Schooling, Poverty, and Disadvantage in the Lao People's Democratic Republic

Elizabeth M. King and Dominique van de Walle
The World Bank

Paper presented at the Population Association of America Annual Meeting,
New York City, March 2007

This paper is based on a background paper to the World Bank's new Poverty Assessment for Lao PDR. The authors thank Boun Oum Inthaxoum, Jossy P. Moeis, Jennica Larrison, and Constant Tra for their help with data; Jeffrey Waite, Kaspar Richter, and Martin Ravallion for useful comments; and Keiko Miwa for collaborating with us in designing and piloting the school survey that we linked to the national household survey.

Schooling, Poverty, and Disadvantage in the Lao People's Democratic Republic

Elizabeth M. King and Dominique van de Walle
The World Bank

Schooling is one of the best hopes for improving the lifetime prospects of a child—even a child from a poor family. The benefits—physical, economic, and social—cascade across generations, increasing socioeconomic mobility and reducing poverty. Unfortunately, the poorest children and those who live in remote rural areas are often the hardest and costliest to reach.

This paper examines educational progress in the Lao People's Democratic Republic and the factors that explain current enrollment and attainment. It examines how familiar variables such as household income and access to schools affect school attendance and school outcomes and how these effects vary by gender, geographical location, and ethnolinguistic affiliation (box 1). The evidence presented shows that these divisions are indeed important in determining whether a child has access to schools (especially to good schools) and what level of education the child can attain.

The analysis draws primarily on data from the Lao Expenditure Consumption Survey for 2002/03 (LECS3), as well as on a school survey that was fielded in conjunction with the LECS3 using the same sampling frame. The LECS3 is a nationally representative household survey that covers 8,100 households (National Statistical Centre, Government of Lao PDR, 2004). Where possible we also make comparisons over time using the LECS2, which was fielded in 1997/98 and covered 8,882 households (Bäckström and Säfström 1997). The linked school survey collected detailed information on facilities, personnel, and other characteristics for each primary school available to children of primary school age surveyed in the LECS3.

The paper is organized as follows. The first section overviews long-run trends in educational achievement and literacy, focusing on the effects of gender, location, ethnolinguistic group, and economic welfare. Section 2 examines current enrollment rates of school-age children, their continuation rates from one level to another, and the age profile of students. Section 3 estimates the importance of the factors identified in previous studies as important to schooling. It presents a basic conceptual model that focuses on individual, household, school, and village characteristics before introducing an expanded model that also includes measures of the supply and quality of schools. The last section summarizes the conclusions and draws some policy implications.

This paper is based on a background paper to the World Bank's 2005 Poverty Assessment for Lao PDR. The authors thank Boun Oum Inthaxoum, Jossy P. Moeis, Jennica Larrison, and Constant Tra for their help with data; Jeffrey Waite, Kaspar Richter, and Martin Ravallion for useful comments; and Keiko Miwa for collaborating with us in designing and piloting the school survey that we linked to the national household survey.

Box 1 Ethnolinguistic diversity in Lao PDR

Lao PDR is one of the poorest countries in Southeast Asia, with per capita gross national income (GNI) of just $390 in 2004 ($1,850 using purchasing power parity adjusted per capita GNI). Its GNI is just 15 percent (23 percent) of Thailand's and 70 percent (69 percent) of Vietnam's (World Bank 2005).

The country is ethnically diverse, especially in the north, where at least three ethnolinguistic families are represented in every district. These ethnic groups speak distinct languages, presenting the education system with a difficult challenge. The Lao-Tai family, the largest of the groups, comprises the Northern, Central, and Southwestern branches, each of which has a different language, although most of the language groups belong to the Southwestern branch. Most of the Southwestern Tai languages (Lao, Lue, Tai Dam) have their own writing systems, but only the Lao language system has been developed and officially approved as the national language. In the Mon-Khmer ethnolinguistic family, two Khmou groups and the Katu have elaborated Laoicized alphabets and dictionaries that have not yet been approved by the government. In the Chine-Tibetan family, most languages are in the Lolo-Burmese branch of Tibeto-Burmese. About 50 years ago, missionaries developed romanized scripts for two groups in this family. The Hmong-Mien family is represented by five languages. Of these, Moun and Mien use Chinese characters, while White Hmong use a romanized writing system. There are Hmong alphabets using Lao characters for both White and Green Hmong, but they are not well developed (World Bank 2004).

In parts of the country populated by minority groups, the availability of teachers and textbooks in the local languages is a problem. Ethnic groups that have no tradition of literacy and do not speak Lao face a major disadvantage.

Educational attainment and adult literacy: Uneven progress over time

Educational attainment (the number of years of schooling completed) increased in Lao PDR during the past four decades, rising from two years of schooling for those born in the mid-1940s to more than five years for those born in the mid-1980s. But progress has been uneven.

Because long time-series data are not available, we use differences in the average number of completed years of schooling of adults of different ages to derive historical changes in education levels.[1] To reduce the effect of higher mortality rates among older people, we examine only people 60 and younger. We compare urban and rural populations, as well as males and females. We also subdivide the geographical and gender groups into two ethnolinguistic groups, Lao-Tai and "Other." Two-thirds of the population is Lao-Tai. The rest of the population is Mon-Khmer (21 percent), Hmong-Lu Mien (8 percent), Chine-Tibetan (3 percent), and other smaller groups (1 percent). Dividing the population into just two groups is done for convenience; together the two groups include 50 distinct ethnicities. Minority ethnic groups are found predominantly in rural areas. Because of small sample size, they are not included in the urban category.

Gains in schooling levels

[1] The average number of years of schooling attained is defined as the highest grade completed rather than the actual number of years enrolled in school. Due to grade repetition, the highest grade attained can imply fewer years of schooling than the number of years actually spent in school.

The educational cycle in Lao PDR starts with five years of primary school, followed by three years of lower-secondary school and three years of upper-secondary school. Some students go directly from primary or lower-secondary school to teacher or vocational training, which may take an additional year or two. Others move on to the upper-secondary level and eventually to university. Ideally, a student who completes all levels of education enters primary school at age six and finishes university at 22.

There has been a steady increase in educational attainment in Lao PDR over the past 40 years, as well as important relative changes across population groups (figure 1). In both urban and rural areas Lao-Tai females achieved the largest gains. In urban areas the average schooling years for male and female Lao-Tais was equal, although this was partly achieved by a decrease of one year in the average years of schooling of the youngest men. In rural areas the gender gap narrowed to just over one year, and Lao-Tai females even overtook non-Lao-Tai males some 20 years ago. In contrast, there is no sign of any gender convergence among non-Lao-Tai groups, and the gap between rural Lao-Tai and non-Lao-Tai females and between rural and urban females is widening.

<Figure 1 about here>

For cohorts born between 1943 and 1985 the average number of completed years of schooling started from a low base of two years and increased to 5.5 years—an annual increase of 0.08 school years, or one school year every 12.5 years. Educational attainment is higher for urban populations, but rural populations have gained, indicating a convergence (attainment has doubled for urban populations but tripled for rural populations). Gains, however, were smallest among rural non-Lao-Tai females (just 0.04 school years per year). Even within the youngest cohort, non-Lao-Tai females had 6.6 fewer years of schooling than urban Lao-Tai males, the group with the highest schooling.

Geographic inequalities go beyond urban-rural differences: significant variation exists also across provinces and districts—even elevations. People living in the highlands have the lowest living standards and the worst schooling outcomes. This is one reason why the government adopted a policy of "focal sites" in the late 1980s. Under this policy, residents of highland villages are resettled in lowland focal areas, where basic public services already exist or could be provided more efficiently (Evrard and Goudineau 2004). In 2003 the government introduced a program that focuses on 47 of 143 priority districts. Within this group a further delineation is made between first and second priority districts.

For the most part, changes in average years of schooling over the period spanned by the 1997/98 and 2002/03 LECS reflect growth in consumption.[2] One striking exception is for urban females, among whom schooling increased at given levels of household economic welfare, particularly among the poor. This divergence from the consumption trend is also evident among poor urban males and better-off rural females. It suggests a supply effect (for example due to greater availability of public schools), an increased preference for schooling (for example due to perceived higher returns to education), or both.

Improvements in literacy

[2] King and van de Walle (2005) provide nonparametric regressions of the relationship between schooling and per capita consumption.

The increase in years of schooling has translated into higher literacy (the ability to read and write).[3] Plotting the literacy rate against age yields historical patterns and trends similar to those for years of schooling (figure 2). Urban Lao-Tai males have the highest literacy (more than 90 percent for all cohorts). The continuous increase in years of completed schooling for urban Lao-Tai females is reflected in a sharp increase in their literacy in the past 30 years. As a result of this increase, the literacy rates of male and female 18-year-old Lao-Tais have converged. In rural areas, Lao-Tai males have also achieved relatively high literacy, although lower than that of urban Lao-Tai females. Rural Lao-Tai females have surpassed rural non-Lao-Tai males. Rural non-Lao-Tai females continue to have the lowest literacy, with only 30 percent of the youngest cohorts literate.[4]

<Figure 2 about here>

Literacy has increased among the poor and nonpoor alike, and the gains have generally been both absolutely and proportionally larger for the poor. Nevertheless, literacy remains much lower among the poor, particularly among rural females.[5] Among poor rural females, the literacy rate was 39 percent in 1997/98 and 46 percent in 2002/03. In contrast, among nonpoor rural females, 58 percent were literate in 1997/98 and 67 percent in 2002/03.

Has progress simply been the result of recent economic growth and increases in income? The evidence suggests not: there has been a shift in the relationship between literacy and household per capita consumption between 1997/98 and 2002/03 for various population groups. At every level of real per capita consumption, literacy is higher in 2002/03 than in 1997/98. As with schooling levels, this gain may reflect any of several factors, including increased availability of public schools, greater preference for schooling among the poor, higher perceived returns to education, other policy initiatives (such as a literacy campaign), or some combination of these factors.

The upward shift in the relationship between literacy and household consumption is consistent with a relative gain in schooling for the poor. For the national and rural distributions, absolute gains in literacy are nearly constant across the income distribution, meaning that they are proportionately larger for the poor. However, some significant differences in absolute gains are apparent in urban areas, where absolute gains have been largest for the poorest. The increase appears to have been driven by the enormous progress among poor urban females, who had lagged behind other urban groups. Poor males also achieved some progress, albeit less than females. As a result of these changes, literacy is becoming less skewed by income in urban areas. The same trend is not apparent in rural areas.

School attendance patterns mirror these trends (figure 3).[6] The percentage of people who never attended school is much higher in rural areas than in urban areas. Within both areas, the proportion of the population that never attended school is much smaller among Lao-Tai than other groups. Among both Lao-Tai and non-Lao-Tai, males are more likely to have attended than females, and the nonpoor

[3] The 2002/03 LECS allows a finer definition than the earlier survey by giving an additional measure that excludes those who can read and write only with difficulty. Defining literacy more strictly as being able to read and write without difficulty results in a significant drop in literacy rates, especially among the poor (King and van de Walle 2005).
[4] These figures are consistent with those of UNESCO, which defines literacy as being able to read, write, and understand a short simple statement about everyday life. According to their data, adult literacy (15 and over) increased from 48.2 percent in 1980 to 56.5 percent in 1990 and 64.8 percent in 2004. Among people ages 15–24, the literacy rate increased from 62.6 percent in 1980 to 70.1 percent in 1990 and 78.5 percent in 2004 (see the entry on Laos at the Global Virtual University's website, http://globalis.gvu.unu.edu/country.cfm?country=LA&indicatorid=0, copyrighted 2003-2007).
[5] Poverty is defined using the cost of basic needs method whereby the poor are those with real consumption per person lower than the cost of a given food and non-food basket of goods. See Richter, van der Weide, and Souksavath 2005.
[6] Throughout this paper, quintiles are of the national population ranked by household per capita consumption in 2002/03.

are more likely to have attended than the poor. Particularly striking is the pronounced disadvantage of both poor and nonpoor non-Lao-Tai females, especially in rural areas.

<Figure 3 about here>

Educational inequality among children now in school

This section examines children currently in school. It describes school enrollment patterns of different groups of children, including age at entry and school continuation rates.

Enrollment in primary and secondary school

Among children in the official primary school-age group (ages 6–12), the gross enrollment rate was 79.8 percent and the net enrollment rate 69.2 percent in 2002/03, according to the LECS. Using UNESCO data for several Asian countries, Lao PDR ranks not too far behind Cambodia or Thailand: in 2001 the gross primary enrollment rate was 86.2 percent in Cambodia, 86.3 percent in Thailand, and 82.8 percent in Lao PDR.[7]

But averages mask enormous variance (table 1). Urban children are more likely to be in school than rural children, Lao-Tai children are more likely to be in school than non-Lao-Tai children, boys are more likely to be in school than girls, and nonpoor children are more likely to be in school than poor children. The one exception to this pattern is urban girls, who have slightly higher enrollment than urban boys. Age-specific participation rates for children ages 6–12, independent of poverty status, range from 52 percent for rural non-Lao-Tai girls to 92 percent for urban Lao-Tai girls—a striking difference. Differences between these two groups in gross enrollment rates (63 versus 87 percent) and net enrollment rates (51 versus 79 percent) are also huge. Taking poverty into account, age-specific participation rates range from 46 percent for poor non-Lao-Tai girls in rural areas to 93 percent for nonpoor Lao-Tai boys and girls in urban areas—another huge difference.

<Table 1 about here >

These numbers obscure further disparities across ethnicity groups. Some groups included in the "Other" ethnolinguistic group fare much worse than others (table 2). Enrollment rates among rural 6–12-year-olds from the Chine-Tibetan ethnolinguistic group are considerably lower than rates among other groups, with just 39 percent of boys and 33 percent of girls enrolled in school. Rural girls in the "other" non-Lao-Tai group have an age-specific enrollment rate of just 30 percent. Due to small sample size, especially in urban areas, we present results for these non-Lao-Tai minority groups in an aggregated form in all other tables and figures. It is important to keep in mind, however, that there is heterogeneity within the non-Lao-Tai ethnolinguistic group.

<Table 2 about here>

Another way of examining the enrollment gaps across income groups is to look at the relationship between enrollment and household per capita consumption (figure 4).[8] Enrollment rises with

[7] There may be some discrepancy between the UNESCO enrollment data for Lao PDR and the LECS3 data.

[8] The nonparametric regression yields the estimated mean of the variable on the vertical axis calculated at each value of the horizontal axis, without assuming a parametric model linking the two variables. These nonparametric regressions are locally weighted smoothed scatter plots.

household consumption, particularly in rural areas. This is true for all groups, although the urban-rural gap narrows at higher consumption levels. The enrollment rates of boys, girls, and Lao-Tai children converge at higher levels of consumption. In contrast, the urban-rural enrollment gap remains large even at higher consumption levels for the non-Lao-Tai groups. The largest schooling gap is for poor girls. At all levels of consumption, enrollment is also much higher in the lowlands than in the highlands (King and van de Walle 2005).

<Figure 4 about here>

A severe drop-off in enrollment occurs between primary and secondary school. At the lower-secondary level, net enrollment is just 31 percent and gross enrollment 44 percent (table 3). This rate ranges from 7 percent for "Other" rural girls to 54 percent for Lao-Tai urban boys. Bringing in the income dimension makes the picture even starker. For the poor, net secondary school enrollment ranges from 3 percent for rural "Other" girls to about 33 percent for urban girls.

<Table 3 about here>

Why don't Laotian children go to school? Nationally, nearly 40 percent report never attending school because they are not interested. This response is vague but it could reflect low expected returns to schooling or low perceived relevance of school content. Another 27 percent report that the school is too far, 14 percent report having to work, and 8 percent report that they (or their parents) believe they are too young. There are striking differences in the relative importance of these reasons in urban and rural areas (table 4). In urban areas, about one-third of children 9–18 not in school report that they have no interest, 19 percent report that they have to work, 13 percent that they are too young, and 9 percent that the school is too far away. By comparison, 37 percent of those in rural areas report that they have no interest, 13 percent that they have to work, 7 percent that they are too young, and 28 percent that the school is too far away. Across these groups, illness was a reason given by 3-4 percent of children.

<Table 4 about here>

The reasons why the poor and nonpoor do not enroll in school also differ, especially in urban areas. The urban poor are much more likely than the urban nonpoor to report that they have to work (27 percent versus 12 percent) or that the cost of schooling keeps them out of school (5 percent versus 0 percent). Illness is also much more common among the urban poor (8 percent versus 0 percent). The urban nonpoor are more likely to state "other" as a reason for not enrolling in school (27 percent versus 8 percent) and much more likely to report that the school is too far away (13 percent versus 5 percent).

In rural areas distance is more often an issue for the poor (32 percent) than the nonpoor (24 percent). Other differences across income groups are small. Interestingly, although not speaking the language of instruction at home is often noted in the literature as a deterrent to schooling, it was rarely cited. Similarly, the direct cost of schooling (as distinct from the opportunity cost) was rarely cited—even among the urban poor, only 5 percent of respondents cited direct cost.

Late entry into primary school

Many children enter the primary cycle later than the prescribed age of six (table 5). The maximum enrollment rate at the primary level is achieved only by age 9 or 10. As a result, children remain in the

primary cycle until their mid to late teens. Rural children who enter school do so later than urban children. A larger percentage of them—male or female, poor or nonpoor, Lao-Tai or not—are still at the primary level even in their late teens.

The average age at which children start school has declined over time, however. In 2002/03, nearly 80 percent of 10 year olds had entered school by age eight, compared with just more than 20 percent for those currently 18 years old.[9]

<Table 5 about here>

School continuation and completion

The probability of continuing in school falls markedly at the end of each basic cycle, particularly at the end of the primary cycle. In rural areas only about 70 percent of boys and less than 60 percent of girls are still in school at the end of grade 5. Continuation rates are much higher in urban areas at nearly all grades and the drop at the end of the primary cycle lower. The probability of remaining in school beyond fifth grade is lower for girls than for boys, for the poor than for the nonpoor, and for the non-Lao-Tai than the Lao-Tai, in both urban and rural areas. Children who continue through lower-secondary school are highly likely to make it through the entire basic cycle, however, so the transition from the primary level appears to be a critical hurdle in the schooling process. Still, school continuation rates have been improving, with postprimary drop-off rates significantly higher for the 18–24 age cohort than for the 6–18 age group.

Why is dropping out of school so pronounced at the end of the primary cycle? Thirty-one percent of 12-year-olds reported cost as the key reason why they dropped out of school, while 30 percent reported having no interest in continuing their studies. Older children cited three reasons most frequently: lack of interest, having to work, and distance to school. Few respondents cited lack of teachers or supplies or language of instruction. Distance to the school was cited as the key constraint more often in rural than urban areas (20 percent versus 7 percent), while the need to work was cited 35–40 percent of the time in both urban and rural areas, across quintiles.

Explaining educational inequalities

What explains differences in school enrollment in Lao PDR? Economists have used household demand models to explain male-female schooling gaps in developing countries. According to those models, girls' schooling can lag behind boys' schooling for several reasons. Unequal provision of schools makes schooling more costly for girls than for boys. Social norms about gender roles within the family may mean that girls face higher opportunity costs of schooling due to their value in home production, or that they face fewer market opportunities in the future, or that, even when market returns do not differ between the sexes, they are less able to take advantage of market opportunities due to discrimination against women participating in the formal labor force. These reduce the returns on girls' schooling relative to those of boys. Finally, parents prefer that boys have more schooling than girls for traditional reasons.[10]

[9] LECS3 included a question asking respondents the age at which they started school, so this information is not a computed age of entry as it often is in the literature..

[10] See Haddad, Hoddinott, and Alderman (1997), Alderman and King (1998), and Schultz (2002) for reviews of the literature.

Much less research has been undertaken on the gap between urban and rural children, even though it is common and quite large in many countries.[11] Although the economic choice is made across households rather than within a household, urban-rural schooling gaps can be explained by the same factors that explain gender gaps: significant inequalities in the supply and quality of schools, in the costs associated with schooling (including the value of children's time in school), in expected market returns to education, and in credit constraints faced by households.[12] The working assumption is that the economics of the education decision is similar in urban and rural areas. This suggests a model that constrains the coefficients of the explanatory factors to be equal for urban and rural households, with any additional effect of place of residence captured by a dummy variable for urban or rural residence. In this model any difference in the elasticity of demand with respect to household income, for example, along the full range of household incomes (consumption) in urban and rural areas, can be considered simply by using a nonlinear specification for the income (consumption) variable.

However, a simple comparison of incomes, costs, or returns in urban and rural areas may be misleading. Household members engage in very different activities in urban and rural areas. Compared with urban areas, rural areas have a greater incidence of unpaid home production and self-employment; measures of the opportunity costs of schooling and the market returns to schooling therefore capture basic differences in the tradeoffs and opportunities a household faces.

To illustrate this structural difference between urban and rural areas, consider the response of Indonesian households to the country's 1998 financial crisis. Thomas and others (2004) find that per capita household incomes fell 25 percent in urban areas and 15 percent in rural areas. Although household incomes fell less in rural areas, children reduced the time spent in school more, suggesting higher income elasticities. This negative effect was largest among the poorest households.

Even less attention has been given to schooling inequality across ethnic (or racial) groups in developing countries. Data on ethnic affiliation are often not available due to the political sensitivity of this issue; household surveys are more likely to ask about the main language spoken in the household rather than ethnicity. Moreover, ethnic affiliation is difficult to interpret in countries with a multitude of minority groups. Yet ethnic (and racial) differences correspond to significant differences in education in many countries. In several Latin American countries, indigenous groups complete many fewer years of schooling than their nonindigenous peers (Hall and Patrinos 2006). The average nonindigenous Paraguayan has 7 years of schooling, while the average indigenous Paraguayan has just 2.2 years. In Bolivia and Chile, indigenous students score 0.3–0.5 standard deviations below nonindigenous students on math and Spanish exams, with only 20–40 percent of the difference attributable to socioeconomic inequality. Geographic isolation is often a primary reason for ethnic disparities in education: in Lao PDR ethnic minorities live predominately in rural areas and the highlands. Language differences are also a barrier, one that is not solved easily, especially in a country with many ethnolinguistic groups.

We examine the demand for schooling in Lao PDR using a set of individual and household data that reflect the factors discussed above. In addition to gender, urban-rural location, and ethnolinguistic affiliation, we include measures of household welfare (proxied by consumption expenditures), parental

[11] Rural education lags behind virtually everywhere in the world, with school participation rates differing by 16–20 percentage points across age groups. Gender gaps are smaller (1–6 percentage points in urban areas and 5–12 percentage points in rural areas). In developing countries gender differences in schooling are largely a rural phenomenon (Orazem and King 2007).

[12] Urban-rural inequalities and ethnic and racial inequalities in education have been found to determine school enrollment and schooling attainment in Cambodia (World Bank 2005), China (Hannum 2002), Malaysia (Anderson, King, and Wang 2002), Peru (Diaz and others 2004), South Africa (Case and Deaton 1999), Turkey (Tansel 2002), and Vietnam (Baulch and others 2004; Behrman and Knowles 1999).

education, the age-gender composition of the household, and village and school characteristics.[13] Before reporting these estimates, first we examine the differences in three factors—direct school costs incurred by the household, the opportunity cost of children's time, and aspects of school supply—and how they may affect schooling decisions.

Private expenditures

Underlying the relationship between per capita household consumption and average years of schooling in Lao PDR is the fact that schooling is not free. Education costs to households include direct expenditures as well as forgone income from child labor. Turning first to the direct costs of primary education, per student education expenditures account for 16 percent of per capita household expenditures in urban areas and 9 percent in rural areas. For secondary education, schooling consumes 21–22 percent of per capita household expenditures in both urban and rural areas.

Expenditures per primary school student are much lower than expenditures per secondary school student, at about 40 percent of secondary school expenditures in rural areas and 60–80 percent in urban areas (table 6). Per student expenditures for both levels are generally lower in rural than in urban areas, and the poor spend less in absolute amounts than do the nonpoor.

<Table 6 about here>

Uniforms account for the largest share of household education expenditures at both the primary and secondary levels, about 50 percent in rural areas and 35–40 percent in urban areas. The second-largest cost in rural areas is textbooks and materials (20–25 percent); in urban areas, it is transportation, meals, and lodging (21 percent). Tuition and parent-teacher association fees account for less than 10 percent. Tuition accounts for less than 5 percent in rural areas and about 7 percent in urban areas; parent-teacher association fees represent an additional 2–3 percent in rural and urban areas.

Higher opportunity costs for rural girls

The opportunity costs of a child's time in school could deter school enrollment. The average Laotian child between 10 and 16 years of age spends 11–12 hours on average sleeping, eating, and engaging in personal care, devoting the rest of the day to leisure, work, school, travel, and other activities (table 7).[14] School (including time spent doing homework) accounts for only a small part of each day—from 2.0 hours for poor rural girls to 4.4 hours for nonpoor urban boys. Boys—poor and nonpoor, urban and rural—spend a larger part of each day on leisure and schooling than do girls. By contrast, girls spend the majority of their disposable time working, both inside and outside the home.

<Table 7 about here>

Poor rural girls spend the fewest hours in school, working 5.3 hours a day instead; nonpoor rural girls work 4.6 hours. Female labor in rural areas is almost evenly divided between on-farm agricultural work (2.0–2.2 hours, spent primarily tending rice, other crops, and animals) and domestic work (2.0–2.5 hours). Domestic work includes cooking, cleaning, washing, collecting wood and water, and taking care of children and elderly household members. Poor rural girls spend almost three hours a day each fetching water, collecting firewood, and caring for other household members. Rural boys spend

[13] The elasticity of demand for schooling with respect to household income or expenditure can be larger than in developed countries. For example, elasticities reported by (or derived from reported estimates) by Bhalotra and Heady (2003) for Pakistan and Handa (2002) for Mozambique are near or greater than 1.

[14] This information is produced by linking household and individual level data from the LECS3 with a module on time use that was administered to all individuals ages 10 and older residing in sample households.

1.7–2.1 hours a day farming and about an hour hunting and fishing. They spend much less time helping with household chores.

Urban children who work are more likely than rural children to be involved in part-time wage work or self-employment activities. Both boys and girls spend about an hour a day on agricultural work. Urban boys spend about 30–45 minutes fishing and hunting, while girls devote about 30 minutes to sewing and weaving. Overall, children spend about an hour on travel and "other" activities, with urban children spending more time on these activities than rural children.

Fewer and lower-quality schools for non-Lao-Tai children

In many other countries, the availability of schools within a reasonable distance has been shown to be an important determinant of school attendance.[15] Lao PDR had 8,573 primary schools in 2004, or 15 primary schools per 10,000 people. According to our data, 84 percent of the population lives in a village with a primary school, but this figure varies across urban and rural areas and therefore across ethnolinguistic groups too (table 8). In urban areas 84 percent of Lao-Tai and 70 percent of non-Lao-Tai have access to a primary school. The percentage of the population served by a primary school is higher in rural areas (88 percent of Lao-Tai and 80 percent of non-Lao-Tai), but as we see below, a larger percentage of schools in these areas do not offer the full cycle or are multigrade. In both urban and rural areas, this measure of school supply does not necessarily mean that children residing in a village without a school do not have access to a primary school, because they can attend a school in a neighboring village.

<Table 8 about here>

Although the number of lower-secondary schools in Lao PDR increased between 1989 and 2004, a far smaller percentage of the population has access to lower-secondary schools than to primary schools—31 percent of nonpoor urban Lao-Tai and 3 percent of poor rural non-Lao-Tai. Upper-secondary schools are even scarcer—only 3 percent of Lao-Tai and 1 percent of non-Lao-Tai population are served by such schools.

School quality also varies. To summarize several measures of quality, we construct a school quality index, based on a regression of enrollment on individual school characteristics.[16] Our measure is based on school inputs and facilities rather than level of student performance. The index varies from 0.17 to 1.0, with a mean of 0.60. Values are lower for rural areas than urban areas and lowest for the poor, rural, non-Lao-Tai population.

School quality rises with household living standards (figure 5). In rural areas school quality rises with consumption levels, leveling off for consumption levels above the rural mean of 140,000KN per capita. The living standards gradient is less pronounced in urban areas. Except for the very poorest among them, non-Lao-Tai groups in urban areas tend to have access to better schools than do the Lao-Tai. In contrast, in rural areas Lao-Tai groups tend to have access to better schools.

<Figure 5 about here>

[15] See Duflo (2004), Handa (2002) and Tansel (2002) for the effect of school supply on enrollment in Indonesia, Mozambique and Turkey, respectively.

[16] The estimated regression coefficients on school characteristics provide a way of aggregating individual school characteristics, using their relative effects on schooling enrollment (purged of household and individual effects) as weights. The resulting quality estimates are then normalized as a continuous variable between zero and one. The index is plotted against expenditure per capita in figure 5.

Inequality in the supply of teachers deserves special attention. Teacher deployment is partly the result of a quota system that requires newly trained teachers to return to their home district. This requirement restricts teacher mobility and the capacity of the school system to balance supply (Asian Development Bank 2000). The average pupil-teacher ratio for primary schools in Lao PDR is about 30 to 1. It is slightly higher in urban areas and for non-Lao-Tai, but the differences are not large. This reflects the government's policy of allocating an additional teacher to a school when enrollment increases by 33 students.

Balancing teacher supply is not just about getting the numbers right—the distribution of teacher characteristics may also matter. In urban areas two-thirds of teachers are women, perhaps giving an impetus for more girls to go to school. The opposite is true in rural areas, where teaching represents a coveted opportunity for wage employment for educated men. Lao-Tai children are taught predominantly by Lao-Tai teachers (90 percent in urban areas and 80 percent in rural areas). Children from other ethnolinguistic groups are much less likely to be taught by a Lao-Tai teacher, suggesting that schools tend to rely on local teachers, especially in rural areas, most likely because of the tremendous language diversity in those areas.[17] The educational attainment and experience of the average teacher are highest in urban areas for Lao-Tai students and lowest in rural areas for non-Lao-Tai students. In schools accessible to Lao-Tai students in urban areas teachers have an average of 10 years of schooling and about 15 years of experience. In contrast, teachers in schools accessible to non-Lao-Tai children in rural areas have 9 years of schooling and 9 years of experience—perhaps reflecting the recent expansion of schools in areas where the rural non-Lao-Tai live. The differences in education are not large, but the experience gap of six years is substantial and may result in worse teacher performance. We have no evidence of the impact on student learning.

Results of the model: Explaining school enrollment and attainment

We estimate a model with individual, household, community, and school variables (table 9). We estimate the model for the full sample of children 6–15 years of age, for six subgroups based on residence, gender, and ethnolinguistic affiliation, and for more disaggregated samples based on all three characteristics at the same time (see tables A.1 and A.2 for variable definitions and basic descriptive statistics). We find striking differences in the normalized coefficients of the probit model, estimated as marginal effects, between the samples of boys and girls, urban and rural children, and Lao-Tai and non-Lao-Tai children. Indeed, Wald tests reject equality of the models across these groups.

To aid interpretation, we transformed the estimated probit coefficients into marginal effects, evaluated at the means. Standard errors in all estimated regressions have been corrected for heteroscedasticity and clustering at the village level.

<Table 9 about here>

Estimates for the full sample

[17] There are advantages and disadvantages to using local teachers. Teacher attrition is lower among local teachers and they are better able to communicate with students and parents. But local teachers in non-Lao-Tai areas may have limited facility in the majority language, and they may not be equipped to teach the national curriculum.

Our results confirm the inequalities documented above: girls are 8 percent less likely to be enrolled in school than boys, and non-Lao-Tai children (except for Mon-Khmers) are significantly less likely to attend school than Lao-Tai children, with this disadvantage being largest (by 20 percent) for Chine-Tibetans. The results also confirm that enrollment rates peak at ages 9–11 and decline thereafter. A disability lowers a child's probability of attending school by 13 percent.[18]

Household size does not matter for enrollment, but the composition of the household does.[19] Controlling for household size, the higher the proportion of household members under six or 6–16 years of age, the lower the probability that a child is in school. This negative association (of 15–24 percent) is largest with respect to the share of under-six children. One interpretation of these results is that they capture the effect of schooling costs, both direct and opportunity costs, on families with more children. Surprisingly, even the number of adult men relative to adult women in the household is negatively associated with school enrollment, albeit with less statistical significance.[20]

We use household expenditures to measure the family's ability to incur schooling costs, its desire to have more highly educated children, or both. We find a positive association with enrollment, although the expenditure gradient is not large. All else equal, increasing log per capita consumption of the household by one unit—increasing the level of consumption by a factor of almost three—increases the probability of a child going to school by 6 percent.[21] The probit regression of schooling on per capita expenditures (and no other regressors) gives a highly significant (z-stat = 11.2) estimated coefficient of 0.21—more than three times the size of the partial regression coefficient including the controls. Controlling for other observable characteristics, however, this coefficient falls, suggesting a considerably lower importance of living standards for achieving universal primary school enrollment.

Related to the expenditure variable is the completed education level of the household head and his or her spouse, but having controlled for household expenditures, these education variables are probably measuring parental preferences for schooling. We expect more educated parents to value their children's schooling more highly—indeed child enrollment is associated positively with parents' education, albeit at a weaker level than expenditures.

Our estimates also include school factors for which we have measures.[22] In general, these variables pertain to the school nearest to the household, whether within the community or in the next village or city—that is, the school attended by most households in the sample area. [23] Few past studies have had access to data on the family and community background of children as well as the characteristics of

[18] Using Demographic and Health Survey data for seven countries, Filmer (2005) estimates that, after controlling for age, gender, residence, and household wealth, the enrollment gap due to a child's disability is 15.8–67.4 percentage points. In Cambodia he estimates that disability lowers enrollment by 26.6 percent for children ages 6–17.

[19] Since our regression also includes log per capita expenditures, the log of household size measures whether there are scale economies in schooling. The results indicate that there are none.

[20] Jacoby (1994) and Bhalotra and Heady (2003) have included a similar set of household composition variables and have interpreted the results as indicating also the opportunity cost of schooling.

[21] The national panel in Figure 4 shows a strong relationship between economic welfare and school enrollment. It would be tempting to draw strong implications from Figure 4 about the importance of economic growth. However, controlling for other characteristics, living standards are seen to be much less central to achieving primary school enrollments.

[22] Compared with the basic model without school variables, the coefficients of the household and child characteristics in the expanded model remain qualitatively the same, but there is loss in coefficient size for some due to a positive correlation between household and community variables and the added school variables. The ethnicity variables also lose statistical significance, except for the variable representing Chine-Tibetan affiliation. In addition a child is now more likely to be enrolled in school in male-headed households.

[23] We do not attempt to address the statistical issue of endogenous school characteristics in our estimates because school choice is very limited in Lao PDR.

the schools available to them. Those that used both sets of data find that family background effects tend to dominate school effects (Levin 1995; Glewwe 2002). Past studies on Asian countries have found that distance to school deters enrollment (Anderson, King, and Wang 2002 for Malaysia; Maliki 2005 for Indonesia), tuition reduces enrollment (Behrman and Knowles 1999 for Vietnam), and having more educated teachers increase enrollment (World Bank 2005 for Cambodia).

In Lao PDR 71 percent of schools are incomplete (they do not offer all primary grades), have multigrade classrooms, or both. These schools are associated with weaker outcomes, but children who have access to a complete primary school are 25 percent more likely to be enrolled.[24] Better school infrastructure—as measured by the availability of electricity, the existence of desks for each student, and the physical condition of classrooms (as measured by the proportion of classrooms with nonleaking roofs)—also promotes enrollment, though the effect is considerably smaller than having a complete school without multigrade classrooms. The distance from the primary school to a city or to a lower-secondary school and the average time it takes for a student to walk from home are negatively related to enrollment. Unexpectedly, the school's distance to a paved road is positively, not negatively, associated with a child's enrollment, although this effect is negligible.

Our results on school fees are contradictory and warrant discussion: higher tuition increases enrollment, whereas higher examination fees reduce enrollment. Neither of these results is statistically significant in the full-sample model. As a result of a policy to reduce tuition fees, these fees represent only a small share of education expenditures (3–7 percent). One possible explanation for tuition's positive coefficient is that, though small, tuition signals a school's quality and its access to extrabudgetary resources, as tuition fees are generally retained by the schools and "always dedicated to operating expenses/current management and small investment" (European Union 2005, 31).

We turn now to the characteristics of teachers and principals. Differences in average teacher education across groups are not large, but our probit estimates suggest that those differences matter.[25] Teachers' ethnolinguistic affiliation may be reflecting the quality of teachers' education and training, because having more Lao-Tai teachers in the school, irrespective of the ethnicity of the majority of students, increases enrollment. While the proportion of male and female teachers does not seem to matter, having a male principal does—more than the principal's ethnic affiliation. Having an officially-designated principal in the school has a negative effect on enrollment. We do not understand this effect, but having a principal might mean one fewer teacher, especially in smaller schools.

Interactions between province and urban-rural location—38 residence dummy variables in all (omitted from table 9 for the sake of brevity)—capture geographical variation and heterogeneity not captured by other included variables, including an area's ability to supply schools and the local demand for an educated labor force. With one exception we obtained positive coefficients for the urban-province variables; with two exceptions we obtained negative coefficients for the rural-province variables.[26] Although a strict urban-rural dichotomy is seldom an accurate representation of economic difference across areas, our results indicate that urban areas are associated with higher enrollment, controlling for other characteristics. There are strong geographical effects.

[24] Incomplete schools have also been found to raise dropout rates and repetition rates in Cambodia (World Bank 2005).
[25] This result contrasts with that found in Cambodia (World Bank 2005), where dropout rates fall with higher average teacher experience and schooling. The study also finds that the characteristics of teachers and school principals are highly correlated, making it difficult to separate their effects.
[26] These estimates are relative to the urban province of Vientiane City.

Two other variables reflect local economic conditions. The regression already controls for province urban and rural fixed effects, so the altitude of the village measures the specific effect of living in highland areas where schools tend to be of lower quality and are more difficult to reach. Children in highland villages are 7 percent less likely to be enrolled. Children residing in priority districts are significantly less likely to be enrolled than those in nonpriority districts.

Estimates for urban and rural groups

Thus far we have implicitly imposed the restriction that, except for a shift term, the coefficients are equal for urban and rural groups. To test this restriction, we disaggregate the full sample by household residence; this yields some striking differences in the results for urban and rural groups which suggest that keeping the geographic samples together hides importance differences between them:

- Being female makes no difference in school enrollment in urban areas but is a significant disadvantage (9 percent) in rural areas.
- For urban and rural children, enrollment peaks at 9–11 years, but the increase in enrollment beyond age six is much more pronounced in rural areas (30 percent increase) than in urban areas (7 percent increase), indicating a much later age of entry in rural areas. In rural areas enrollment still rises after age 11.
- The age-gender household composition variables have much larger (and significant) coefficients for the rural sample, perhaps reflecting the larger demands of the household economy on the resources and time of household members. In rural (but not urban) areas, the greater the shares of household members of different ages relative to adult women, the less likely a child will be in school. Having preschool boys depresses enrollment equally in both urban and rural areas—by much more than the opportunity cost effect of the other age-gender composition variables. The effect of preschool girls is larger than that of preschool boys in rural areas and smaller in urban areas.
- The education of the male head of household matters more in rural areas, and the spouse's education is significant only in rural areas, but these effects are very small.
- Residence in the highlands and residence in priority districts are a significant disadvantage for children in rural areas.
- Rural areas are more than twice as likely to have a complete primary school in the village that does not include multigrade classrooms, presumably because it is easier for urban residents to attend a school in a neighboring community. The school distance variables are also statistically significant in both urban and rural areas (though having different signs), but their coefficients are very small.
- School infrastructure—electricity in the school and nonleaking classrooms in particular—has a larger effect in rural areas. Examination fees have a significant negative effect in urban but not in rural areas. These effects are very small compared with the effect of having a complete primary school without multigrade classrooms.
- The share of Lao-Tai teachers has a positive and significant coefficient in urban but not in rural areas.

Estimates for boys and girls

Instead of keeping the girls and boys in one sample, we now disaggregate by sex in estimating our model. Girls' schooling is generally more precarious than that of boys, vulnerable to the costs of

schooling and to changes in the socioeconomic and demographic conditions of the household. We find significant differences in the results for the other variables:

- Boys and girls do not have the same age-enrollment profile. Boys who do not enter school by the peak ages of 9–11 are likely to enter school later. Girls not in school by ages 9–11 are unlikely to do so.
- Ethnolinguistic differences are more pronounced for girls than for boys. Compared with boys, girls from the Chine-Tibet group are much less likely to be in school than those from the Lao-Tai group.
- The household's age-gender composition has a much larger, statistically significant effect on girls: the number of children—even the number of men—relative to the number of women reduces girls' enrollment.
- Living in the highlands or a priority district has a greater (negative) effect on girls, indicating that girls' enrollment is more highly correlated with the household's living standard and the economic value of schooling in the community.
- Having a complete primary school without multigrade classrooms in the village appears to have a much greater effect on girls. Controlling for this, the time to walk to school is negatively associated with enrollment for boys but has no apparent effect for girls. Tuition has a positive effect on enrollment for girls but not for boys. If this variable is indeed measuring school quality, the results could indicate that girls' enrollment is more responsive to school quality. Examination fees have a negative effect on enrollment, but this variable is significant only for boys. School characteristics have more pronounced and statistically significant effects on girls.

Estimates for more disaggregated samples

We now disaggregate the four groups, defined by residence, gender, and ethnolinguistic affiliation, and estimate the same probit models separately for each. For the rural subgroups, Wald tests reject the hypothesis that the models for boys and for girls are equal within the Lao-Tai population ($chi^2(55) = 234.7$, probability>$chi^2 = 0.0000$) or within the non-Lao-Tai group ($chi^2(55) = 322.6$, probability>$chi^2 = 0.0000$). The tests also reject equality of models among the rural ethnolinguistic groups for girls ($chi^2(57) = 4126.5$, probability>$chi^2 = 0.0000$) and for boys ($chi^2(57) = 6760.2$, probability>$chi^2 = 0.0000$). For the urban subgroups the tests reject equality of models for boys and girls ($chi^2(57) = 1795.8$, probability>$chi^2 = 0.0000$). The urban sample includes too few observations to disaggregate by ethnolinguistic group.

Several differences among the four groups are noteworthy:

- The household age-gender composition variables are statistically significant in the rural but not the urban sample.[27] Breaking down the rural sample reveals that these variables are significant only for girls and that the size of the coefficients for these variables is far larger for non-Lao-Tai girls than for Lao-Tai girls. The results strongly suggest that girls' enrollment is reduced by household demands on their time—school-age girls are expected to substitute for adult women caring for younger children and performing chores. The coefficient of the share of girls ages 6–16 is somewhat smaller than the other coefficients, perhaps indicating that the presence of other school-age girls diminishes the burden on any one school-age girl in the household.
- School-age girls are the only subgroup for whom per capita household consumption has an insignificant effect on the probability of going to school.

[27] In the urban samples, the one exception is the share of preschool boys, which has a statistically significant coefficient for boys but not for girls and is larger for boys than for girls.

- Disability has a considerably larger (and significant) negative effect on enrollment for rural Lao-Tai girls than for other subgroups.
- Having a complete primary school without multigrade classrooms in the village is the school variable that has the largest and most consistently significant effect on enrollment across the models. Disaggregating the samples reveals that among the rural groups, its effect is largest for the non-Lao-Tai, partly reflecting the greater shortage of such schools the rural non-Lao-Tai population faces. This effect is larger for girls, possibly because of a greater reluctance to send girls outside the village to attend school due to risk and cost.
- Living in a highland village has a significant negative effect on enrollment only for rural Lao-Tai girls. Having controlled separately for school supply conditions that partly measure the cost of schooling, this result suggests that girls' enrollment is also responsive to the perceived returns to education, which are likely to be low in the rural highlands.

Conclusions and policy implications

Lao PDR has made steady progress in education across its population groups in the past 40 years—enrollment rates, literacy rates, and the number of years of schooling completed have all increased. This progress has been partly a result of government education policy; economic growth alone would not have sufficed.

Improvements in educational outcomes have placed Lao PDR much closer to its neighbors, but significant challenges lie ahead. First, the number of school-age children will continue to rise, requiring continued expansion in the number of school places. The number of children ages 5–14, which reportedly rose 20 percent between 2000 and 2005, is predicted to continue to grow over the next five years, albeit at the slower pace of 7–8 percent (United Nations 2005).

Second, past progress has involved increasing the intake of school-age children rather than raising school continuation or completion rates. The challenge is to keep children in school longer and to improve instruction in classrooms so that children acquire functional literacy and numeracy and other important skills for life and work.

Third, educational progress has not been equal across groups. Using very simple measures of academic success, urban, male, and Lao-Tai groups perform better than rural, female, and non-Lao-Tai groups, with rural, non-Lao-Tai, females lagging farthest behind. This situation contrasts with that of Lao-Tai females, whose literacy and years of education have converged with those of Lao-Tai men in recent years, in both rural and urban areas.

While the education of all groups has increased, some disparities appear unyielding. Girls' schooling, particularly of poor, rural, non Lao-Tai girls, is more responsive to household and school characteristics than that of boys. Our estimates for the disaggregated population groups reveal how residence, gender, and ethnolinguistic affiliation affect school enrollment. Indeed, the underlying factors that explain why some children are enrolled and others are not differ significantly across these subgroups. The results suggest that improving school supply in rural areas is likely to benefit non-Lao-Tai more than Lao-Tai and non-Lao-Tai girls even more than non-Lao-Tai boys. Any program to raise enrollment among the rural population will need to address the opportunity cost of attending school

for girls, as such costs dampen girls' enrollment.[28] Policy interventions to increase schooling will not succeed unless they consider the specific constraints and needs facing each group.

References

Alderman, H. and E. M. King. 1998. "Gender Differences in Parental Investment in Education." *Social Change and Economic Development* 9: 453-468.

Anderson, K., E.M. King, and Y. Wang. 2002. "Market Wages, Transfers, and Demand for Schooling in Malaysia, 1976–1989." *Journal of Development Studies* 39 (3): 1–28.

Asian Development Bank. 2000. "Lao: Education Sector Development Plan." ADB: Manila.

Bäckström, Cecilia and Vicke Säfström. 1997. Lao Expenditure and Consumption Survey (LECS2) 1997/98. Report from a mission to National Statistical Centre (NSC), Vientiane, Lao PDR, Statistics Sweden.

Baulch, B.T., T.K. Chuyen, D. Haughton, and J. Haughton. 2004. "Ethnic Minority Development in Vietnam: A Socioeconomic Perspective." In Paul Glewwe, Nisha Agrawal, and David Dollar, eds., *Economic Growth, Poverty and Household Welfare: Policy Lessons from Vietnam*. Washington, D.C.: World Bank Regional and Sectoral Studies.

Behrman, J.R., and J. Knowles. 1999. "Household Income and Child Schooling in Vietnam." *World Bank Economic Review* 13 (2): 211–56.

Behrman, J. R., P. Sengupta, and P. Todd. 2005. "Progressing through PROGRESA: An Impact Assessment of a School Subsidy Experiment in Mexico." *Economic Development and Cultural Change* 54 (1): 237–76.

Bhalotra, S., and C. Heady. 2003. "Child Farm Labor: The Wealth Paradox." *World Bank Economic Review* 17 (2): 197–227.

Case, A., and A. Deaton. 1999. "School Inputs and Educational Outcomes in South Africa." *Quarterly Journal of Economics* 114 (3): 1047–84.

Diaz, J.J.D., H. Ñopo, J. Saavedra, and M. Torero. 2004. "Ethnicity and Access to Education in Urban Peru." Paper prepared as part of the project on social exclusion. Inter-American Development Bank, Washington, D.C.

Duflo, Esther. 2004. **"**The medium run effects of educational expansion: evidence from a large school construction program in Indonesia." *Journal of Development Economics* 74 (1): 163–197.

[28] For example, conditional cash transfer programs, such as Mexico's PROGRESA/Oportunidades program, which compensate parents for the opportunity cost of schooling, have been effective. In Mexico's program, which has been carefully evaluated, the level of the grants to households was set with the aim of compensating for the opportunity cost of children's school attendance (Schultz 2004; Behrman, Sengupta, and Todd. 2005). The size of the grant increases with the grade attended by the child.

European Union. 2005. “Study on Public Expenditure Policy in Primary Education and Primary Health in Lao PDR.” Draft contribution to the preparation of the Public Expenditure Tracking Survey. Brussels.

Evrard, O., and Y. Goudineau. 2004. “Planned Resettlement, Unexpected Migrations and Cultural Trauma in Laos.” *Development and Change* 35 (5): 937–62.

Filmer, D. 2005. “Disability, Poverty, and Schooling in Developing Countries: Results from 11 Household Surveys.” Policy Research Working Paper 3794. World Bank, Washington. D.C.

Glewwe, P. 2002. “Schools and Skills in Developing Countries: Education Policies and Socioeconomic Outcomes.” *Journal of Economic Literature* 40 (2): 436–82.

Global Virtual University. 2003-07. *Globalis - Laos*. Website address: http://globalis.gvu.unu.edu/country.cfm?country=LA&indicatorid=0.

Haddad, L., J. Hoddinott, and H. Alderman, eds. 1997. *Intrahousehold Resource Allocation in Developing Countries: Methods, Models, and Policy*. Baltimore, Md.: Johns Hopkins University Press.

Handa, S. 2002. “Raising Primary School Enrolment in Developing Countries: The Relative Importance of Supply and Demand.” *Journal of Development Economics* 69 (1): 103–28.

Hall, G., and H.A. Patrinos, eds. 2006. *Indigenous Peoples, Poverty and Human Development in Latin America*. New York: Palgrave Macmillan.

Hannum, E. 2002. “Educational Stratification by Ethnicity in China: Enrollment and Attainment in the Early Reform Years.” *Demography* 39 (1): 95–117.

Jacoby, H. G. 1994. “Borrowing Constraints and Progress through School: Evidence from Peru.” *Review of Economics and Statistics* 76 (1): 151–160.

King, E., and D. van de Walle. 2005. “Schooling and Poverty in Laos.” World Bank, Development Economics Research Group, Washington, D.C.

Levin, H.M. 1995. “Raising Educational Productivity.” In Martin Carnoy, ed., *International Encyclopedia of Economics of Education*. Oxford, United Kingdom: Elsevier Science.

Maliki. (2005) “Education policy and intergenerational transfers in Indonesia.” Unpublished PhD dissertation, University of Hawaii.

National Statistical Centre, Committee for Planning and Cooperation, Government of Lao Peoples’ Democratic Republic. 2004. *The Household of Lao PDR. Social and economic indicators. Lao Expenditure and Consumption Survey 2002/03 (LECS 3).*

Orazem, P. and E. M. King. 2007. “Schooling in Developing Countries: The Roles of Supply, Demand and Government Policy.” *Handbook of Development Economics*. Amsterdam: North Holland. Forthcoming.

Richter, K., R. van der Weide, and P. Souksavath. 2005. “Lao PDR Poverty Trends 1992/3–2002/3.” Draft Report. World Bank, Washington, D.C.

Schultz, T. P. 2002. "Why governments should invest more to educate girls." *World Development* 30 (2): 207–25.

Schultz, T. P. 2004. “School subsidies for the poor: evaluating the Mexican Progresa poverty program.” *Journal of Development Economics* 74 (1):199–250.

Tansel, A. 2002. “Determinants of school attainment of boys and girls in Turkey: individual, household and community factors.” *Economics of Education Review* 21 (5): 455–470.

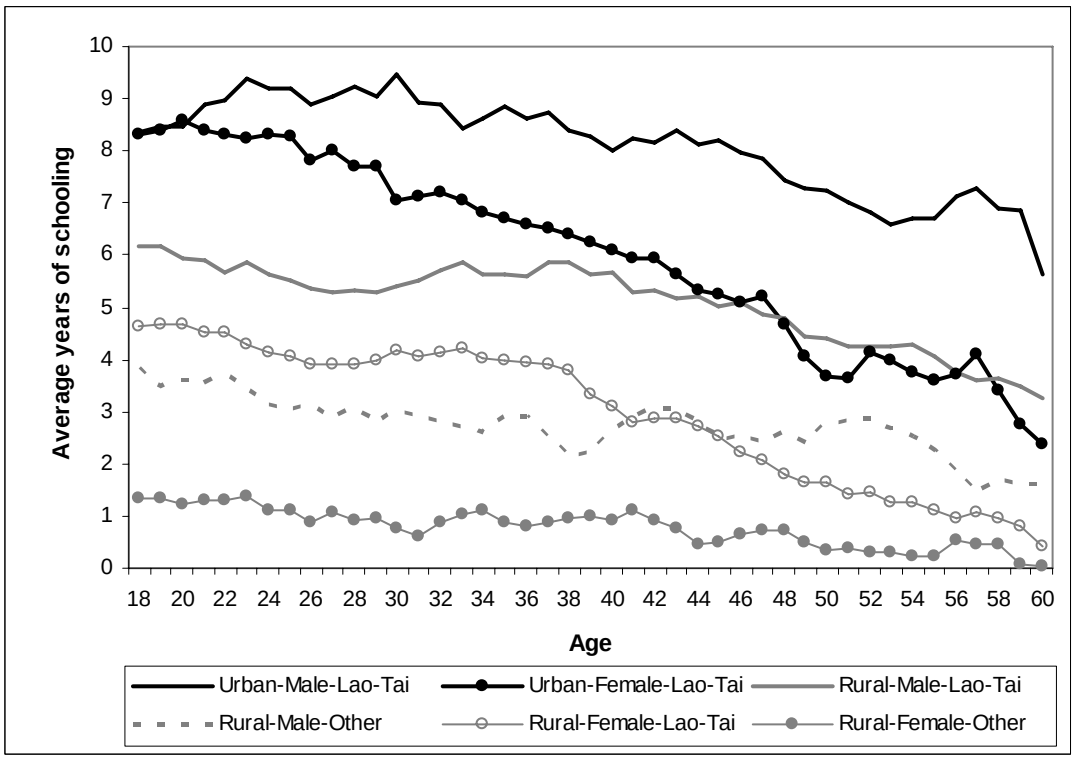
Thomas, D., K. Beegle, E. Frankenberg, B. Sikoki, J. Strauss, and G. Teruel. 2004. “Education in a Crisis.” *Journal of Development Economics* 74 (1): 53–85.

United Nations. 2005. *Population projections. 2004 Revision* Population Division, New York.

World Bank. 2004. “Project Appraisal Document on a Proposed Credit to the Lao People’s Democratic Republic for a Second Education Development Project.” East Asia and Pacific Region, Washington, D.C.

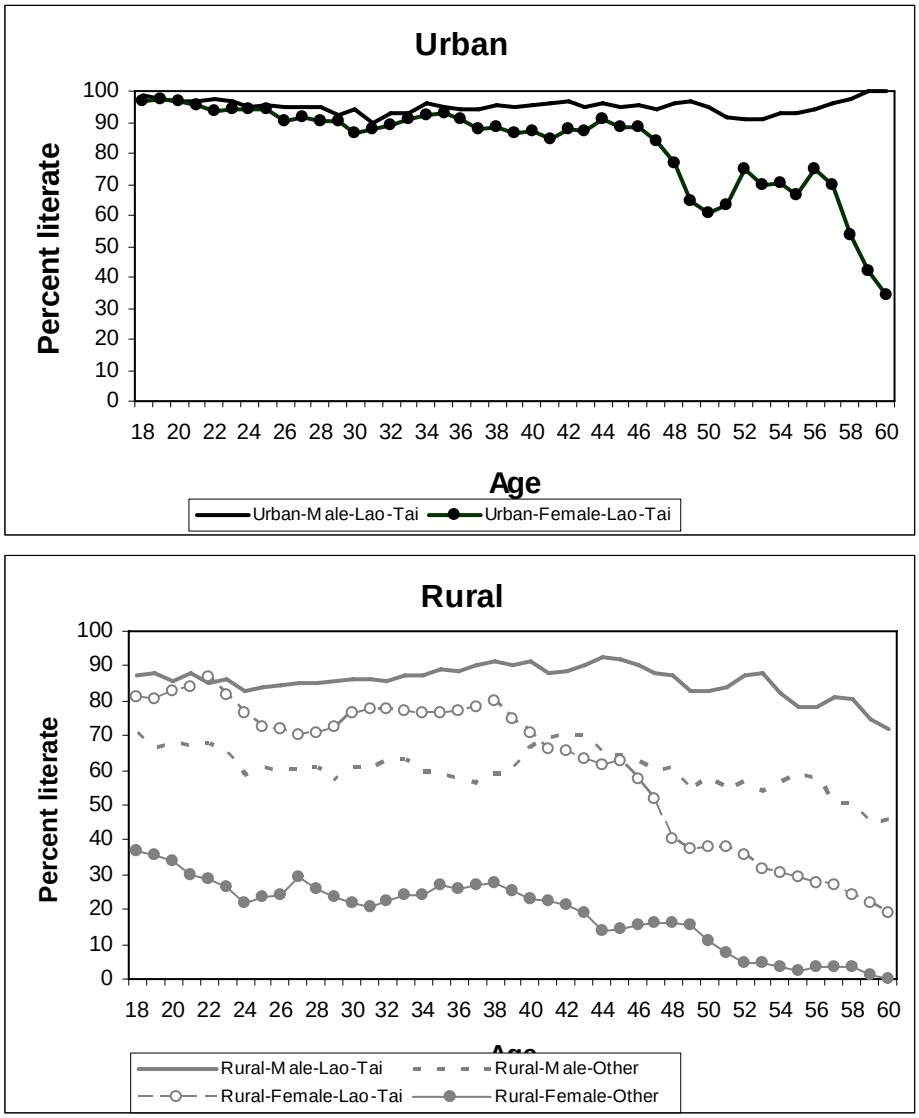
———. 2005. “Cambodia: Quality Basic Education for All.” Human Development Sector Report. East Asia and Pacific Region, Washington, D.C.

Figure 1 Average years of schooling in Lao PDR, by age, gender, and ethnolinguistic group, 2002/03



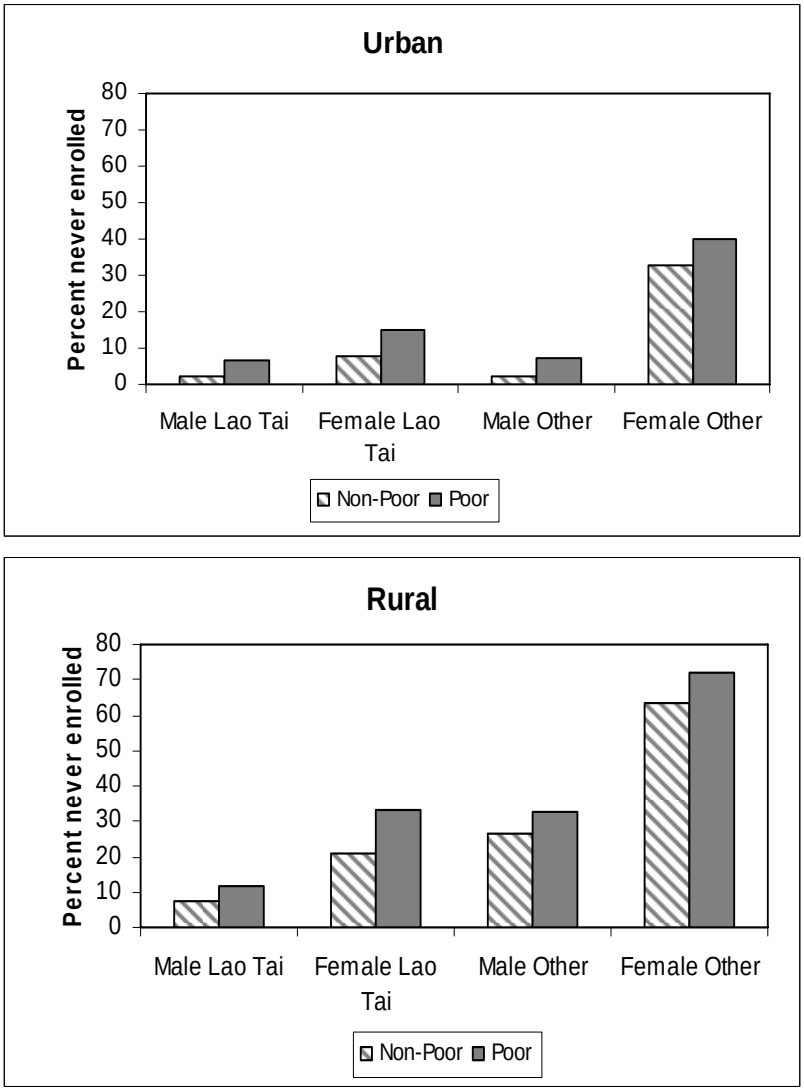
Note: Figures represent three-age moving averages. Data for urban non-Lao-Tai are not plotted because of small sample size.
Source: LECS3, 2002/03.

Figure 2 Literacy rates in Lao PDR, by age, gender, and ethnolinguistic group, 2002/03



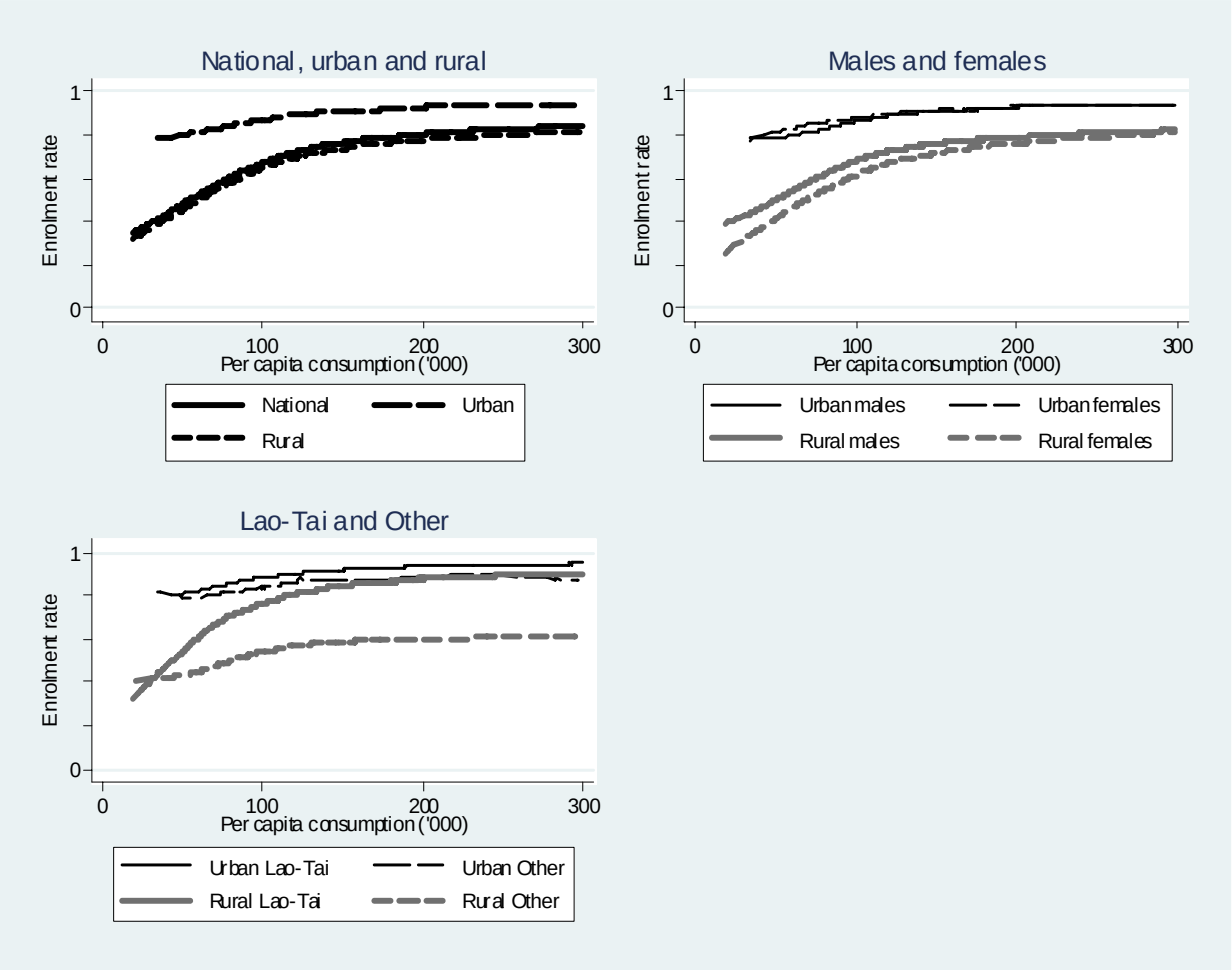
Note: Figures represent three-age moving averages. Data for the urban non-Lao-Tai are not plotted because of small sample size.
Source: LECS3, 2002/03.

Figure 3 Percentage of Laotians 18–60 that never attended school, by gender, ethnolinguistic group, poverty status, and urban/rural location, 2002/03



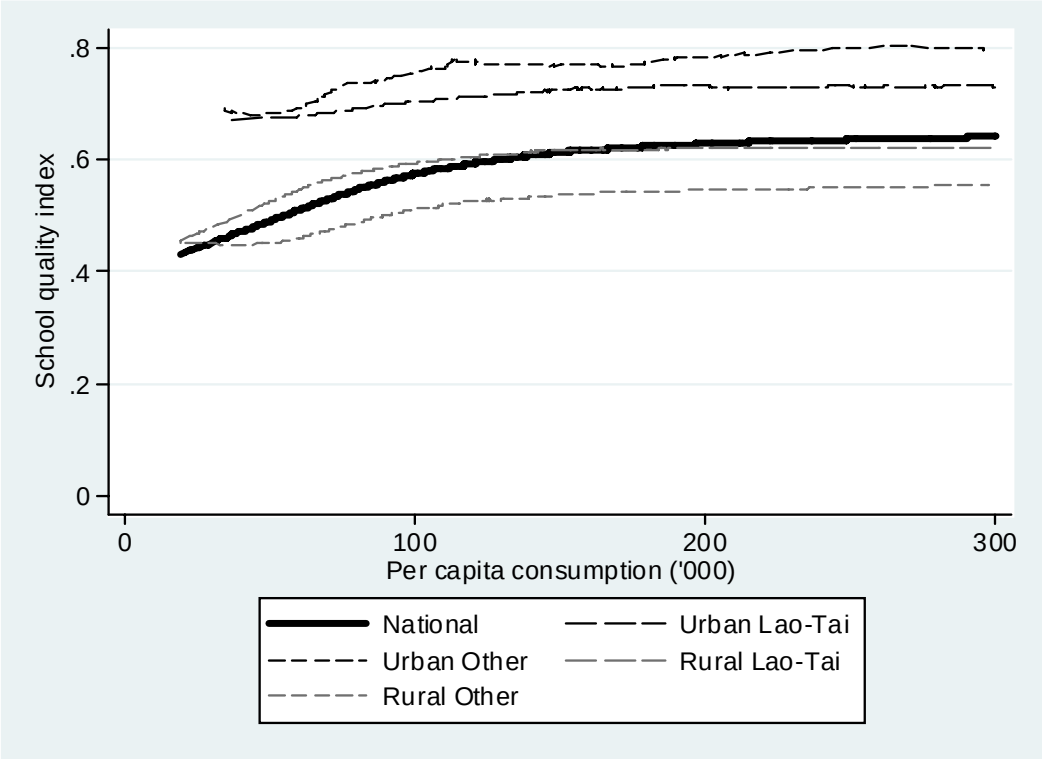
Source: LECS2, 1997/98 and LECS3, 2002/03.

Figure 4 Per capita consumption and school enrollment by children 6–12 in Lao PDR, 2002/03



Note: Per capita consumption is deflated by a regional price index and expressed in real 2002/03 kip per month.
Source: LECS3, 2002/03.

Figure 5 School quality and per capita consumption by children 6–15 in Lao PDR, 2002/03



Note: Per capita consumption is deflated by a regional price index and expressed in real 2002/03 kip per month. School quality is given by an index that is calculated from the coefficients on school characteristics in a regression explaining enrollment and normalized to be between 0 and 1.
Source: LECS3, 2002/03.

Table 1. Primary school enrollment in Lao PDR, by gender, urban/rural location, ethnolinguistic group, and poverty status, 2002/03 (percent)

	Urban				*Rural*						*Total*
	Lao-Tai		*Total*		*Lao-Tai*		*Other*		*Total*		
Item	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	
Total											
Age-specific participation (6–12)	90.4	91.9	89.4	90.8	82.1	80.7	60.1	52.0	73.1	68.7	74.6
Net enrollment rate	78.4	78.7	78.6	78.1	76.8	74.4	58.6	51.0	69.4	64.7	69.2
Gross enrollment rate	89.1	86.5	90.5	86.6	91.2	84.3	78.3	63.2	86.0	75.5	79.8
Number of observations	686	655	847	796	2356	2269	2139	2201	4495	4470	10608
Nonpoor											
Age-specific participation (6–12)	92.7	93.4	91.8	92.5	86.8	85.6	65.8	59.5	80.1	77.2	81.8
Net enrollment rate	79.3	78.4	79.2	77.8	80.6	77.9	63.3	58.1	75.1	71.5	74.5
Gross enrollment rate	88.8	85.6	89.5	85.6	95.2	87.2	83.6	70.2	91.5	81.7	86.9
Number of observations	541	533	624	603	1,607	1,513	990	988	2,597	2,501	6,325
Poor											
Age-specific participation (6–12)	82.0	85.9	82.4	85.1	71.3	70.2	54.9	45.7	62.4	56.7	62.5
Net enrollment rate	75.1	79.7	76.9	79.0	68.2	67.1	54.5	45.0	60.8	55.0	60.3
Gross enrollment rate	90.3	90.3	93.4	90.1	82.3	78.2	73.6	57.4	77.6	66.7	74.5
Number of observations	145	122	223	193	749	756	1,149	1,213	1,898	1,969	4,283

Note: The denominator for the net and gross enrollment rates is the number of children 6–12. All estimates are population weighted.
Source: LECS3, 2002/03.

Table 2. Mean primary net school enrollment rates in Lao PDR for children 6–12, by ethnolinguistic group, gender, and urban/rural location, 2002/03
(percent)

	Urban		*Rural*	
Item	*Male*	*Female*	*Male*	*Female*
Lao-Tai				
Enrollment rate	90.4	91.9	82.1	80.7
Number of observations	686	655	2,356	2,269
Mon-Khmer				
Enrollment rate	80.1	75.0	61.4	57.4
Number of observations	76	73	1271	1,321
Hmong-lu Mien				
Enrollment rate	87.8	84.5	66.0	48.3
Number of observations	50	42	560	580
Chine-Tibetan				
Enrollment rate	86.5	100.0	38.7	32.7
Number of observations	32	23	260	248
Non Lao-Tai 'other'				
Enrollment rate	—	—	47.3	30.0
Number of observations	3	3	48	53

Notes: All estimates are population weighted. ─ indicates insufficient observations.
Source: LECS3, 2002/03.

Table 3 Net and gross lower-secondary enrollment rates for children 12–15 in Lao PDR, by gender, urban/rural location, ethnolinguistic group, and poverty status, 2002/03
(percent)

	Urban				*Rural*					
	Lao-Tai		*Total*		*Lao-Tai*		*Other*		*Total*	
Item	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*
Total										
Net enrollment rate	54.2	45.4	51.2	44.4	35.0	31.5	11.9	6.5	27.2	22.3
Gross enrollment rate	76.2	61.1	72.2	61.5	52.0	42.7	24.3	11.1	42.6	31.1
Number of observations	501	518	605	583	1,323	1,286	933	1,033	2,256	2,319
Nonpoor										
Net enrollment rate	60.0	48.2	57.2	47.4	39.5	37.0	15.5	10.3	33.6	29.4
Gross enrollment rate	84.9	64.3	81.0	64.5	57.4	49.7	32.7	15.8	51.3	40.1
Number of observations	401	424	459	456	980	908	435	503	1,415	1,411
Poor										
Net enrollment rate	31.2	32.8	31.2	32.8	21.3	17.4	8.7	2.9	14.7	10.0
Gross enrollment rate	41.7	46.8	42.3	49.9	35.6	24.7	16.6	6.6	25.7	15.4
Number of observations	100	122	146	127	343	378	498	530	841	908

Note: Non-Lao-Tai are not shown in urban areas because of the small number of observations. The denominator for the net and gross enrollment rates is the number of children 12–15. All estimates are population weighted.
Source: LECS3, 2002/03.

Table 4 Reasons why children ages 9-18 who have never attended school (percent)

Reasons given	National	Urban	Rural
Too young	7.8	13.5	7.5
Too expensive	1.4	2.4	1.4
No interest in school	37.1	32.1	37.3
Had to work	13.6	19.4	13.3
School too far	27.1	9.2	28.1
Illness	3.4	3.9	3.4
Others	9.6	19.5	9.1

Source: LECS3, 2002/3

Table 5 Age at which children currently 12 and 16 started school, Lao PDR, 2002/03

	Urban				*Rural*						*Total*
	Lao-Tai		*Total*		*Lao-Tai*		*Other*		*Total*		
Item	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	
Total											
12-year-olds	6.6	6.6	6.7	6.7	7.3	7.4	8.8	9.1	7.8	7.9	7.6
16-year-olds	6.8	6.8	6.9	7.0	7.8	8.0	9.8	10.2	8.4	8.4	7.9
Nonpoor											
12-year-olds	6.4	6.5	6.6	6.6	7.0	7.2	8.5	8.7	7.4	7.6	7.3
16-year-olds	6.8	6.8	6.9	6.9	7.6	8.0	9.4	9.4	8.0	8.2	7.6
Poor											
12-year-olds	6.9	7.1	7.0	7.0	7.9	7.8	9.1	9.6	8.5	8.5	8.2
16-year-olds	6.2	7.0	7.1	7.2	8.8	8.0	10.2	11.0	9.4	9.1	8.9

Note: Non-Lao-Tai are not shown in urban areas because of the small number of observations.
Source: LECS3, 2002/03.

Table 6 Household spending on education and component shares, by urban/rural location, ethnolinguistic group and poverty status, Lao PDR, 2002/03 (thousands of kip per month)

	Urban			Rural		
	Lao-Tai	**Other**	**Total**	**Lao-Tai**	**Other**	**Total**
Total						
Exp. per primary student	**32.5**	**15.2**	**30.5**	**12.9**	**10.6**	**12.1**
Share to tuition	7.2	6.6	7.1	2.1	3.5	2.6
Share to PTA fees	2.0	2.3	2.0	2.1	2.5	2.2
Share to uniforms	32.5	42.7	33.8	47.9	53.5	50.0
Share to textbooks & materials	15.5	24.3	16.6	21.5	24.8	22.7
Share to transportation / meals / boarding	22.8	6.5	20.8	11.5	5.2	9.2
Other expenses	20.0	17.6	19.7	14.9	10.6	13.3
Exp. per lower sec. student	**43.5**	**22.0**	**41.8**	**30.0**	**31.8**	**30.3**
Share to tuition	7.2	5.5	7.0	3.0	3.7	3.2
Share to PTA fees	1.9	2.4	1.9	1.9	2.2	2.0
Share to uniforms	34.2	47.5	35.4	43.8	47.9	44.6
Share to textbooks & materials	14.7	24.3	15.5	20.0	19.8	19.9
Share to transportation / meals / boarding	22.7	5.4	21.3	15.2	13.4	14.9
Other expenses	19.3	15.0	18.9	16.1	13.1	15.5
Non-Poor						
Exp. per primary student	**35.6**	**18.2**	**34.1**	**14.3**	**12.3**	**13.8**
Share to tuition	7.6	6.8	7.5	2.0	3.5	2.4
Share to PTA fees	1.9	1.4	1.9	2.1	2.6	2.3
Share to uniforms	31.0	42.6	32.1	47.0	51.0	48.2
Share to textbooks & materials	15.3	23.0	16.0	20.6	24.0	21.6
Share to transportation / meals / boarding	24.7	6.6	23.1	12.5	6.3	10.7
Other expenses	19.5	19.7	19.5	15.8	12.7	14.9
Exp. per lower sec. student	**45.5**	**-**	**44.4**	**31.0**	**33.7**	**31.4**
Share to tuition	7.2	-	7.1	3.1	3.5	3.1
Share to PTA fees	1.8	-	1.8	2.0	1.7	2.0
Share to uniforms	34.0	-	34.5	43.6	46.1	44.0
Share to textbooks & materials	14.6	-	15.1	19.4	20.1	19.5
Share to transportation / meals / boarding	23.9	-	22.8	15.6	14.6	15.4
Other expenses	18.6	-	18.6	16.4	14.0	16.0
Poor						
Exp. per primary student	**18.9**	**11.6**	**17.1**	**8.9**	**8.7**	**8.8**
Share to tuition	5.5	6.4	5.7	2.4	3.5	3.0
Share to PTA fees	2.4	3.4	2.7	1.9	2.4	2.1
Share to uniforms	38.7	42.9	39.8	50.4	56.3	53.4
Share to textbooks & materials	16.6	26.0	19.0	24.0	25.7	24.9
Share to transportation / meals / boarding	14.7	6.3	12.5	8.8	3.9	6.4
Other expenses	22.2	15.1	20.3	12.5	8.3	10.3
Exp. per lower sec. student	**29.3**	**-**	**26.9**	**24.9**	**28.0**	**25.9**
Share to tuition	6.8	-	6.7	2.7	4.3	3.2
Share to PTA fees	2.5	-	2.6	1.7	3.1	2.1
Share to uniforms	35.7	-	39.7	44.9	51.3	46.9
Share to textbooks & materials	15.6	-	17.6	22.9	19.2	21.8
Share to transportation / meals / boarding	15.2	-	12.8	13.3	10.9	12.6
Other expenses	24.2	-	20.6	14.5	11.2	13.5

Note: Figures are calculated conditional on having one or more children enrolled in school. Expenditures are deflated by a regional price index and expressed in thousands of real 2002/03 kip per month. Expenditures per Lower-secondary student for the non-Lao-Tai urban poor and nonpoor are omitted because of small sample size.
Source: LECS3, 2002/03.

Table 7 Time use by Laotian children 10–16, by urban/rural location, poverty status, and gender (hours per day)

	Urban				*Rural*			
	Nonpoor		*Poor*		*Nonpoor*		*Poor*	
Activity	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*
Sleeping, eating, personal care	11.5	11.4	11.6	11.2	11.6	11.5	11.8	11.6
Leisure	4.6	4.0	5.0	4.4	4.2	3.8	4.3	3.9
School	4.4	3.8	3.4	3.3	3.7	3.0	2.6	2.0
Remunerative work	1.8	2.1	2.5	2.3	2.7	2.7	3.1	2.8
Work as employee	0.3	0.2	0.5	0.2	0.1	0.1	0.1	0.1
Self-employed	0.2	0.6	0.1	0.3	0.1	0.1	0.0	0.0
Agricultural work	0.7	0.7	1.1	1.1	1.7	2.0	2.1	2.2
Tending rice	0.3	0.4	0.3	0.5	0.7	1.1	1.1	1.3
Tending other crops	0.1	0.1	0.4	0.4	0.3	0.4	0.3	0.5
Tending animals	0.3	0.1	0.5	0.2	0.7	0.5	0.8	0.4
Hunting/fishing	0.5	0.1	0.7	0.1	0.8	0.1	0.8	0.2
Nonagricultural work								
Construction	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Handicraft (nontextile)	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.1
Weaving, sewing, textile care	0.0	0.4	0.0	0.5	0.0	0.3	0.0	0.2
Domestic work	0.7	1.9	0.9	2.0	0.8	1.9	1.0	2.5
Cooking	0.2	0.6	0.1	0.7	0.1	0.5	0.2	0.5
Washing, cleaning	0.3	0.8	0.3	0.5	0.1	0.4	0.1	0.3
Caring for young and elderly family members	0.1	0.3	0.3	0.4	0.2	0.3	0.3	0.8
Collecting wood/ fetching water	0.1	0.2	0.2	0.3	0.3	0.7	0.4	0.9
Buying/shopping	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0
Travel, other	1.0	0.9	0.7	0.9	1.1	1.1	1.2	1.2
Total work and travel	3.5	4.9	4.1	5.2	4.6	5.7	5.3	6.5

Note: Schooling includes time spent on homework.
Source: LECS3, 2002/03.

Table 8 Access to primary, lower-secondary, and upper-secondary schools in Lao PDR, by urban-rural location and ethnolinguistic affiliation, 2002/03

	Percentage of population living in village with school					
	Urban		*Rural*		*Total*	
Item	*Lao-Tai*	*Other*	*Lao-Tai*	*Other*	*Lao-Tai*	*Other*
Total						
Primary school	83.6	70.2	87.6	80.0	86.4	79.3
Lower-secondary school	29.2	22.7	16.6	3.9	20.5	5.2
Upper-secondary school	11.3	14.1	4.9	1.0	6.8	1.9
Number of observations	7,812	1,358	20,841	19,532	28,653	20,890
Nonpoor						
Primary school	82.4	80.5	88.0	79.1	86.1	79.2
Lower-secondary school	30.6	26.6	18.4	4.7	22.6	6.4
Upper-secondary school	11.8	18.2	6.4	2.0	8.3	3.2
Number of observations	6,505	762	14,589	9,362	21,094	10,124
Poor						
Primary school	89.6	57.0	86.6	80.8	87.2	79.3
Lower-secondary school	22.5	17.6	12.1	3.3	14.3	4.1
Upper-secondary school	8.7	8.7	1.0	0.2	2.6	0.7
Number of observations	1,307	596	6,252	10,170	7,559	10,766

Source: LECS3, 2002/03.

Table 9 Regression results on probability of attending school in Laos PDR, 2002/03

	Full sample	*Male*	*Female*	*Urban*	*Rural*	*Lao-Tai*	*Non-Lao-Tai*
Independent variable	*dF/dx*	*dF/dx*	*dF/dx*	*dF/dx*	*dF/dx*	*dF/dx*	*dF/dx*
Child/household characteristics							
Child is female	-0.08			-0.01	-0.09	-0.03	-0.16
	(7.63)			(1.16)	(7.77)	(3.89)	(6.92)
Child is disabled	-0.13	-0.13	-0.12	-0.12	-0.13	-0.16	-0.06
	(2.87)	(2.19)	(1.83)	(2.13)	(2.40)	(3.01)	(0.77)
Child is 7	0.11	0.11	0.10	0.02	0.14	0.08	0.18
	(9.67)	(9.38)	(5.02)	(1.68)	(9.63)	(7.47)	(6.31)
Child is 8	0.16	0.14	0.16	0.04	0.19	0.11	0.25
	(15.52)	(12.56)	(9.51)	(3.66)	(15.42)	(11.68)	(10.12)
Child is 9–11	0.26	0.25	0.27	0.07	0.30	0.18	0.40
	(22.07)	(18.24)	(14.91)	(5.61)	(21.43)	(16.42)	(15.52)
Child is 12	0.18	0.16	0.18	0.05	0.21	0.12	0.31
	(16.85)	(14.87)	(10.02)	(4.57)	(16.27)	(11.74)	(12.43)
Child is 13	0.16	0.16	0.14	0.04	0.19	0.10	0.28
	(13.40)	(13.08)	(6.51)	(3.01)	(13.22)	(9.53)	(10.23)
Child is 14 or older	0.12	0.14	0.07	0.03	0.14	0.07	0.22
	(8.20)	(10.77)	(2.70)	(2.18)	(7.81)	(5.56)	(6.90)
Child is first or second born	3.3e-03	-2.3e-04	3.5e-03	0.01	-9.2e-04	-0.01	0.02
	(0.32)	(0.02)	(0.22)	(1.13)	(0.08)	(0.88)	(1.12)
Birth order is missing	-0.04	-0.03	-0.05	-0.04	-0.04	-0.02	-0.09
	(2.07)	(1.38)	(1.79)	(1.45)	(1.84)	(0.81)	(2.55)
Log household size	-5.0e-05	0.01	-0.01	-2.4e-03	-6.4e-04	-3.4e-03	-0.01
	(0.00)	(0.50)	(0.35)	(0.09)	(0.03)	(0.18)	(0.32)
Share of male adults, 17 and up	-0.15	-0.03	-0.30	-0.02	-0.20	-0.08	-0.34
	(2.01)	(0.33)	(2.76)	(0.31)	(2.20)	(1.12)	(1.97)
Share of males 6–16	-0.21	-0.12	-0.35	-0.02	-0.29	-0.09	-0.47
	(3.83)	(1.60)	(4.26)	(0.25)	(4.26)	(1.79)	(3.67)
Share of females 6–16	-0.19	-0.10	-0.31	-0.05	-0.25	-0.10	-0.37
	(3.55)	(1.61)	(3.95)	(0.91)	(3.71)	(2.01)	(2.96)
Share of boys 0–6	-0.23	-0.13	-0.35	-0.23	-0.24	-0.15	-0.41
	(3.57)	(1.75)	(3.52)	(2.89)	(3.20)	(2.24)	(3.17)
Share of girls 0–6	-0.24	-0.12	-0.38	-0.15	-0.28	-0.16	-0.36
	(3.55)	(1.54)	(3.75)	(1.82)	(3.49)	(2.06)	(2.79)

Child is Mon-khmer	6.7e-04	0.01	-0.01	-0.03	0.01		
	(0.04)	(0.36)	(0.28)	(1.40)	(0.32)		
Child is Chine-Tibet	-0.20	-0.18	-0.25	-0.22	-0.20		
	(4.31)	(3.93)	(2.95)	(2.25)	(3.83)		
Child is Hmong-Iu Mien	-0.02	-0.01	-0.03	-0.04	-0.01		
	(0.85)	(0.31)	(0.87)	(0.90)	(0.38)		
Log of per capita consumption	0.06	0.06	0.07	0.02	0.07	0.06	0.06
	(5.05)	(4.59)	(3.84)	(2.22)	(4.73)	(5.02)	(2.08)
Male household head	0.17	0.18	0.19	0.02	0.05	0.23	0.11
	(1.86)	(1.88)	(1.55)	(0.52)	(0.26)	(1.79)	(0.54)
Age of household head	-1.3e-03	-0.01	0.01	-0.01	-1.8e-04	-1.0e-03	2.0e-03
	(0.41)	(2.62)	(1.53)	(1.37)	(0.05)	(0.34)	(0.31)
Age of head squared	1.7e-05	9.2e-05	-6.5e-05	8.4e-05	5.6e-06	1.5e-05	-9.6e-06
	(0.53)	(2.55)	(1.27)	(1.44)	(0.15)	(0.46)	(0.14)
Male head/spouse's years of schooling	0.01	0.01	0.01	2.7e-03	0.01	4.3e-03	0.02
	(4.75)	(5.00)	(2.55)	(2.14)	(4.40)	(2.82)	(3.69)
Female head/spouse's years of schooling	0.01	0.01	0.02	1.3e-03	0.02	0.01	0.02
	(5.26)	(3.41)	(4.71)	(0.71)	(5.57)	(4.56)	(3.46)
School characteristics							
School has electricity	0.06	0.03	0.09	0.01	0.08	0.01	0.10
	(2.27)	(1.34)	(2.44)	(0.67)	(1.98)	(0.62)	(0.77)
School is complete and does not have multigrade classrooms	0.25	0.20	0.30	0.11	0.28	0.19	0.36
	(11.85)	(10.19)	(10.31)	(6.27)	(9.92)	(11.14)	(6.59)
Each student has desk	0.03	0.02	0.04	-0.02	0.03	-0.02	0.12
	(1.32)	(1.05)	(1.14)	(0.57)	(1.14)	(0.68)	(2.39)
Share of leaky classrooms	-0.05	-0.04	-0.05	0.02	-0.05	-0.05	-0.07
	(2.83)	(2.12)	(2.37)	(0.87)	(2.42)	(3.28)	(1.52)
Share of male teachers	-0.02	0.01	-0.05	0.02	-0.03	-0.01	-0.08
	(0.95)	(0.63)	(1.73)	(0.84)	(1.38)	(0.52)	(1.62)
Share of Lao-Tai teachers	0.05	0.02	0.08	0.18	0.04	0.03	0.09
	(2.16)	(0.86)	(2.52)	(3.20)	(1.54)	(1.20)	(2.06)
Teachers' years of schooling	6.4e-04	1.3e-03	4.7e-04	0.01	-3.2e-04	-7.2e-04	1.3e-03
	(0.16)	(0.35)	(0.08)	(0.94)	(0.07)	(0.16)	(0.17)

School has official principal	-0.11	-0.10	-0.09	0.07	-0.10	-0.08	-0.07
	(1.86)	(1.81)	(1.12)	(1.13)	(1.26)	(1.87)	(0.46)
Principal is male	0.06	0.03	0.07	0.01	0.05	0.03	0.06
	(1.90)	(1.20)	(1.73)	(0.75)	(1.16)	(1.29)	(0.74)
Principal is Lao-Tai	-0.03	-3.8e-03	-0.07	-0.02	-0.03	-0.02	-0.11
	(1.32)	(0.16)	(1.95)	(1.31)	(1.07)	(0.74)	(1.55)
Principal's years of schooling	2.8e-03	2.0e-03	2.8e-03	-8.0e-04	5.2e-04	3.7e-03	-0.01
	(0.58)	(0.39)	(0.44)	(0.28)	(0.08)	(1.03)	(0.37)
Kilometers to closest city	-4.6e-04	-4.3e-04	-5.2e-04	3.0e-04	-5.5e-04	-3.0e-04	-7.8e-04
	(3.70)	(3.54)	(2.97)	(2.80)	(3.65)	(2.98)	(2.60)
Kilometers to closest paved road	3.8e-04	4.6e-04	2.7e-04	1.5e-04	3.0e-04	2.6e-04	8.0e-04
	(2.72)	(3.18)	(1.37)	(2.02)	(1.59)	(2.09)	(2.63)
Kilometers to closest lower-secondary school	-9.8e-04	-1.2e-03	-7.7e-04	5.6e-04	-1.4e-03	-7.1e-04	-1.4e-03
	(3.44)	(4.10)	(1.77)	(2.06)	(3.39)	(2.53)	(1.93)
Tuition is compulsory	0.03	0.02	0.04	0.02	0.02	0.02	0.05
	(1.73)	(1.09)	(1.83)	(1.24)	(1.20)	(1.47)	(1.51)
Examination fees are compulsory	-0.02	-0.03	-0.02	-0.03	-0.02	-0.02	-0.02
	(1.55)	(2.22)	(0.69)	(2.16)	(1.13)	(1.33)	(0.53)
Mean walking time to school	-1.7e-04	-4.1e-04	6.2e-05	-3.6e-04	-1.7e-04	1.9e-05	-4.2e-04
	(1.00)	(2.50)	(0.22)	(2.14)	(0.78)	(0.11)	(1.03)
Village characteristics							
Highlands	-0.03	-0.02	-0.05	-1.4e-03	-0.04	-0.01	-0.04
	(1.91)	(0.93)	(2.12)	(0.04)	(2.01)	(0.75)	(1.01)
Priority 1 districts	0.01	0.02	-5.0e-05	-4.7e-03	0.02	3.8e-03	0.02
	(0.65)	(1.30)	(0.00)	(0.20)	(0.86)	(0.20)	(0.62)
Priority 2 districts	-0.08	-0.07	-0.09	-3.1e-03	-0.07	-0.05	-0.05
	(2.96)	(2.62)	(2.40)	(0.11)	(2.43)	(2.35)	(0.77)
Number of observations	11,059	5,482	5,470	1,831	9,228	6,925	4,144
Pseudo R^2	0.28	0.27	0.30	0.31	0.28	0.27	0.26
Wald test: Chi^2		786.0		176.5		2,215.9	
Prob>Chi^2		0.00		0.00		0.00	

Note: A full set of province urban/rural dummies are included in all regressions but not shown for ease of presentation. *Z*-statistics based on standard errors corrected for heteroskedasticity and clustering at the village level appear in parentheses.
Source: LECS3, 2002/03.

Table A.1 Variable definitions and descriptive statistics for national, urban, and rural samples of children 6–15

		National		*Urban*		*Rural*	
		Mean	*Standard deviation*	*Mean*	*Standard deviation*	*Mean*	*Standard deviation*
Child/household characteristics							
enroll	Child is enrolled in school	0.73	0.44	0.88	0.33	0.69	0.46
rpce	Household per capita consumption (thousands of 2002/03 kip per month)	151.16	121.79	194.64	170.61	139.55	101.88
lrpce	Log of household per capita consumption	11.76	0.53	11.98	0.58	11.70	0.51
lhhsize	Log household size	1.92	0.32	1.84	0.31	1.94	0.32
age6	Child is 6	0.10	0.30	0.07	0.25	0.11	0.31
age7	Child is 7	0.10	0.30	0.09	0.28	0.10	0.30
age8	Child is 8	0.11	0.31	0.10	0.29	0.12	0.32
age911	Child is 9, 10, or 11	0.29	0.45	0.28	0.45	0.30	0.46
age12	Child is 12	0.11	0.32	0.12	0.32	0.11	0.32
age13	Child is 13	0.10	0.30	0.11	0.32	0.09	0.29
age14+	Child is 14 or 15	0.19	0.39	0.24	0.43	0.17	0.38
smadlt	Household share of male adults 17 and older	0.22	0.10	0.25	0.11	0.22	0.09
sfadlt	Household share of female adults 17 and older	0.23	0.10	0.25	0.10	0.23	0.09
sm616	Household share of males aged 6–16	0.22	0.15	0.23	0.16	0.22	0.15
sf616	Household share of females 6–16	0.21	0.14	0.20	0.15	0.21	0.14
sm06	Household share of boys 0–6	0.06	0.09	0.04	0.07	0.07	0.09
sf06	Household share of girls 0–6	0.06	0.09	0.03	0.07	0.06	0.09
c1or2	Child is first or second born	0.45	0.50	0.45	0.50	0.45	0.50
bordmis	Birth order is missing	0.10	0.30	0.10	0.30	0.10	0.30
female	Child is female	0.50	0.50	0.48	0.50	0.50	0.50
eth1	Child is from Lao-Tai ethnolinguistic group	0.67	0.47	0.88	0.32	0.61	0.49
eth2	Child is from Mon-khmer ethnolinguistic group	0.21	0.40	0.05	0.22	0.25	0.43
eth3	Child is from Chine-Tibet ethnolinguistic group	0.03	0.18	0.02	0.16	0.04	0.19
eth4	Child is from Hmong-Iu Mien ethnolinguistic group	0.09	0.28	0.04	0.19	0.10	0.30
eth5	Child is from “other” ethnolinguistic group	0.01	0.10	0.00	0.04	0.01	0.11
malehead	Household head is male	0.97	0.18	0.94	0.24	0.97	0.16
headage	Age of household head	44.08	10.36	45.41	10.09	43.72	10.40
disabled	Child is disabled	0.01	0.11	0.01	0.10	0.01	0.11
hdspmsch	Male head or spouse’s years of schooling	4.67	3.61	6.83	4.04	4.11	3.26
hdspfsch	Female head or spouse’s years of schooling	2.90	3.10	4.77	3.60	2.40	2.74

		National		Urban		Rural	
School characteristics							
elec_yn	School has electricity	0.14	0.34	0.44	0.50	0.06	0.24
compnmul	School is complete and does not have multigrade classrooms	0.20	0.40	0.32	0.47	0.17	0.38
ncompmul	School is not complete and has multigrade classrooms	0.37	0.48	0.09	0.28	0.44	0.50
ncomnmul	School is not complete and does not have multigrade classrooms	0.34	0.47	0.52	0.50	0.29	0.46
eachdesk	Each student has desk	0.91	0.28	0.95	0.23	0.91	0.29
sh_wleaks	Share of leaky classrooms	0.27	0.36	0.25	0.31	0.27	0.37
tc_shmale	Share of male teachers	0.61	0.38	0.28	0.27	0.70	0.36
tc_shlao	Share of Lao-Tai teachers	0.66	0.44	0.86	0.30	0.61	0.45
tc_mschlyr	Teachers' mean years of schooling	9.83	1.53	10.14	0.96	9.75	1.63
pr_yn	School has official principal	0.60	0.49	0.94	0.24	0.51	0.50
pr_male	Principal is male interacted with pr_yn	0.48	0.50	0.56	0.50	0.46	0.50
pr_lao	Principal is a Lao-Tai interacted with pr_yn	0.42	0.49	0.78	0.42	0.33	0.47
pr_schlyr	Principal's years of schooling interacted with pr_yn	6.06	5.34	10.13	3.52	5.00	5.23
city_dis	Kilometers to closest city	71.57	65.73	28.84	56.84	82.48	63.36
road_dis	Kilometers to closest paved road	28.65	49.00	13.39	62.36	32.54	44.13
lsec_dis	Kilometers to closest lower-secondary school	11.02	21.80	6.48	27.75	12.18	19.83
fee_tuit	Fees are compulsory for tuition	0.51	0.50	0.71	0.45	0.46	0.50
fee_exam	Fees are compulsory for examinations	0.50	0.50	0.64	0.48	0.47	0.50
v_walktime	Mean walking time to school calculated over all households in village	26.87	39.18	25.83	39.77	27.16	39.01
Village characteristics							
althigh	Highlands	0.25	0.43	0.05	0.22	0.30	0.46
dprior1	Priority 1 district	0.24	0.43	0.14	0.34	0.27	0.45
dprior2	Priority 2 district	0.12	0.33	0.04	0.19	0.14	0.35
provu2	Urban province 2	0.00	0.07	0.02	0.15	0.00	0.00
provu3	Urban province 3	0.00	0.06	0.02	0.13	0.00	0.00
provu4	Urban province 4	0.01	0.09	0.04	0.19	0.00	0.00
provu5	Urban province 5	0.00	0.06	0.01	0.12	0.00	0.00
provu6	Urban province 6	0.01	0.09	0.04	0.19	0.00	0.00
provu7	Urban province 7	0.01	0.09	0.03	0.18	0.00	0.00
provu8	Urban province 8	0.01	0.12	0.07	0.25	0.00	0.00
provu9	Urban province 9	0.01	0.09	0.04	0.20	0.00	0.00

		Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
provu10	Urban province 10	0.01	0.08	0.03	0.17	0.00	0.00
provu11	Urban province 11	0.01	0.11	0.06	0.24	0.00	0.00
provu12	Urban province 12	0.01	0.11	0.06	0.23	0.00	0.00
provu13	Urban province 13	0.03	0.17	0.14	0.35	0.00	0.00
provu14	Urban province 14	0.00	0.06	0.02	0.13	0.00	0.00
provu15	Urban province 15	0.00	0.05	0.01	0.11	0.00	0.00
provu16	Urban province 16	0.02	0.13	0.08	0.27	0.00	0.00
provu17	Urban province 17	0.00	0.04	0.01	0.10	0.00	0.00
provu18	Urban province 18	0.00	0.03	0.00	0.07	0.00	0.00
provr1	Rural province 1	0.02	0.15	0.00	0.00	0.03	0.17
provr2	Rural province 2	0.03	0.18	0.00	0.00	0.04	0.20
provr3	Rural province 3	0.02	0.14	0.00	0.00	0.02	0.15
provr4	Rural province 4	0.04	0.20	0.00	0.00	0.05	0.23
provr5	Rural province 5	0.02	0.14	0.00	0.00	0.02	0.15
provr6	Rural province 6	0.07	0.26	0.00	0.00	0.09	0.29
provr7	Rural province 7	0.05	0.22	0.00	0.00	0.07	0.25
provr8	Rural province 8	0.05	0.22	0.00	0.00	0.06	0.24
provr9	Rural province 9	0.04	0.19	0.00	0.00	0.05	0.22
provr10	Rural province 10	0.06	0.23	0.00	0.00	0.07	0.26
provr11	Rural province 11	0.02	0.15	0.00	0.00	0.03	0.17
provr12	Rural province 12	0.05	0.22	0.00	0.00	0.06	0.24
provr13	Rural province 13	0.12	0.33	0.00	0.00	0.16	0.36
provr14	Rural province 14	0.05	0.22	0.00	0.00	0.07	0.25
provr15	Rural province 15	0.01	0.10	0.00	0.00	0.01	0.11
provr16	Rural province 16	0.09	0.29	0.00	0.00	0.12	0.32
provr17	Rural province 17	0.02	0.13	0.00	0.00	0.02	0.15
provr18	Rural province 18	0.01	0.11	0.00	0.00	0.01	0.12

Note: Birth order missing is also a measure of whether children are living in a household in which at least one parent is head of household or spouse of head.
Source: LECS3, 2002/03.

Table A.2 Descriptive statistics for samples of children 6–15, dissaggregated by gender, urban/rural location. and ethnolinguistic group

	Urban				*Rural*											
					Lao-Tai						*Non Lao-Tai*					
	Male		*Female*		*Male*		*Female*		*Total*		*Male*		*Female*		*Total*	
	Mean	*S. D.*	*Mean*	*S. D.*	*Mean*	*S. D.*	*Mean*	*S. D.*	*Mean*	*S. D.*	*Mean*	*S. D.*	*Mean*	*S. D.*	*Mean*	*S. D.*
Child/household characteristics																
enroll	0.88	0.32	0.87	0.33	0.80	0.40	0.75	0.43	0.78	0.42	0.62	0.49	0.50	0.50	0.56	0.50
rpce	192.66	159.82	196.81	181.69	157.40	117.34	155.92	113.51	156.67	115.47	114.07	64.14	112.15	72.05	113.09	68.30
lrpce	11.98	0.57	11.99	0.59	11.82	0.51	11.81	0.51	11.81	0.51	11.54	0.45	11.51	0.44	11.52	0.45
lhhsize	1.83	0.30	1.84	0.33	1.89	0.30	1.89	0.31	1.89	0.30	2.00	0.33	2.03	0.33	2.01	0.33
age6	0.07	0.25	0.07	0.25	0.09	0.29	0.09	0.29	0.09	0.29	0.13	0.33	0.13	0.33	0.13	0.33
age7	0.09	0.28	0.09	0.28	0.10	0.30	0.09	0.29	0.10	0.30	0.12	0.32	0.11	0.32	0.11	0.32
age8	0.10	0.30	0.09	0.29	0.11	0.31	0.11	0.31	0.11	0.31	0.12	0.33	0.13	0.33	0.13	0.33
age911	0.28	0.45	0.27	0.45	0.30	0.46	0.30	0.46	0.30	0.46	0.30	0.46	0.28	0.45	0.29	0.45
age12	0.11	0.31	0.13	0.33	0.11	0.32	0.11	0.32	0.11	0.32	0.11	0.31	0.11	0.32	0.11	0.31
age13	0.12	0.32	0.11	0.31	0.10	0.30	0.10	0.30	0.10	0.30	0.08	0.28	0.08	0.27	0.08	0.27
age14+	0.23	0.42	0.25	0.43	0.19	0.39	0.19	0.39	0.19	0.39	0.14	0.35	0.16	0.36	0.15	0.36
smadlt	0.24	0.11	0.25	0.12	0.22	0.09	0.23	0.09	0.22	0.09	0.20	0.08	0.21	0.09	0.20	0.08
sfadlt	0.25	0.11	0.25	0.10	0.23	0.09	0.24	0.09	0.24	0.09	0.22	0.09	0.21	0.09	0.22	0.09
sm616	0.31	0.14	0.14	0.13	0.30	0.13	0.15	0.13	0.22	0.15	0.28	0.12	0.13	0.12	0.20	0.14
sf616	0.12	0.12	0.29	0.13	0.14	0.13	0.29	0.12	0.22	0.15	0.14	0.12	0.28	0.11	0.21	0.14
sm06	0.04	0.07	0.04	0.07	0.06	0.09	0.05	0.08	0.05	0.09	0.08	0.10	0.09	0.10	0.09	0.10
sf06	0.03	0.07	0.03	0.07	0.05	0.08	0.05	0.08	0.05	0.08	0.08	0.10	0.08	0.10	0.08	0.10
c1or2	0.46	0.50	0.43	0.50	0.47	0.50	0.44	0.50	0.45	0.50	0.44	0.50	0.44	0.50	0.44	0.50
bordmis	0.09	0.28	0.11	0.32	0.09	0.28	0.09	0.29	0.09	0.29	0.12	0.32	0.11	0.31	0.11	0.32
female					0.00	0.00	1.00	0.00	0.50	0.50	0.00	0.00	1.00	0.00	0.51	0.50
eth1	0.88	0.33	0.89	0.31	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
eth2	0.05	0.22	0.05	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.48	0.62	0.48	0.63	0.48
eth3	0.03	0.18	0.02	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.29	0.09	0.28	0.09	0.29
eth4	0.04	0.19	0.04	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.43	0.25	0.44	0.25	0.43
eth5	0.00	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.16	0.03	0.17	0.03	0.17
malehead	0.94	0.23	0.93	0.25	0.97	0.18	0.97	0.17	0.97	0.17	0.97	0.16	0.98	0.12	0.98	0.14
headage	45.01	9.95	45.84	10.23	44.13	10.12	44.38	10.11	44.25	10.12	42.97	10.86	42.85	10.68	42.91	10.77
disabled	0.01	0.10	0.01	0.10	0.01	0.12	0.01	0.10	0.01	0.11	0.01	0.12	0.02	0.12	0.01	0.12
hdspmsch	6.77	4.00	6.89	4.08	4.99	3.24	4.94	3.25	4.97	3.24	2.72	2.76	2.85	2.90	2.79	2.83
hdspfsch	4.77	3.62	4.77	3.58	3.36	2.85	3.20	2.81	3.28	2.83	0.98	1.85	1.04	1.90	1.01	1.88

School characteristics																
elec_yn	0.42	0.49	0.46	0.50	0.08	0.28	0.08	0.27	0.08	0.28	0.02	0.14	0.02	0.14	0.02	0.14
compnmul	0.33	0.47	0.31	0.46	0.22	0.42	0.22	0.41	0.22	0.41	0.09	0.29	0.09	0.28	0.09	0.29
ncompmul	0.09	0.29	0.08	0.27	0.37	0.48	0.38	0.49	0.38	0.48	0.55	0.50	0.56	0.50	0.56	0.50
ncomnmul	0.51	0.50	0.52	0.50	0.31	0.46	0.31	0.46	0.31	0.46	0.27	0.44	0.27	0.44	0.27	0.44
eachdesk	0.94	0.23	0.95	0.22	0.94	0.23	0.94	0.24	0.94	0.23	0.85	0.36	0.84	0.37	0.84	0.36
sh_wleaks	0.26	0.32	0.25	0.30	0.28	0.36	0.30	0.36	0.29	0.36	0.24	0.38	0.24	0.38	0.24	0.38
tc_shmale	0.26	0.27	0.29	0.27	0.66	0.34	0.65	0.34	0.66	0.34	0.76	0.37	0.77	0.36	0.77	0.37
tc_shlao	0.85	0.30	0.87	0.29	0.79	0.37	0.78	0.38	0.79	0.37	0.30	0.42	0.27	0.40	0.29	0.41
tc_mschlyr	10.13	0.97	10.14	0.95	9.99	1.37	10.04	1.35	10.01	1.36	9.25	1.94	9.28	1.95	9.26	1.95
pr_yn	0.94	0.24	0.94	0.24	0.59	0.49	0.60	0.49	0.59	0.49	0.38	0.48	0.36	0.48	0.37	0.48
pr_male	0.56	0.50	0.56	0.50	0.55	0.50	0.55	0.50	0.55	0.50	0.31	0.46	0.29	0.45	0.30	0.46
pr_lao	0.78	0.42	0.78	0.42	0.47	0.50	0.47	0.50	0.47	0.50	0.11	0.31	0.10	0.30	0.10	0.30
pr_schlyr	10.14	3.52	10.12	3.52	5.76	5.24	5.86	5.26	5.81	5.25	3.70	4.91	3.56	4.88	3.63	4.89
city_dis	30.82	60.81	26.58	51.84	76.04	63.81	76.13	62.79	76.09	63.30	93.82	61.97	92.92	61.92	93.35	61.95
road_dis	13.36	62.09	13.42	62.67	27.42	45.76	26.24	42.89	26.83	44.36	42.82	41.96	41.75	41.98	42.27	41.97
lsec_dis	5.99	26.61	7.04	28.99	7.34	17.89	7.18	16.59	7.26	17.26	20.37	20.86	20.71	21.28	20.55	21.08
fee_tuit	0.71	0.46	0.72	0.45	0.47	0.50	0.45	0.50	0.46	0.50	0.46	0.50	0.44	0.50	0.45	0.50
fee_exam	0.63	0.48	0.65	0.48	0.50	0.50	0.53	0.50	0.51	0.50	0.39	0.49	0.39	0.49	0.39	0.49
v_walktime	24.90	36.82	26.85	42.76	23.15	30.95	22.59	30.28	22.87	30.62	33.97	48.89	34.30	48.98	34.14	48.94
Village characteristics																
althigh	0.05	0.22	0.05	0.21	0.13	0.33	0.13	0.33	0.13	0.33	0.57	0.49	0.59	0.49	0.58	0.49
dprior1	0.14	0.35	0.13	0.34	0.18	0.39	0.19	0.39	0.19	0.39	0.41	0.49	0.41	0.49	0.41	0.49
dprior2	0.04	0.19	0.03	0.18	0.14	0.35	0.14	0.35	0.14	0.35	0.14	0.35	0.15	0.35	0.15	0.35

Note: S. D. indicates the standard deviation.
Source: LECS3, 2002/03.