	-0.158**	0.018	-0.007	-0.058	0.37
	(0.069)	(0.068)	(0.073)	(0.066)	(0.065)	(0.066)	(0.48)
Years of schooling	0.145***	0.123***	0.067***	0.145***	0.125***	0.077***	8.31
	(0.013)	(0.013)	(0.015)	(0.013)	(0.012)	(0.013)	(2.64)
Age group 10-19	1.032***	0.787***	0.653***	0.723***	0.469***	0.447***	0.30
	(0.065)	(0.075)	(0.099)	(0.059)	(0.069)	(0.085)	(0.46)
Age group 20-29	0.420***	0.244***	0.164*	0.215***	0.017	0.091	0.16
	(0.068)	(0.075)	(0.097)	(0.065)	(0.073)	(0.080)	(0.37)
Age group 30-39	0.199***	0.188**	0.077	0.074	0.029	-0.021	0.18
	(0.073)	(0.074)	(0.097)	(0.065)	(0.068)	(0.085)	(0.38)
Age group 40-49	0.205***	0.173**	0.065	0.092	0.056	0.013	0.22
	(0.065)	(0.068)	(0.088)	(0.061)	(0.064)	(0.073)	(0.41)
Female	0.021	-0.011	-0.034	-0.063**	-0.086***	-0.107***	0.51
	(0.032)	(0.032)	(0.032)	(0.028)	(0.028)	(0.027)	(0.50)
Ethnic minority	-0.337***	-0.287**	N.A.	-0.284***	-0.209**	N.A.	6.46
	(0.122)	(0.114)		(0.106)	(0.102)		(4.07)
Urban	0.125**	0.150***	N.A.	0.096	0.081	N.A.	5.06
	(0.053)	(0.053)		(0.059)	(0.061)		(3.94)
Father's years of schooling		0.018***	0.009		0.019***	0.007	0.05
		(0.006)	(0.007)		(0.006)	(0.007)	(0.22)
Mother's years of schooling		0.027***	0.033***		0.030***	0.022***	0.30
		(0.007)	(0.010)		(0.007)	(0.008)	(0.46)
Constant	-2.001***	-1.915***	-1.233***	-1.786***	-1.729***	-1.169***	
	(0.142)	(0.140)	(0.166)	(0.127)	(0.128)	(0.139)	
Rho			0.483***			0.553***	
R2	0.228	0.242	0.214	0.212	0.232	0.191	
N	3282	2900	2900	3273	2891	2891	2971-3282
Household effects	No	No	Fixed	No	No	Fixed	

*Note: For columns 1 to 6: *p< .1, **p<0.05, ***p<0.01; robust standard errors in parentheses accounting for clustering at the commune level. For column 7, standard deviations in parentheses.*

APPENDIX I: ADDITIONAL TABLES ON ACHIEVEMENT EQUITY

Table I1: Residual of mathematics Roh by provinces (sorted)

Lai Chau	**0.70**	**0.62**	**0.36**	**0.26**
Khanh Hoa	0.31	0.42	0.19	0.23
Tuyen Quang	0.71	0.58	0.36	0.22
Dien Bien	0.70	0.56	0.36	0.20
Lao Cai	0.67	0.54	0.34	0.19
Ba Ria Vung Tau	0.33	0.36	0.19	0.16
Ha Giang	0.76	0.51	0.38	0.13
Phu Yen	0.43	0.35	0.24	0.12
Binh Dinh	0.54	0.37	0.29	0.09
Kon Tum	0.76	0.47	0.38	0.09
Kien Giang	0.54	0.37	0.29	0.09
Dong Nai	0.22	0.22	0.15	0.07
Ca Mau	0.68	0.42	0.35	0.07
Can Tho	0.48	0.32	0.26	0.06
Bac Giang	0.49	0.32	0.27	0.05
Son La	0.80	0.45	0.40	0.05
Ninh Thuan	0.49	0.31	0.27	0.05
Yen Bai	0.78	0.43	0.39	0.04
Quang Binh	0.69	0.39	0.35	0.04
Tra Vinh	0.47	0.30	0.26	0.04
Soc Trang	0.45	0.29	0.25	0.04
Quang Tri	0.44	0.28	0.24	0.03
Dak Lak	0.62	0.35	0.32	0.03
Lam Dong	0.63	0.34	0.33	0.01
Ha Noi	0.47	0.25	0.26	0.00
Quang Ninh	0.73	0.37	0.37	0.00
Thanh Hoa	0.59	0.31	0.31	0.00
Quang Ngai	0.49	0.27	0.27	0.00
Hai Phong	0.51	0.26	0.28	-0.01
Cao Bang	0.78	0.37	0.39	-0.01
Thai Nguyen	0.75	0.37	0.38	-0.01
Phu Tho	0.64	0.32	0.33	-0.01
Ha Tinh	0.51	0.26	0.27	-0.01
Quang Nam	0.42	0.23	0.24	-0.01
Gia Lai	0.67	0.33	0.34	-0.01
Ho Chi Minh	0.41	0.22	0.23	-0.01
Tay Ninh	0.50	0.26	0.27	-0.01
An Giang	0.57	0.29	0.30	-0.01

Bac Lieu	0.72	0.35	0.37	-0.01
Vinh Phuc	0.63	0.30	0.33	-0.03
Nghe An	0.64	0.30	0.33	-0.03
Lang Son	0.63	0.29	0.33	-0.04
Hoa Binh	0.77	0.34	0.39	-0.05
Da Nang	0.43	0.19	0.24	-0.05
Dak Nong	0.62	0.26	0.32	-0.06
Thua Thien Hue	0.57	0.23	0.30	-0.07
Binh Duong	0.51	0.20	0.27	-0.07
Hai Duong	0.66	0.26	0.34	-0.08
Bac Kan	0.80	0.32	0.40	-0.08
Ninh Binh	0.50	0.18	0.27	-0.09
Dong Thap	0.68	0.26	0.35	-0.09
Tien Giang	0.65	0.24	0.34	-0.09
Bac Ninh	0.77	0.29	0.39	-0.10
Binh Thuan	0.39	0.12	0.22	-0.10
Binh Phuoc	0.37	0.11	0.22	-0.10
Hung Yen	0.63	0.22	0.33	-0.11
Ha Nam	0.47	0.14	0.26	-0.11
Ben Tre	0.46	0.14	0.25	-0.11
Hau Giang	0.48	0.15	0.26	-0.11
Long An	0.49	0.15	0.26	-0.12
Vinh Long	0.51	0.16	0.27	-0.12
Ha Tay	0.68	0.21	0.35	-0.13
Nam Dinh	0.60	0.18	0.31	-0.13
Thai Binh	0.60	0.14	0.31	-0.17
Thái Bình	0,60	0,14	0,31	-0,17

Source:Griffin and Cuc, 2009

Table I2: Residual between 2007 reading and 2007 expected and Roh (sorted)

Province name	V_Roh_01	V_Roh_07	V_Roh_ Expcted07	V_Roh_Risidual
Dien Bien	0.61	0.68	0.35	0.32
Lao Cai	0.52	0.58	0.32	0.26
Quang Ngai	0.48	0.55	0.30	0.25
Phu Yen	0.29	0.40	0.22	0.18
Lai Chau	0.61	0.52	0.35	0.17
Tuyen Quang	0.60	0.51	0.35	0.16
Khanh Hoa	0.28	0.37	0.21	0.16
Ha Giang	0.68	0.53	0.39	0.14
Kon Tum	0.72	0.50	0.40	0.10
Ninh Thuan	0.36	0.35	0.25	0.10
Ba Ria Vung Tau	0.29	0.32	0.22	0.10
Tra Vinh	0.46	0.39	0.29	0.10
Ha Nam	0.38	0.34	0.26	0.08
Yen Bai	0.75	0.49	0.42	0.08
Son La	0.74	0.48	0.41	0.07
Hoa Binh	0.64	0.43	0.37	0.06
Vinh Phuc	0.51	0.36	0.31	0.05
Ha Tinh	0.57	0.38	0.34	0.05
Dong Nai	0.15	0.21	0.16	0.05
Phu Tho	0.58	0.38	0.34	0.04
Dak Lak	0.57	0.38	0.34	0.04
Lam Dong	0.53	0.36	0.32	0.04
Kien Giang	0.45	0.32	0.29	0.04
Ninh Binh	0.33	0.27	0.23	0.03
Binh Duong	0.39	0.28	0.26	0.02
Cao Bang	0.75	0.43	0.41	0.01
Quang Tri	0.41	0.28	0.27	0.01
Gia Lai	0.67	0.39	0.38	0.01
Soc Trang	0.43	0.29	0.28	0.01
Bac Giang	0.41	0.27	0.27	0.00
Binh Dinh	0.53	0.32	0.32	0.00
Hai Phong	0.45	0.28	0.29	-0.01
Quang Ninh	0.67	0.37	0.38	-0.01
Quang Binh	0.56	0.32	0.34	-0.01
Can Tho	0.55	0.32	0.33	-0.02
Thai Nguyen	0.68	0.36	0.39	-0.03
Quang Nam	0.46	0.26	0.29	-0.03
Ca Mau	0.56	0.31	0.33	-0.03
Nghe An	0.61	0.30	0.36	-0.05
Dak Nong	0.57	0.28	0.34	-0.05
Ho Chi Minh	0.34	0.19	0.24	-0.05

Tay Ninh	0.40	0.21	0.27	-0.05
Ha Noi	0.37	0.19	0.25	-0.06
Hai Duong	0.58	0.28	0.34	-0.06
Bac Kan	0.70	0.33	0.40	-0.06
Bac Ninh	0.68	0.32	0.38	-0.06
Da Nang	0.33	0.18	0.24	-0.06
Long An	0.35	0.18	0.25	-0.07
Thanh Hoa	0.52	0.24	0.32	-0.08
Thua Thien Hue	0.58	0.26	0.34	-0.08
An Giang	0.54	0.24	0.33	-0.08
Nam Dinh	0.40	0.18	0.27	-0.09
Lang Son	0.63	0.27	0.36	-0.09
Vinh Long	0.52	0.21	0.32	-0.10
Ben Tre	0.32	0.13	0.23	-0.10
Ha Tay	0.57	0.23	0.34	-0.11
Hung Yen	0.54	0.22	0.33	-0.11
Dong Thap	0.55	0.23	0.33	-0.11
Binh Thuan	0.33	0.12	0.23	-0.12
Binh Phuoc	0.39	0.10	0.26	-0.16
Bac Lieu	0.59	0.19	0.35	-0.16
Tien Giang	0.54	0.15	0.33	-0.18
Thai Binh	0.55	0.11	0.33	-0.22
Hau Giang	0.55	0.11	0.33	-0.22

Source: Griffin and Cuc, 2009

Table I3: HLM Slopes as Outcomes Models for Pupil Health, Family SES and Grade Four Result, by Subject (t-statistics)

Variable	TIẾNG VIỆT			TOÁN		
	Pupil health	**Family ses**	**Grade 4 result**	**Pupil health**	**Family ses**	**Grade 4 result**
Constant	24.27	-52.55	60.48	24.41	-47.92	47.85
	-0.65	(-1.23)	-5.13	-0.46	(-0.77)	-3.07
School Characteristics:						
National Standard School	1.94	5.48	2.38	-1.23	10.19	4.62
	-0.41	-0.95	-1.6	(-0.20)	-1.28	-2.47
Fundamental School Index	0.12	0.25	0.09	0.37	0.41	0.11
	-0.55	-0.91	-1.4	-1.39	-1.22	-1.29
Average G5 Class Size	-0.47	-0.05	0.15	-0.09	-0.07	0.29
	(-1.77)	(-0.18)	-1.88	(-0.40)	(-0.20)	-2.76
Total Enrollment	0.001	0.03	0.005	0.003	0.02	0.005
	-0.12	-3.08	-1.66	-0.30	-2.00	-1.36
Head Teacher Experience	0.36	-0.52	-0.05	0.12	-0.15	-0.06
	-1.30	(-1.74)	(-0.61)	-0.24	(-0.37)	(-0.51)
Availability of Benches	-7.60	-5.76	-2.39	-1.66	-2.93	-1.67
	(-1.60)	(-1.03)	(-1.66)	(-0.28)	(-0.40)	(-0.92)
Teacher Characteristics:						
Average Teacher with 12+ Years Education	-5.37	24.25	10.29	13.66	9.25	18.69
	(-0.65)	-2.56	-3.70	-1.34	-0.76	-5.44
Teacher Years Experience	0.18	0.40	0.13	0.44	-0.09	-0.05
	-0.45	-0.87	-1.03	-0.93	(-0.15)	(-0.33)
Excellent Teacher:						
District	5.33	-7.66	-1.86	17.36	14.44	0.14
	-0.46	(-0.61)	(-0.50)	-1.28	-0.82	-0.03
Province	-3.27	18.68	2.73	-0.25	25.16	6.36
	(-0.22)	-1.16	-0.53	(-0.02)	-1.01	-1.03
National	-10.92	16.64	1.00	-17.54	7.61	0.22
	(-0.50)	-0.55	-0.14	(-0.84)	-0.2	-0.03
Marking-Grading (hours/ day)	-1.36	-0.51	-0.53	1.10	3.31	-0.60
	(-0.88)	(-0.26)	(-1.01)	-0.52	-1.31	(-0.88)
Frequency meets with parents	-0.30	3.84	0.19	-6.86	4.96	-0.67
	(-0.09)	-1.01	-0.19	(-1.86)	-1.07	(-0.52)
Frequency observed by principal	-2.48	-2.91	-0.85	-0.09	-2.06	0.25
	(-0.74)	(-0.72)	(-0.76)	(-0.02)	(-0.40)	-0.19
Frequency observed by Colleagues	17.81	3.25	-1.70	3.02	0.92	-1.45
	-2.34	-0.39	(-0.70)	-0.26	-0.07	(-0.43)
Classroom Averages:						
Frequency get homework	3.32	-2.90	-4.20	1.61	-8.83	-4.74
	-0.66	(-0.50)	(-2.69)	-0.26	(-1.23)	(-2.67)

Frequency get feedback on tests/homework	-14.20	4.53	-0.39	-2.77	-0.96	2.40
	(-2.02)	-0.57	(-0.18)	(-0.32)	(-0.10)	-0.88
Frequency work in groups	-2.95	2.24	1.06	4.96	-5.75	2.14
	(-0.43)	-0.27	-0.52	-0.56	(-0.55)	-0.83
Frequency observe pictures and Map	-8.23	-14.07	-4.15	-13.97	-6.08	-6.51
	(-1.26)	(-1.74)	(-2.03)	(-1.68)	(-0.62)	(-2.57)
Frequency do work in study notes	6.39	-0.36	-3.78	2.00	5.05	-2.65
	-1.24	(-0.06)	(-2.26)	-0.30	-0.63	(-1.26)
Frequency study in library	2.00	7.11	-4.28	-1.81	1.66	-5.18
	-0.32	-0.87	(-2.13)	(-0.22)	-0.17	(-2.09)
Random Effect P-Value	0.02	0.00	0.00	0.04	0.00	0.00
Sample Size (schools)	47,993	47,993	47,993	47,993	47,993	47,993
	-3,424	-3,424	-3,424	-3,424	-3,424	-3,424

Source: Vietnam Data 2009

Notes: See text for more detail.

Table I4: 2001-2007 Common Schools Achievement Decompositions

Variable	VIETNAMESE LANGUAGE					MATHEMATICS				
	FE (1)	REML (2)	Means 2001	Means 2007	Decomp. (3)	FE (4)	REML (5)	Means 2001	Means 2007	Decomp. (6)
2007 Year Control (residual)	-6.65	-2.89	----	----	----	13.49	12.41	----	----	----
	(-0.96)	(-1.04)				(1.75)	(4.01)			
Student-Family Characteristics:										
Student Age	-0.53	-2.33	11.91	11.57	1.54	2.78	0.49	11.91	11.57	1.00
	(-0.44)	(-2.60)		(37.40)	(2.63)	(2.15)	(0.70)		(37.40)	(1.90)
Student Female	15.14	13.32	0.49	0.50	0.01	-0.96	-1.61	0.49	0.50	0.11
	(13.54)	(15.19)		(1.60)	(0.63)	(-0.76)	(-1.70)		(1.60)	(0.87)
Frequency Speaks Vietnamese	4.76	10.70	2.81	2.85	0.40	5.09	8.89	2.81	2.85	0.16
	(1.44)	(8.03)		(7.59)	(2.41)	(1.28)	(6.15)		(7.59)	(1.64)
Family SES	22.74	20.06	0.60	0.69	1.48	18.57	18.11	0.60	0.69	1.79
	(6.04)	(5.74)		(43.60)	(2.05)	(4.87)	(4.78)		(43.60)	(3.13)
Student no. of meals	12.46	10.32	2.75	2.81	1.64	11.32	10.74	2.75	2.81	1.62
	(5.34)	(8.88)		(12.13)	(5.19)	(4.46)	(8.51)		(12.13)	(5.64)
Student repeating:										
1 Time	-19.82	-19.11	0.15	0.05	2,97	-19.23	-18.21	0.15	0.05	2.25
	(-6.92)	(-12.20)		(27.93)	(5.95)	(-6.70)	(-10.71)		(27.93)	(5.97)
2 or more Times	-23.46	-15.85	0.03	0.01	0.54	-21.05	-13.73	0.03	0.01	0.68
	(-4.81)	(-4.70)		(17.47)	(1.57)	(-4.19)	(-3.75)		(17.47)	(2.71)
Student school materials	50.76	41.32	0.83	0.92	0.33	50.60	39.83	0.83	0.92	1.55
	(7.05)	(9.87)		(63.42)	(0.32)	(6.41)	(8.77)		(63.42)	(1.83)
Student shift:										
Afternoon only	-2.69	-5.07	0.14	0.12	0.06	-1.55	-7.05	0.14	0.12	0.05
	(-0.68)	(-2.85)		(4.52)	(0.69)	(-0.37)	(-3.66)		(4.52)	(0.72)
Full Day Schooling	8.23	12.05	0.19	0.40	3.92	12.22	17.40	0.19	0.40	2.29
	(2.38)	(7.70)		(43.65)	(4.33)	(3.01)	(10.24)		(43.65)	(3.35)
School Characteristics:										
Average Family SES	99.18	78.21	0.60	0.69	9.13	125.52	100.89	0.60	0.69	6.59
	(8.54)	(33.13)		(59.42)	(5.69)	(10.57)	(15.82)		(59.42)	(4.98)

Average G5 Class Size	0.45	-0.29	33.18	28.62	-4.84	0.94	0.30	33.18	28.62	-1.81
	(1.84)	(-2.61)		(55.93)	(-3.42)	(3.43)	(2.46)		(55.93)	(-1.83)
Average Teacher Education	1.15	-1.04	2.96	4.15	11.84	3.41	2.69	2.96	4.15	3.96
	(0.27)	(-0,62)		(26.02)	(1.71)	(0.72)	(1.48)		(26.02)	(0.76)
Head Teacher Female	9.70	7.87	0.36	0.43	1.05	9.01	4.21	0.36	0.43	0.79
	(2.88)	(4.77)		(12.80)	(2.24)	(2.47)	(2.35)		(12.80)	(2.22)
Head Teacher Experience	0.17	0.20	12.42	10.11	-0.49	-0.36	-0.33	12.42	10,11	-1.08
	(0.74)	(2.00)		(29.20)	(-0.63)	(-1.47)	(-3.22)		(29.20)	(-1.63)
Total Enrollment	-0.004	-0.011	879.5	611.1	1.73	-0.008	-0.013	879.5	611.1	-1.20
	(-0.76)	(-3.73)		(61.04)	(0.78)	(-1.58)	(-4.28)		(61.04)	(-0.86)
Average Teacher SES	43.94	35.73	0.50	0.75	9.73	36.78	33.28	0.50	0.75	8.95
	(4.02)	(7.11)		(13.23)	(2.68)	(3.01)	(6.10)		(13.23)	(3.17)
Excellent Teacher:										
District	4.86	5.32	0.09	0.23	3.01	6.34	5.86	0.09	0.23	2.54
	(1.35)	(2.93)		(34.26)	(3.59)	(1.52)	(2.98)		(34.26)	(3.91)
Province	17.07	12.01	0.03	0.08	1.12	14.94	6.92	0.03	0.08	1.09
	(3.18)	(4.57)		(22.59)	(3.08)	(2.55)	(2.43)		(22.59)	(3.63)
Provincial Fixed Effects?	Yes	No	----	----	----	Yes	No	----	----	----
School-Provincial Random Effects?	No	Yes	----	----	----	No	Yes	----	----	----
Original Weights?	Yes	No	----	----	----	Yes	No	----	----	----
Explained Variance (R^2)	0.25	----	----	----	----	0.28	----	----	----	----
Sample Size (schools)	33,150	33,150	19,857	13,337	33,150	33,131	33,131	19,857	13,337	33,131
	(1,022)	(1,022)	(1,002)	(1,002)	(1,002)	(1,022)	(1,022)	(1,022)	(1,022)	(1,022)

Source: Marshall, 2010..

APPENDIX J: ADDITIONAL TABLES FOR COSTS AND EXPENDITURES ANALYSIS

Table J1: Mean education household education expenditures by type.

Type of Expense	1992	1998	2004	2006
Mean Th. VNDs (2006)				
Tuition	67.9	148.8	255.0	307.4
Parent Association (PTA)	39.9	11.8	94.4	103.4
Books & related	96.9	69.4	95.5	100.3
Other	222.9	520.3	382.1	485.7
Total	*521.0*	*793.1*	*922.6*	*1030.1*
Mean household % spent in[4]:				
Tuition	9.32	11.40	16.02	18.23
Parent Association (PTA)	12.68	1.79	16.91	17.17
Books & related	25.37	13.55	13.10	14.57
Other	27.26	61.80	40.87	45.05

Source: Nores, 2008b.

4 For each child in the VLSS the percentages spent in each of these categories are estimated as a percentage of total household expenditures. These numbers represent the average percentage spent by households on each of these.

APPENDIX K: ADDITIONAL TABLES FOR POLICY ANALYSIS

Table K1: Stepwise Regression Results for School Shift Categories (Morning Only Excluded)

	Afternoon only:			Full day schooling:			Boarding school:		
Estimation	**FE**	**FE Weight**	**REML**	**FE**	**FE Weight**	**REML**	**FE**	**FE Weight**	**REML**
				Vietnamese Language Achievement					
(1) Empty Model	-6,39	-6,13	2,15	24,72	19,71	21,75	40,78	41,49	20,28
	(-2,51)	(-2,39)	(1,32)	(12,97)	(7,77)	(14,85)	(10,22)	(8,77)	(9,09)
(2) Add Grade 4 Result	-5,42	-4,92	1,71	15,23	11,56	12,59	22,39	21,83	9,84
	(-2,49)	(-2,19)	(1,16)	(7,26)	(5,05)	(9,49)	(6,53)	(5,18)	(4,89)
(3) Add Family Background	-2,35	-1,61	2,22	6,45	5,16	8,00	8,55	10,29	4,23
	(-1,36)	(-0,78)	(1,54)	(3,36)	(2,40)	(1,63)	(2,79)	(2,69)	(1,42)
(4) Add School/Teacher Variables	-2,49	-1,37	2,48	3,65	2,80	6,29	4,23	5,95	4,36
	(-1,29)	(-0,67)	(1,73)	(1,90)	(1,32)	(4,75)	(1,42)	(1,59)	(2,17)
				Mathematics Achievement					
(1) Empty Model	-5,91	-6,32	1,94	33,41	25,60	29,79	52,61	48,08	28,96
	(-1,89)	(-1,86)	(0,93)	(12,08)	(7,56)	(15,97)	(10,62)	(8,14)	(10,13)
(2) Add Grade 4 Result	-4,73	-4,84	1,36	21,69	15,44	18,52	29,91	23,58	15,99
	(-1,72)	(-1,64)	(0,72)	(8,55)	(5,03)	(10,87)	(7,01)	(4,56)	(6,15)
(3) Add Family Background	-1,67	-1,28	2,32	11,05	7,24	12,57	13,46	9,70	10,03
	(-0,67)	(-0,47)	(1,25)	(4,63)	(2,51)	(7,49)	(3,49)	(1,97)	(3,89)
(4) Add School/Teacher Variables	-1,35	-1,11	2,73	7,10	3,84	10,32	9,00	4,76	8,26
	(-0,54)	(-0,41)	(1,47)	(2,95)	(1,36)	(6,04)	(2,35)	(0,96)	(3,17)

Source: Vietnam Data 2009

Notes: A total of 12 models were estimated for each subject. In each model the three controls for shift (Afternoon, Full Day Schooling and Boarding School) were included, and the coefficients are interpreted in relation to the excluded category (Morning Only). The four main models begin with the Empty Model that only includes the shift controls and then add more variables until the full model (number 4). Each of these models is estimated using three specifications: Province Fixed Effects, Province Fixed Effects with Weights, and Province and School Random Effects. T-statistics (in parentheses) correct for clustering of students at school level.

Table K2: Indicators and formulas (weighting) for calculating FII points

	FSQL contents	Annual inventory indicators	Grade scale
	Total	**(29 indicators)**	**100**
	1. School organization and management		**26**
1	All Head teachers and Deputy Head teachers graduated from or more than primary teachers' college	% rate of Head teachers and Deputy Head teachers achieved degree of primary teachers' college (12+2) or more than.	2
2	All Head teachers and Deputy Head teachers are given a refresher course or trained technical profession of school management, appropriate to local requirements	% rate of Head teachers and Deputy Head teachers attended education management training at least 5 days a year	3
3	Each school has its own SDP approved by BoET; including implementation measures and monitoring plan for 5 years, 1 year and each semester, close to real situation of school and local area. Specific tasks were assigned to each teacher and school staff annually	% rate of schools having SDP submitted to BoET timely.	6
4	Following rightly teaching curriculum issued by MoET Minister, and technical regulations issued by local education managers.	% rate of full day schooling students	6
		% rate of students learning from 6 to 9 sessions/ week	3
		Number of students attending class regularly	3
		% rate of number of grades learning full subjects following regulation.	2
5	Having table of monitoring and evaluation in accordance with regulation on quanity and quality of educating students in each school – year and 5 successive school – years	% rate of satellites keeping record of attendance and learning results	2
6	Developing plan and guiding measures to manage classes of a satellite and creating favourable learning environment for students.	% rate of Head teachers and Deputy Head teachers working with satellites from 3 times and more than in 1 year.	2
	2. Teaching staff		**27**
7	All teachers graduated from or more than primary teachers' college.	Tỷ lệ giáo viên tối thiểu có bằng 9+3	10
		Tỷ lệ giáo viên tối thiểu có bằng 12+2	5
8	All teachers of schools and satellites are trained to improve profession (continuously or through majors in the summer, in the school - year) at least 50 periods/school - year	% rate of teachers being trained at least 5 days at provincial/district level.	6
		% rate of teachers being trained at least 10 days at school	6
	3. Infrastructure, teaching and learning equipments		**25**
9	School, satellite is located in a high and dry place, convenient for all students; 2 to 3m^2 of play ground for 1 student; fence or boundary for classroom; separate toilets for girls and boys; available well - water or other pure water supplies. There is no house or shop in the school areas.	% rate of satellites having at least 1 toilet reaching FSQL standard.	1
		% rate of satellites having play ground with areas of at least 50m^2	1

10	Classrooms were constructed in accordance with specifications from class 4 to 2, enough natural lighting and school hygiene is ensured. Ensuring conditions for at least 2 disabled students learning inclusive education/class	% rate of classrooms being constructed solidly, following specifications and in good condition (not temporary , hired classrooms or need renovating)	10
11	Classrooms are equipped with enough board, table for teachers and desks and chairs for students.	% rate of classrooms having high-quality boards	1
		% rate of seats (desks and chairs) for students reaching FSQL standard (assumed that on average, 1 classroom includes 30 seats)	2
12	A school and satellite has to have at least a set of teaching aids and materials for one grade.	% rate of classes having teaching aids of Maths in a satellite	1
		% rate of classes having teaching aids of Vietnamese in a satellite.	1
		% rate of grades having supplementary reading materials in a satellite	1
13	A teacher has at least a set of necessary stationery (such as ruler, scissors, chalk, paper, pen); a set of text - books, teacher's guide materials and other vital ones following requirements for each grade in charge by the teacher.	% rate of teachers having enough stationery.	1
		% rate of teachers having one set of teacher's guide materials	1
14	All students of schools and satellites have to have at least one set of text - books, enough minimum learning aids such as notebooks and pencils.	% rate of students having Maths and Vietnamese text - books	2
		% rate of students having minimum learning aids such as notebooks and pencils.	2
15	Ethnic minority students are provided with VLS materials and learning aids, improved Vietnamese to learn other subjects better.	% rate of ethnic minority students having VLS materials.	1
	4. Implementation of education socialization		**7**
16	Schools and satellites have PTA who cooperate with schools periodically with effective performance to educate students Permanent member of PTA is trained about contents, specific measures to support students' learning; developing a friendly education environment between school, family and community; involving in devising; and school supervision. SDP.	% rate of satellites having different PTA	2
		% rate of satellites having at least 2 PTA meetings in a year	3

17	School organizes advocacy activities by many forms to improve community awareness of primary education; in terms of contents, methods and ways of evaluating primary students, creating favourable conditions for community to involve in implementing objectives and plan of primary education. Mobilising involvement from many social resources so that students can have enough minimum learning aids. Mobilizing involvement of family and community in protecting, maintaining school infrastructure to improve quality and make school scene more beautiful.	% rate of satellites reported 'receiving active support from parents' by Headteachers	2
	5. Education activities and quality		**15**
18	Encouraging satellites to teach enough 5 grades for students.	% rate of satellites teaching enough 5 primary grades or 'located near the other satellites teaching enough 5 primary grades'.	15

Table K3: Stepwise Regression Results for Excellent Teacher Categories (no excellent award excluded)

	School level:			District level:			Province level:			National level:		
Estimation	**FE**	**FE Weight**	**REML**	**FE**	**FE Weight**	**REML**	**FE**	**FE Weight**	**REML**	**FE**	**FE Weight**	**REML**
Vietnamese Achievement												
(1) Empty Model	7,06	6,81	3,27	23,90	23,37	11,41	48,48	45,46	20,62	69,46	77,22	33,14
	(2,10)	(2,11)	(1,58)	(7,13)	(7,26)	(5,62)	(11,24)	(10,86)	(8,34)	(4,72)	(5,69)	(4,36)
(2) Add Grade 4 Result	3,63	4,72	1,40	16,35	16,41	7,53	32,87	30,65	12,94	44,64	49,79	18,09
	(1,15)	(1,60)	(0,75)	(5,21)	(5,54)	(4,13)	(8,31)	(8,06)	(5,81)	(3,73)	(4,24)	(2,65)
(3) Add Family Background	-1,00	0,56	-0,23	6,26	7,20	4,77	15,92	15,63	8,47	14,90	24,06	12,00
	(-0,34)	(0,20)	(-0,13)	(2,18)	(2,65)	(2,66)	(4,40)	(4,41)	(3,87)	(1,35)	(2,05)	(1,78)
(4) Add School/Teacher Variables	-1,85	-0,01	-0,59	3,11	4,72	3,65	10,52	11,18	6,79	8,43	17,05	9,97
	(-0,65)	(-0,01)	(-0,32)	(1,12)	(1,76)	(2,03)	(3,04)	(3,20)	(3,09)	(0,79)	(1,50)	(1,48)
Mathematics Achievement												
(1) Empty Model	16,22	14,16	8,57	35,10	33,41	17,68	62,16	60,06	28,36	79,16	85,28	36,11
	(4,10)	(3,18)	(3,22)	(9,06)	(7,47)	(6,79)	(12,00)	(10,20)	(8,93)	(4,45)	(5,21)	(3,69)
(2) Add Grade 4 Result	11,94	11,60	6,20	25,77	25,13	12,88	42,58	41,70	18,81	48,28	51,17	17,48
	(3,24)	(2,85)	(2,57)	(7,16)	(6,14)	(5,45)	(9,09)	(7,90)	(6,53)	(3,27)	(3,61)	(1,97)
(3) Add Family Background	6,61	6,51	4,21	14,19	14,18	9,48	23,10	24,34	13,19	14,75	22,09	9,25
	(1,94)	(1,75)	(1,77)	(4,33)	(3,88)	(4,08)	(5,33)	(5,03)	(4,64)	(1,12)	(1,70)	(1,06)
(4) Add School/Teacher	5,11	5,52	3,47	9,78	11,02	7,65	16,32	18,88	10,88	0,32	8,03	-0,42
Variables	(1,57)	(1,54)	(1,46)	(3,11)	(3,12)	(3,27)	(3,88)	(3,99)	(3,81)	(0,03)	(0,68)	(-0,05)

Source: Vietnam Data 2009

Notes: A total of 16 models were estimated for each subject. In each model the four categories for excellent teacher award were included, and the coefficients are interpreted in relation to the excluded category (no excellent awards). The four main models begin with the Empty Model that only includes the shift controls and then add more variables until the full model (number 4). Each of these models is estimated using three specifications: Province Fixed Effects, Province Fixed Effects with Weights, and Province and School Random Effects. T-statistics (in parentheses) correct for clustering of students at school level.