

# THE ALLOCATION OF CHILDREN'S TIME IN MEXICO AND PERU

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Both Mexico and Peru have experienced significant oscillations in incomes and standards of living since the 1980s (Edwards 1995; Robles 1997; Rodríguez and Abler 1998). Due in part to a significant drop in world oil prices and huge external debts on the part of both the Mexican government and private enterprises, Mexico entered a severe economic crisis in the early 1980s. The crisis was characterized by declining incomes and high rates of inflation. The economy rebounded in the late 1980s and early 1990s, with incomes rising and the rate of inflation being reduced to moderate levels. The economy suffered another serious jolt in late 1994 as a result of the government's decisions to devalue the peso and move to a free floating exchange rate regime. While the economy has for the most part recovered from these shocks, the recovery process is not yet complete.

In the case of Peru, the oscillations in living standards have been even more severe. In spite of two stabilization programs, the rate of inflation grew dramatically during 1981-1985 and real per capita income fell by over 10%. Unlike the Mexican government, which pursued more conventional stabilization and structural adjustment programs, the Peruvian government responded in 1985 with a heterodox stabilization program based on reduced foreign debt payments, a price freeze, and major new public programs financed by deficit spending. The program succeeded initially but proved unsustainable due to large government budget deficits and resulting inflationary pressures. The end result, by 1990, was an inflation rate of hyperinflationary proportions and a further 20% drop in real per capita income. The Peruvian government changed course and adopted a more traditional stabilization and structural adjustment program in 1990, and living standards have gradually recovered since 1992. Per capita income currently stands at about the same level as 1985.

In the spite of these economic oscillations, both the Mexican and Peruvian economies are now substantially more market-oriented than they were in the early 1980s. Since the mid-1980s in Mexico, and since the early 1990s in Peru, a significant opening to trade and foreign investment has occurred, particularly in Mexico under the North American Free Trade Agreement (NAFTA). In both countries there has also been privatization of state-owned enterprises, tax reform, and deregulation in several economic sectors.

In the midst of these economic policy changes, there have also been significant changes in educational policy in both countries. One of the most noteworthy was a significant decline in public expenditures on education during the 1980s. In the case of Mexico, real public expenditures per capita on education fell by more than 50% between 1982 and 1986 (Robles 1997). Expenditures have since recovered (Secretaría de Educación Pública 1997), but the reality is still that an entire cohort of Mexican schoolchildren went through the public educa-

tional system during a period of low public expenditures. In the case of Peru, public educational expenditures also fell substantially and have not yet recovered. During 1985-1991, real public expenditures per capita on education fell by approximately 75% (Saavedra, Melzi, and Miranda 1997). Expenditures have since rebounded somewhat, but are still substantially below their 1985 level.

Within the context of these significant economic and educational changes, the objective of this paper is to investigate tendencies since the 1980s in the allocation of children's time between school and work in Mexico and Peru. As measured by school enrollment rates, which have been rising in both countries since the 1980s, the picture looks fairly rosy. This paper attempts to look deeper than mere enrollment statistics by examining actual attendance and time spent in school and on work. We begin in Section I with a general discussion of the economic factors affecting child time allocation. In Section II, we move on to a discussion of what has happened since the

1980s in Mexico and Peru. Drawing on household survey data from these two countries, we offer new evidence about school attendance, labor force participation, and hours worked by those in the labor force. We also discuss the ability of the economic factors reviewed in Section I to explain the observed changes in time allocation. This discussion is exploratory in nature and is primarily intended to stimulate discussion and further thinking. We are in the process of developing and implementing econometric models to more rigorously test the hypotheses outlined in Section 1.

## **1. Economic Factors Affecting Child Time Allocation**

When economists think about how children allocate their time between school, work, and other activities, the starting point is usually human capital theory (Becker 1993; Mincer 1974). Human capital refers to the knowledge, skills, abilities, and capacities possessed by people. Human capital theory posits, on the one hand, that

individuals can increase their future earnings through enhancement of their productive capacities and, on the other hand, that the acquisition of these capacities entails up-front costs. As such, human capital is an investment much as land, factories, real estate, stocks, etc. are investments: all entail costs now in anticipation of returns later. Formal schooling and vocational training are two important ways of investing in human capital. Other important ways include on-the-job training, on-the-job experience (often called learning-by-doing), undertaking activities that improve health (since health is one component of human capital), participating in outreach and extension programs, and searching for information about goods, services, and employment opportunities.

Economists typically use human capital theory as a framework within which to analyze child time allocation because children in most countries spend a significant portion of their time investing in their own human capital through schooling. Depending on their age and other factors, many children also

spend a significant amount of time in vocational training, on-the-job training, and other types of investments in human capital. Within the ambit of human capital theory, the economic factors affecting child time allocation can be divided into three broad categories: expected rates of return to investments in human capital, household borrowing constraints, and portfolio analysis. We discuss each of these three categories in turn.

### A. Expected Rates of Return to Investments in Human Capital

The rate of return to an investment (whether in human capital or some other type of asset) is defined as the average annual benefits from the investment divided by net present value of all costs associated with the investment. Average annual benefits in this case are calculated as the net present of all benefits divided by the useful life of the investment. For investments in human capital, the “useful life” would be the number of additional years a person expects to work or perhaps, depending on the type of investment, a person’s

entire remaining life span. Net present value refers to the value of a stream of future benefits or costs discounted to the present by means of some interest rate. The interest rate should reflect the opportunity cost of resources – what the resources devoted to the investment could have earned if they had been invested elsewhere.

Within these confines, the economically optimal decision about time allocation between schooling and other activities is straightforward. If the rate of return to an additional year of schooling exceeds the interest rate, then it is economically optimal for the child to attend school for another year. If the rate of return to an additional year of schooling is less than the interest rate, then the resources that would have been devoted to schooling could be used better elsewhere. For children who might not be attending school on a full-time basis, this same type of analysis can be applied to decisions about weeks or hours per year to spend on schooling versus other activities. If the rate of return to an additional week per year of schooling ex-

ceeds the interest rate, the child should spend that additional week in school. If not, the child’s time is better spent on other activities.

Monetary benefits to investments in schooling arise because those with more schooling tend to earn more. There have been literally thousands of econometric studies worldwide of the impact of schooling on earnings, and most conclude that the impact is positive and substantial (Psacharopoulos 1994). Our own estimates of the rate of return to schooling in Mexico and Peru (Abler, Robles, and Rodríguez 1998), which are reproduced in Table 1, are consistent with previous research. In several cases, estimated rates of return are quite high (greater than 10%/year).

The monetary benefits of schooling depend not only on the number of years of schooling but also on the quality of schooling. Reliable measures of school quality tend to be scarce, particularly in developing countries, but available evidence for developing countries does suggest an important

interaction between the quantity and quality of schooling (Glewwe 1996; Strauss and Thomas 1995). As measured by student-teacher ratios and per pupil expenditures, school quality tends to be lower in rural areas than in urban areas of developing countries such as Mexico (Secretaría de Educación Pública 1997) and Peru (Arregui 1993).

The monetary costs of investments in schooling basically fall into two categories: the direct costs of going to school, and the opportunity cost of schooling in the form of foregone earnings or other foregone opportunities. The direct costs of schooling include such items as tuition, books, school uniforms, and school supplies. In some cases, all of these items may be provided free of charge to the student. In other cases, students or their families must pay some or all of these items themselves, even in public educational systems. The direct costs of schooling also include the cost of transportation between home and school. In some cases, transportation costs are trivial and can safely be left

out of the analysis. In other cases, particularly in rural areas of developing countries, transportation costs can be substantial. For example, many villages and small towns in developing countries have no schools, and the nearest school is a great distance away. Furthermore, the roads between the village or town and the nearest school may be of very poor quality or nonexistent.

The opportunity cost of schooling is the income that could have been earned had the child been working or engaged in other activities instead of going to school. This work could have been on a family-owned enterprise, such as a farm or other small business, or for an outside business. For many children, particularly young children, the opportunity cost of schooling is quite low, since there is little they could do productively if they worked. The opportunity cost could even be zero if the household had no business of its own and if child labor laws prevented the child from working for others. However, it should be recognized that child labor laws are often weakly enforced

in developing countries (Grootaert and Kanbur 1995), including Mexico and Peru. For many other children, particularly teenage children and young adults, the opportunity cost of schooling in terms of foregone earnings can be substantial.

For boys in developing countries, the principal opportunity cost is foregone earnings. For girls in developing countries, however, the principal opportunity cost is often foregone household work. Older girls are often expected to care for younger siblings, particularly when the mother is deceased or absent, and this shows up in studies of time allocation among girls versus boys (e.g., Binder 1997; Levison and Moe 1997). The opportunity cost of foregone household work is a non-monetary cost that, by its nature, is difficult to quantify. However, in order to be calculated properly, rates of return to schooling for adolescent girls should in many cases be based on the opportunity cost of foregone household work rather than the opportunity cost of foregone income.

We should note that there might be a variety of non-monetary benefits to schooling. Similarly, there may be non-monetary costs in addition to foregone household work. The degree to which estimated rates of return in other studies or our own study (Abler, Robles, and Rodríguez 1998) are biased as a result of failure to include these non-monetary benefits and costs is unclear. If non-monetary benefits were large relative to non-monetary costs, then these estimated rates of return would understate “true” rates of return that include these non-monetary benefits and costs. If non-monetary benefits were small relative to non-monetary costs, the opposite conclusion would hold.

From the viewpoint of child and parental decision-making, what matters are not actual rates of return to schooling but rather expected rates of return. The degree to which expected rates of return are consistent with actual rates of return depends on the information available to a household, which can vary considerably (Rosen 1987). Information is an important constraint in

every economic problem, because knowledge of the factors influencing benefits and costs can have a large impact on what is perceived to be the best course of action. Erroneous expectations about returns to schooling are more likely for advanced and specialized schooling than for primary or secondary schooling. The skills learned in primary and secondary school tend to be basic, all-purpose skills that are useful in a wide variety of occupations. Even if someone loses their job, the skills learned in primary and secondary school can readily be put to use in some other job. On the other hand, someone with specialized training (such as an economist) is highly vulnerable to unanticipated changes in the job market for that profession. Previous studies, although scarce, suggest that expectations are fairly realistic for students with good access to information and often very unrealistic for other students (McMahon 1987; Post 1994).

## B. Household Borrowing Constraints

Like other types of investments, investments in schooling and other forms of human capital have an up-front cost in anticipation of future returns. Some households have enough income – from wages, salaries, interest income, or other sources – to finance these investments. Poorer households might not have enough income to cover the up-front costs. If they wish to make investments in their children’s human capital, they have no choice but to borrow money.

Banks and other formal private-sector lenders typically require collateral in order to obtain a loan. Informal sources of finance such as moneylenders often do not require collateral, but loan amounts tend to be small and interest rates tend to be high because of the risk of default (Bouman 1989). In this regard, borrowing to finance investments in human capital differs from borrowing to finance a house, a car, real estate, or some other tangible asset. If someone defaults on a car

loan, the car can be repossessed. The asset itself (the car) serves as partial or full collateral on the loan. Schooling cannot be repossessed if the holder of a school loan defaults, so that some other form of collateral must be found. However, if the household had another form of collateral, it could sell that to finance the investment in schooling, making the loan unnecessary. The result is that poorer households are constrained in the amount they can borrow to finance investments in schooling, other forms of human capital, and other forms of capital generally (Pender 1996).

If there were no borrowing constraints, there would be no relationship (holding other relevant factors constant) between current household income and investments in schooling. Investments would be based solely on expected rates of return and nothing else. However, because of borrowing constraints, a household's investments in its children's schooling depend positively on its current income. Poorer parents provide less education to their children than wealthier ones because they are

less able to finance investments in education out of current income (Becker 1993). Empirical evidence on borrowing constraints and investments in schooling is scarce, particularly in developing countries. In a study of Peru, Jacoby (1994) found that, among borrowing-constrained households, poorer children were more likely to repeat grades than children from better-off households. Since grade repetition in Peru and other Latin American countries depends in part on a failure to attend school (Psacharopoulos 1997), Jacoby interpreted his finding as evidence that poorer children were being withdrawn from school more frequently in order to work than better-off children. Among households that were not borrowing constrained, Jacoby found no statistically significant relationship between household income and grade repetition.

While direct costs of schooling are negatively related to investments in schooling even for households that do not face borrowing constraints (because they affect expected rates of return to schooling), this negative relations-

hip is stronger for households facing borrowing constraints. For these households, an increase in direct costs deters investments in schooling both because it reduces the expected rate of return to schooling and because it represents an additional demand on limited current financial resources. In fact, much experience from developing countries indicates that even very small direct costs can be too much for poor families to pay. In a study of rural Peru, for example, Ilon and Mook (1991) found school attendance to be highly sensitive to changes in school fees and other direct costs.

Similarly, while the presence of young children in the household can deter investments in schooling by adolescent girls (because young children increase the opportunity cost of time spent by adolescent girls in school), this negative relationship is stronger for households facing borrowing constraints. For these households, the presence of young children not only reduces the expected rate of return to schooling but also represents an additional demand on limited current household



resources. For children with minimal child care responsibilities, such as most adolescent boys, the presence of young children in the household should not deter investments in schooling in the absence of borrowing constraints. However, for borrowing-constrained households, the presence of young children reduces resources available to finance investments in education generally, including the education of adolescent boys. In his study of Peru, Jacoby (1994) found that, among borrowing-constrained households the probability of grade repetition increased as the number of young children (under age 6) in the household increased. However, among households that were not borrowing constrained, he found no statistically significant relationship between the number of young children and grade repetition. In a separate study of Peru, Patrinos and Psacharopoulos (1997) found the number of siblings had a positive and statistically significant impact on lagging behind in school attainment, especially the number of siblings under age 6.

### C. Portfolio Analysis

Schooling and other forms of human capital can be viewed as part of a “portfolio” of assets held by individuals and households. Every type of asset in the portfolio is beneficial to the individual or household because it yields income and possibly other, non-monetary returns. Depending on the situation, other investments in a household’s portfolio might include a house, other buildings, livestock, machinery, land, savings accounts, stocks, bonds, and/or other financial instruments. Some individuals and households, typically those that are financially well off, may be fairly well diversified in that they hold a wide spectrum of assets. Diversification has the advantage of spreading risk across a variety of assets – recall the old adage about not putting all one’s eggs in one basket.

Other individuals and households, particularly in developing countries, may have very limited assets and may have very limited opportunities for diversifying their portfolios. This is particularly true in rural areas of developing

countries, where even something as simple as a checking account may be out of the question either because there are no local banks or because the sums of money to be deposited are too small to justify doing so. However, even the poor in rural areas of developing countries have some investment options, whether they are in livestock, farm implements, land, or housing (Rosenzweig and Wolpin 1993).

The usual economic approach to portfolio choice views the problem as one of choosing between competing investments that vary in terms their expected returns and their degree of risk (Markowitz 1991; Sharpe and Alexander 1990). Some investments have extremely large payoffs if they pan out, but the odds that they will pan out are low. These are investments with large expected returns but significant risk. Other investments have relatively modest payoffs, but the odds that they will pan out are high. These are investments with modest expected returns and minimal risk. For a given degree of risk, higher returns are preferable to lower returns; and for a given ex-

pected return, less risk is preferable to more risk. If one type of investment becomes riskier or its expected return falls, investors will shift out of that investment and into others with better characteristics in terms of risk and expected return.

When schooling is viewed as one of many components of a portfolio of assets, rather than as some activity totally distinct from an individual or household's other investment decisions, we are compelled to look at all the portfolio choices simultaneously. This means that individuals and households make schooling decisions within the context of deciding the total size of their portfolio of assets and the distribution of that portfolio among different types of assets. Suppose that, for some reason, a competing investment (e.g., land) becomes riskier or its expected return falls. If possible, individuals and households will shift resources out of land and might possibly shift resources into schooling instead. On the other hand, if schooling becomes a riskier investment or if its expected return falls, then individuals and house-

holds will shift resources out of schooling and into other uses.

Portfolio analysis differs from expected rate of return analysis as discussed above primarily in that it introduces risk issues into the decision-making process. Expected rate of return analysis, like portfolio analysis, compares the expected rate of return on schooling to the expected rate of return on other investments. However, expected rate of return analysis does not take into account the fact that some investments are riskier than others, or the fact that households should attempt, if possible, to minimize risk by diversifying their portfolio across several types of investments. Unfortunately, to our knowledge, there have been no published studies that have examined the impact on either school attendance or school attainment in developing countries of risk to investments in schooling versus risk to other investments.

## 2. Child Time Allocation in Mexico and Peru

In this section, we move from the general discussion in Section I of the economic factors that can affect child time allocation to a discussion of what has happened in Mexico and Peru since the 1980s. Drawing on household survey data from 1984 and 1992 for Mexico, and from 1985/86, 1994, and 1996 for Peru, we offer new evidence about school attendance, labor force participation, and hours worked by those in the labor force. We also briefly discuss the ability of the economic factors reviewed in Section I to explain the observed changes in child time allocation.

### A. Mexico

In order to examine changes in child time allocation in the case of Mexico, we utilize data from the 1984 and 1992 rounds of the Encuesta Nacional de Ingreso-Gasto de los Hogares (ENIGH). The ENIGH is a household survey designed to provide reliable national information about both inco-



mes and expenditures. The ENIGH covered over 4,700 households in 1984 and more than 10,000 households in 1992. Other rounds of the ENIGH were conducted in 1987, 1990, and 1995. Although the ENIGH is not a specialized survey on education or child labor, it provides information on the educational and labor force status of household members. Labor force information was collected only for children 12 and older, on the grounds that it is illegal for children under the age of 12 to work. (Of course, this does not imply that many children under age 12 are not actually working.) Someone is defined as being in the labor force in the ENIGH if they worked at least one hour in the month before the survey or if they did not work for reasons beyond their control.

Tables 2-5 show the percentage distribution of urban male, urban female, rural male, and rural female adolescents by principal activity, respectively. Adolescents are divided into three age groups – 12-14, 15-16, and 17-18. Activities are grouped into five categories in these tables: full-time stu-

dent, working outside the home less than 20 hours/week, working outside the home 20 hours/week or more, working in the home, and all other activities. Work outside the home includes work on family farms and other family-owned enterprises. Indeed, for rural adolescent males in the 12-14 and 15-16 age groups, the majority who work outside the home do so as a worker on the family farm. For rural adolescent males in the 17-18 age group, family farm workers are somewhat less than half of the total number of workers.

Table 6 shows the average number of hours worked per week in 1984 and 1992 among adolescents who work. While there are differences in hours worked between the two years, the differences are not statistically significant. In all three age groups, the average number of hours worked per week among those who work is quite high. Essentially, those who work are doing so, on average, on a full-time basis. The amount of time left over in the week for school is limited, to say nothing of homework.

The figures in Tables 2-5 indicate that the time allocation of young people in Mexico changed dramatically between 1984 and 1992. The percentage of adolescents who were full-time students decreased with the exception of 12-14 year-old urban males and urban females, where the percentages grew slightly. In some cases, the decreases were substantial. For example, the percentage 15-16 year-old rural males who were full-time students fell by over 15 percentage points, from about 45% to less than 30%. The corresponding decline among 15-16 year-old urban males was about 10 percentage points (69% to less than 60%).

These declines in the percentage of full-time students were matched by increases in labor force participation. Except for 12-14 year-old urban males and 17-18 year-old rural females, the percentage of adolescents working 20 hours/week or more outside the home increased. In some cases, the increases were fairly significant. For example, for 17-18 year-old urban males, the percentage increased from about 31% to about 44%. For 15-16

year-old rural females, it increased from about 4% to about 16%. With respect to work in the home by female adolescents, patterns of change differed between rural and urban areas. The percentage reporting that they worked in the home fell somewhat for urban females but increased for rural females (and increased by over 10 percentage points for 12-14 year-old rural females). The percentages of urban and rural males reporting work in the home are very small in all cases.

As indicated in the footnotes to Tables 2-5, the three “working” categories and the “other activities” category include adolescents who may also be students, but who do not report being a student as their primary activity. The 1984 ENIGH has no separate school attendance question that would permit us to calculate attendance rates by activity category, but the 1992 ENIGH does. School attendance rates by activity category and age group for 1992 are shown in Table 7. Attendance rates among those working less than 20 hours/week outside the home vary from about one-half (12-14 year-olds)

to about one-fourth (17-18 year-olds). Among those working 20 hours/week or more outside the home, attendance rates are significantly lower, varying from about one-third (12-14 year-olds) to about 10% (17-18 year-olds). Attendance rates are lower still for those working in the home and those engaged in other activities. The conclusion is that work outside the home strongly discourages school attendance, particularly for adolescents working a significant number of hours each week. The conclusion is also that work in the home is an even stronger disincentive to school attendance than work outside the home.

Figures in Robles (1997) not reported here indicate that, in spite of the changes in time allocation seen in Tables 2-5, the educational attainment of Mexican adolescents increased between 1984 and 1992. This could only be explained if children began school at a younger age, if fewer children dropped out before reaching adolescence, or if there was a decline in grade repetition prior to students' adolescent years. The figures reported here indi-

cate, in effect, that adolescents in 1992 forfeited much of their initial advantage in school attainment over their 1984 counterparts by leaving school earlier and working more hours when they were in school.

As with any sample survey, it could be asked whether the changes between 1984 and 1992 indicated by the ENIGH are real or are for some reason an artifact of this particular survey. Based on other surveys, the changes appear to be real. Estimates of school attendance and school completion from the 1984 ENIGH are close to the corresponding estimates from the 1980 Mexican Census of Population and Housing, and the same can be said with respect to the 1992 ENIGH and the 1990 Census (Robles 1997). Furthermore, estimates of adolescent labor force participation from the 1992 ENIGH are very close to estimates from another sample survey for the same year, the Encuesta Nacional de la Dinámica Demográfica.

Within the ambit of human capital theory, what can explain the changes in adolescent time allocation indicated

by the ENIGH? On the whole, adolescents in all four groups analyzed here – urban males, urban females, rural males, and rural females – shifted time away from schooling and toward work. This suggests, though by no means requires, that we look for an underlying change common to all four groups. Given this, it would appear difficult to tie the changes in time allocation to the changes in rates of return to schooling reported in Table 1. While rates of return to schooling fell for urban females and rural males, they rose for urban males and rural females. Of course, this does not preclude the possibility that expected rates of return to schooling fell for all four groups.

An alternative possibility is that a decline in the quality of schooling between 1984 and 1992 discouraged school attendance. As noted in the Introduction, public expenditures on education in Mexico fell significantly in the 1980s. This was manifested in declines in real teachers' salaries, teacher-student ratios, and educational supplies per student. In principle, this decline should be reflected in lower

rates of return to schooling. However, the rates of return reported in Table 1 pertain to adults aged 25-55. As such, these rates of return would not be affected much by a decline in the quality of schooling in the 1980s, since most people in the age 25-55 cohort would have already left school before the decline set in. They instead reflect school quality when the age 25-55 cohort was in school. Putting this another way, the rates of return in Table 1 might be overestimates of the returns that an adolescent going through the lower quality secondary school system in 1992 could have expected to obtain.

Again starting with the premise that we should look for an underlying change common to all four groups (urban males, urban females, rural males, and rural females), household borrowing constraints represent another potential part of the explanation. Between 1984 and 1992, the average real wage increased in Mexico more than 10% (Edwards 1995). However, accompanying this rise in the average real wage was a bifurcation in wages and income distribution that left a significant

proportion of the population worse off (Cragg and Epelbaum 1996; Lustig 1995). For example, the minimum wage, which is the wage received by a significant fraction of the labor force, fell by over 40% in real terms between 1984 and 1992 (Edwards 1995). Because of these changes, it is reasonable to presume that a larger fraction of households was subject to borrowing constraints in 1992 than in 1984, and that real incomes among those households subject to borrowing constraints declined during this period.

Whether portfolio considerations might also be part of the explanation for observed changes in adolescent time allocation is doubtful. The economic oscillations during the 1984-1992 period were accompanied by significant oscillations in real interest rates (Edwards 1995). This suggests that financial investments became riskier during this period, but individuals did not respond by shifting resources into investments in schooling. Financial market deregulation in the late 1980s and early 1990s led to a number of lucrative investment opportunities in urban-

based economic sectors, but these were largely skill-intensive sectors such as financial services requiring advanced levels of education (Cragg and Epelbaum 1996). In other words, these were sectors requiring both physical capital and human capital, not just one or the other, in order to be successful.

## B. Peru

In order to examine changes in child time allocation in the case of Peru, we utilize data from the 1985/86, 1994, and 1996 rounds of the Encuesta Nacional de Niveles de Vida (ENNIV). The ENNIV began as part of a comprehensive World Bank program to measure living standards in developing countries. The LSMS (Living Standards Measurement Survey), as the ENNIV is known in English, was developed as a questionnaire “template” that was subsequently adapted and enlarged according to the precise needs of each country implementing the survey (Grosch and Glewwe 1995). The ENNIV covered approximately 5,000 households in 1985/86, over 3,500 households in 1994, and approximately

1,500 households in 1996. The 1996 sample was drawn entirely from households interviewed in 1994. Other rounds of the ENNIV were conducted in 1990 (Lima only), 1991, and 1997.

Tables 8-11 show school attendance rates and labor force participation rates for urban male, urban female, rural male, and rural female children, respectively. Children are divided into two age groups, 6-11 and 12-16. Unlike the Mexican ENIGHs, which only collected labor force participation information for children aged 12 and older, the ENNIVs collected this information for all children aged 6 and older. Tables 12 and 13 show the percentage distribution of urban and rural adolescents across four mutually exclusive and exhaustive activity categories – student and not in labor force, student and in labor force, in labor force and not a student, and not a student and not in labor force.

Table 14 shows the average number of hours per week for all children aged 6-16 in school, work in the home, and work outside the home according to

their student and labor force participation status for 1985/86 and 1994. We are in the process of assembling similar information using the 1996 ENNIV. Table 15 shows the sample means of selected individual and household characteristics for children aged 6-16 according to whether or not they attend school for 1985/86. Table 16 presents corresponding sample means according to whether or not children were in the labor force. We are in the process of preparing similar tables for 1994 and 1996.

The figures in Tables 8-14 indicate that, like Mexico, the allocation of children’s time in Peru has changed dramatically since the 1980s. However, the direction of change has been exactly the opposite of Mexico. With one limited exception (12-16 year-old urban males between 1985/86 and 1996), the figures in Tables 8-11 indicate that school attendance rates in 1994 and 1996 were greater than in 1985/86. In urban areas, attendance rates were all approximately 90% or greater in 1985/86, and with the one exception just noted were even larger in 1994 and

1996. In rural areas, attendance rates started at lower levels in 1985/86 but increased dramatically between 1985/86 and 1994 or 1996. For example, attendance rates rose about 20 percentage points for 6-11 year-old rural males and females between 1985/86 and 1996, and rose nearly 25 percentage points for 12-16 year-old rural females.

In urban areas, the figures in Tables 8-9 indicate that the increase in school attendance rates has been accompanied by a decrease in labor force participation rates. Although the 1994 and 1996 labor force participation figures differ somewhat from each other, they are all smaller than their 1985/86 counterparts. The figures in Table 12 reinforce this conclusion. The percentage of children classified as being a student and not in the labor force increased, while the percentages classified as student/in the labor force and not a student/in the labor force decreased.

In rural areas, the trends in labor force participation rates are not quite as clear. The 1994 figures in Tables 10-

11 are all less than their 1985/86 counterparts, but most of the 1996 figures are greater than their 1985/86 counterparts. However, the figures in Table 13 indicate that the increases in rural labor force participation between 1985/86 and 1996 did not come at the expense of school enrollment. Instead, children in 1996 (and 1994) were more likely than their 1985/86 counterparts to combine work and school as opposed to working and not going to school at all. The percentage of children classified as not a student/in the labor force fell, while the percentage classified as student/in the labor force increased. The percentage classified as student/not in the labor force also increased.

In both 1985/86 and 1994, the figures in Table 14 indicate that the average number of hours per week in school was about the same for children who were only students and children who were also in the labor force. The differences between the two groups are not statistically significant. Furthermore, in marked contrast to Mexico, the number of hours worked outside the home among children is not so large as to

be a significant deterrent to school attendance or to homework. Those children who are in the labor force and also go to school (which is the vast majority of those children in the labor force) work, on average, about 17 hours per week.

One important fact about the 1985/86 ENNIV is that the survey was conducted over a period of about one year (July 1985-July 1986), including the school vacation months of January, February, and March. By contrast, the 1994 and 1996 ENNIVs were conducted entirely during non-vacation months. The question in the ENNIV pertaining to school attendance that we use here is quite specific in that it only asks if a person attended school during the week prior to the interview date. The result is that the measured overall school attendance rate is only about 3% during January-March. In calculating the figures reported here, we excluded the households interviewed during these three months. Failing to do so would have led to a significant downward bias in estimated school attendance during 1985/86 (nearly 20

percentage points for both 6-11 year-olds and 12-16 year-olds). Somewhat surprisingly, a number of previous studies using the 1985/86 ENNIV to analyze school attendance apparently failed to take the summer vacation months into account.

We should note that excluding the months of January-March does not significantly affect sample means for the other variables of interest here, including child and adolescent labor force participation rates. In other words, unlike countries such as the U.S., there is no significant jump in child or adolescent labor force participation during the school vacation months. Those children in Peru who work tend to do so year-round.

We should also note that there does not appear to be a similar problem in the case of the Mexican ENIGHs. Although both the 1984 and 1992 ENIGHs cover the school vacation months of June-September, respondents' answers to the questions in the ENIGH pertaining to school attendance do not appear to be as not time-specific as in

the ENNIV. Indeed, there are no significant differences in either the 1984 or 1992 ENIGH between the proportion of children reported as attending school among households interviewed during the school vacation months and the proportion among households interviewed during other months of the year. The questions themselves in the ENIGH on labor force participation and school attendance ask respondents only about the previous month. However, these questions were preceded in the survey by other questions pertaining to the previous six months. We suspect that, in spite of this one-month time frame, the six-month time frame used in the preceding questions caused most respondents to think in terms of the previous six months, not just the previous month, when answering the school attendance and labor force participation equations.

As with the ENIGH, one might ask whether the figures indicated by the ENNIVs are real or are for some reason an artifact of this survey. This question is particularly appropriate in light of the dramatic increases in school at-

tendance in rural areas suggested by the ENNIV over a period of just ten years. Overall school attendance rates in both the 1994 and 1996 ENNIVs are on the order of 5-7 percentage points higher than attendance rates calculated using information from the 1993 Census of Population and the 1993 School Census (Rodríguez 1998). However, it is unclear whether school attendance rates were overestimated in the 1994 and 1996 ENNIVs, underestimated in the Census of Population and School Census, or both. In the case of the 1985/86 ENNIV, estimated school attendance rates generally lie between the attendance rates in the 1981 Census of Population and rates derived from the 1993 Census of Population and the 1993 School Census (Rodríguez 1998). While this does not necessarily mean that the 1985/86 figures are accurate, it does give us some confidence in them.

In any event, even using figures derived from the 1993 Census of Population and the 1993 School Census in place of the 1994 and 1996 ENNIVs, school attendance rates still increased



between the mid-1980s and 1990s. The tentative conclusion is that the increase in school attendance suggested by the ENNIVs is real, but that the magnitude of the increase might be overestimated.

Explaining this increase in attendance is difficult. On the whole, children in all four groups analyzed here – urban males, urban females, rural males, and rural females – shifted time away from work and toward schooling. As in the case of Mexico, the fact that all four groups moved in the same direction suggests, but does not require, that we look for an underlying change common to all four groups. Given this, it would appear difficult to tie the changes in time allocation to the changes in rates of return to schooling reported in Table 1. Rates of return stayed about the same for urban males and fell for the other three groups. Of course, this does not preclude the possibility that expected rates of return to schooling increased for all four groups.

The increase in school attendance is especially puzzling in light of the eco-

nomie difficulties and declining public expenditures on education noted in the Introduction. There was no improvement in school quality to motivate an increase in attendance; in fact, quality as measured by a variety of indicators fell significantly between the mid-1980s and the mid-1990s. Similarly, there was no improvement in living standards permitting households subject to borrowing constraints to better finance investments in schooling. Indeed, living standards declined substantially over much of the period between the mid-1980s and mid-1990s, in both rural and urban areas (Rodríguez and Abler 1998). Other evidence against the importance of borrowing constraints in the case of Peru can be found in Tables 15-16. The data in Table 15 indicate that children who attend school do not come from wealthier households than children who do not attend school (in the sense that there is no statistically significant difference between the two groups of children in average per capita household income). The data in Table 16 tell a similar story regarding average per capita household income for children

in the labor force versus children not in the labor force.

Portfolio considerations might offer one avenue for explaining increases in school attendance. Peru, like Mexico, experienced tremendous instability in its capital markets in the 1980s and early 1990s. Real interest rates were negative during several years and, as noted in the Introduction, the inflation rate reached hyperinflationary proportions by 1990, subsiding thereafter as a result of economic policy reforms. Furthermore, the tremendous economic downfall in the late 1980s surely took its toll on returns to physical capital. Glewwe and Hall (1994) found that the decline in real per capita expenditures between 1985/86 and 1990 among the wealthiest 10% of households in Lima, for whom capital income would be an important share of their income, was about the same as all households in Lima (about 55%). In the face of this decline in returns and tremendous uncertainty, it is not surprising that private savings as a percentage of gross domestic product (GDP) fell by about half between the late 1980s and early 1990s (Edwards 1995).

It is possible that households responded to this decline in returns and tremendous uncertainty for physical capital by reallocating funds away from physical capital and toward human capital, including schooling. In regard to risk, investing in human capital has the advantage over investing in physical capital of equipping people with the knowledge and abilities to respond to changing economic conditions. The greater the pace of change, the greater the advantage to investing in human capital relative to investing in physical capital. T. W. Schultz (1975) refers to this attribute of human capital as the “ability to deal with disequilibria.” Glewwe and Hall (1994) found that the decline in per capita consumption expenditures of households in Lima between 1985/86 and 1990 varied significantly according to the educational level of the household head. Households headed by someone with no schooling or only primary schooling experienced the largest percentage declines in per capita consumption expenditures (about 59%).

### 3. Conclusions

The objective of this paper was to investigate tendencies since the 1980s in the allocation of children’s time between school and work in Mexico and Peru. We began in Section I with a discussion of the economic factors affecting child time allocation, which we grouped under three general headings: expected rates of return to investments in human capital, household borrowing constraints, and portfolio analysis.

In Section II, we discussed what has happened to child time allocation since the 1980s in Mexico and Peru, drawing on household survey data from these two countries. We found dramatic changes in time allocation in both countries, but in opposite directions. In Mexico adolescents moved decidedly away from school and toward work, while the opposite occurred among young children and adolescents in Peru. We also found important differences between the two countries in hours worked among those who work. In Mexico, adolescents who work

do so essentially on a full-time basis, making it difficult to also attend school or do homework. In Peru, by contrast, young children and adolescents who work do so on a much more limited basis, so that work is not a significant deterrent to school attendance. As a caveat, we should note that comparisons between the two countries are hampered by differences in available information. In general, information is more limited in the case of Mexico.

We also discussed in section II the ability of the economic factors reviewed in Section I to explain the observed changes in time allocation. An explanation appears possible in Mexico based on a decline in the quality of public schooling and an increase in the extent and severity of household borrowing constraints. An explanation appears as if it might be possible in Peru based on a desire by households to change the mix of investments in their portfolio of assets away from physical capital and toward human capital. We are in the process of developing and implementing econometric models to test these hypotheses.

**TABLE 1 / ESTIMATED RATES OF RETURN TO SCHOOLING IN MEXICO AND PERU**

population Subgroup	Estimated Rate of Return (%/Year)			
	Mexico		Peru	
	1984	1992	1985/86	1994
Urban Males	10.7	11.5	9.8	9.8
Urban Females	12.7	8.0	11.3	9.7
Rural Males	11.5	9.8	9.1	6.6
Rural Females	1.8*	13.9	16.7	10.0

*Source: Abler, Robles, and Rodríguez (1998), based on analysis of ENIGH and ENNIV data for persons 25-55 years old. An \* denotes an estimate that is not statistically significant at the 5% level.*

**TABLE 2 / DISTRIBUTION OF (%) URBAN MALE ADOLESCENTS BY PRINCIPAL ACTIVITY, MEXICO**

Principal Activity and Year	Age Group		
	12-14	15-16	17-18
Full-Time Student			
1984	85.0	69.0	51.1
1992	85.3	59.5	40.2
Working Outside the Home Less than 20 Hours/Week*			
1984	1.9	1.9	3.5
1992	3.1	5.1	2.4
Working Outside the Home 20 Hours/Week or More*			
1984	8.2	19.7	30.7
1992	7.0	23.3	43.5
Working in the Home*			
1984	2.1	2.6	0.5
1992	0.7	2.1	0.7
Other Activities*			
1984	2.8	6.8	14.2
1992	3.9	10.0	13.2

*\*Possibly also a student. Source: Robles (1997), based on 1984 and 1992 ENIGH data.*

**TABLE 3 / DISTRIBUTION (%) OF URBAN FEMALE ADOLESCENTS BY PRINCIPAL ACTIVITY, MEXICO**

Principal Activity and Year	Age Group		
	12-14	15-16	17-18
Full-Time Student			
1984	83.8	65.9	50.3
1992	85.7	62.4	43.9
Working Outside the Home Less than 20 Hours/Week*			
1984	1.2	1.5	1.3
1992	0.2	1.3	2.3
Working Outside the Home 20 Hours/Week or More*			
1984	1.9	4.9	16.5
1992	2.9	13.4	21.8
Working in the Home*			
1984	11.9	25.9	27.3
1992	9.5	19.1	24.3
Other Activities*			
1984	1.2	1.8	4.6
1992	1.7	3.8	7.7

*\*Possibly also a student. Source: Robles (1997), based on 1984 and 1992 ENIGH data.*

**TABLE 4 / DISTRIBUTION (%) OF RURAL MALE ADOLESCENTS BY PRINCIPAL ACTIVITY, MEXICO**

Principal Activity and Year	Age Group		
	12-14	15-16	17-18
Full-Time Student			
1984	74.6	45.4	22.9
1992	65.3	29.2	10.5
Working Outside the Home Less than 20 Hours/Week*			
1984	2.1	5.0	4.3
1992	5.5	6.4	3.9
Working Outside the Home 20 Hours/Week or More*			
1984	18.2	43.8	63.8
1992	22.4	50.2	70.6
Working in the Home*			
1984	1.5	0.6	2.0
1992	1.6	2.2	0.3
Other Activities*			
1984	3.6	5.2	7.0
1992	5.2	12.0	14.7

*\*Possibly also a student. Source: Robles (1997), based on 1984 and 1992 ENIGH data.*



**TABLE 5 / DISTRIBUTION (%) OF RURAL FEMALE ADOLESCENTS BY PRINCIPAL ACTIVITY, MEXICO**

Principal Activity and Year	Age Group		
	12-14	15-16	17-18
Full-Time Student			
1984	76.8	51.6	23.6
1992	61.5	32.3	14.1
Working Outside the Home Less than 20 Hours/Week*			
1984	0.8	4.0	2.0
1992	0.9	1.8	1.8
Working Outside the Home 20 Hours/Week or More*			
1984	2.7	3.9	17.6
1992	4.0	16.1	16.1
Working in the Home*			
1984	19.5	40.3	54.9
1992	31.6	45.3	64.0
Other Activities*			
1984	0.2	0.2	1.9
1992	2.0	4.5	4.0

*\*Possibly also a student. Source: Robles (1997), based on 1984 and 1992 ENIGH data.*

**TABLE 6 / AVERAGE HOURS WORKED PER WEEK BY ADOLESCENTS WHO WORK, MEXICO**

Year	Age Group		
	12-14	15-16	17-18
1984	37.8*	41.0*	44.7*
1992	36.5*	36.6*	37.8*

*Note: An \* indicates that the sample means for 1984 and 1992 for a given age group are not statistically different from each other at the 5% level. Source: Calculations by Robles based on 1984 and 1992 ENIGH data.*

**TABLE 7 / SCHOOL ATTENDANCE RATES (%) BY PRINCIPAL ACTIVITY, MEXICO, 1992**

Principal Activity and Year	Age Group		
	12-14	15-16	17-18
Full-Time Student	98.7	98.1	97.9
Working Outside the Home Less than 20 Hours/Week	49.4	44.5	24.7
Working Outside the Home 20 Hours/Week or More	32.9	15.0	10.3
Working in the Home	11.0	3.9	1.6
Other Activities	6.9	9.4	2.0

*Note: Full-time student status is based on a separate question in the 1992 ENIGH survey than school attendance. If the answers to the two questions had been internally consistent on the part of all the respondents, the percentage of full-time students reported as attending school would have been 100 for each age group. As it is, the percentages are slightly less than 100. Source: Robles (1997), based on 1992 ENIGH data.*

**TABLE 8 / SCHOOL ATTENDANCE AND LABOR FORCE PARTICIPATION RATES, URBAN MALES, PERU**

Activity Rate (%)	Age Group 6-11	Age Group 12-16
School Attendance Rate		
1985/86	93.3	91.9
1994	97.9	95.0
1996	98.1	91.7
Labor Force Participation Rate		
1985/86	7.7	27.8
1994	2.8	15.0
1996	3.0	20.3

Source: Rodríguez and Abler (1998), based on 1985/86, 1994, and 1996 ENNIV data.

**TABLE 9 / SCHOOL ATTENDANCE AND LABOR FORCE PARTICIPATION RATES, URBAN FEMALES, PERU**

Activity Rate (%)	Age Group 6-11	Age Group 12-16
School Attendance Rate		
1985/86	93.0	89.2
1994	96.9	93.2
1996	98.2	95.2
Labor Force Participation Rate		
1985/86	6.4	22.0
1994	2.6	9.9
1996	4.1	14.2

Source: Rodríguez and Abler (1998), based on 1985/86, 1994, and 1996 ENNIV data.

**TABLE 10 / SCHOOL ATTENDANCE AND LABOR FORCE PARTICIPATION RATES, RURAL MALES, PERU**

Activity Rate (%)	Age Group 6-11	Age Group 12-16
School Attendance Rate		
1985/86	76.4	76.7
1994	93.6	86.1
1996	96.1	88.8
Labor Force Participation Rate		
1985/86	42.3	67.2
1994	35.0	65.9
1996	47.1	74.0

Source: Rodríguez and Abler (1998), based on 1985/86, 1994, and 1996 ENNIV data.

**TABLE 11 / SCHOOL ATTENDANCE AND LABOR FORCE PARTICIPATION RATES, RURAL FEMALES, PERU**

Activity Rate (%)	Age Group 6-11	Age Group 12-16
School Attendance Rate		
1985/86	74.4	58.2
1994	94.5	77.1
1996	95.1	82.8
Labor Force Participation Rate		
1985/86	34.6	62.7
1994	26.2	45.5
1996	34.7	55.3

Source: Rodríguez and Abler (1998), based on 1985/86, 1994, and 1996 ENNIV data.

**TABLE 12 / DISTRIBUTION (%) OF URBAN CHILDREN BY ACTIVITY, PERU**

Activity and Year	Age Group 6-11	Age Group 12-16
Student and Not in Labor Force		
1985/86	87.1	70.6
1994	94.8	84.1
1996	94.6	78.5
Student and in Labor Force		
1985/86	6.0	20.0
1994	2.6	10.1
1996	3.5	14.8
In Labor Force and Not a Student		
1985/86	1.0	5.1
1994	0.0	2.3
1996	0.0	2.6
Not a Student, Not in Labor Force		
1985/86	5.8	4.4
1994	2.5	3.6
1996	1.8	4.1

*Note: Percentages across the four activities may not add to 100 because of rounding. Source: Rodríguez and Abler (1998), based on 1985/86, 1994, and 1996 ENNIV data.*

**TABLE 13 / DISTRIBUTION (%) OF RURAL CHILDREN BY ACTIVITY, PERU**

Activity and Year	Age Group 6-11	Age Group 12-16
Student and Not in Labor Force		
1985/86	46.2	28.2
1994	65.5	38.3
1996	55.7	32.1
Student and in Labor Force		
1985/86	29.3	39.3
1994	28.6	43.2
1996	40.0	53.9
In Labor Force and Not a Student		
1985/86	9.2	25.7
1994	1.7	12.3
1996	1.1	11.3
Not a Student, Not in Labor Force		
1985/86	15.3	6.8
1994	4.3	6.2
1996	3.2	2.8

*Note: Percentages across the four activities may not add to 100 because of rounding. Source: Rodríguez and Abler (1998), based on 1985/86, 1994, and 1996 ENNIV data.*



**TABLE 14 / AVERAGE HOURS PER WEEK DEVOTED TO SCHOOL, WORK IN THE HOME, AND WORK OUTSIDE THE HOME, ALL CHILDREN AGED 6-16, PERU**

Activity and Year	School	Work in the Home	Work Outside the Home
Student and Not in Labor Force			
1985/86	21.1	8.5	0
1994	25.1	8.6	0
1996			
Student and in Labor Force			
1985/86	20.8	9.9	16.9
1994	24.2	10.8	16.9
1996			
In Labor Force and Not a Student			
1985/86	0	13.7	33.8
1994	0	14.1	36.5
1996			
Not a Student, Not in Labor Force			
1985/86	0	12.7	0
1994	0	18.3	0
1996			

*Source: Calculations by Rodríguez based on 1985/86 and 1994 ENNIV data.*

**TABLE 15 / AVERAGE CHARACTERISTICS OF CHILDREN AGED 6-16 ACCORDING TO WHETHER OR NOT THEY ATTEND SCHOOL, PERU, 1985/86**

Characteristic	Does Child Attend School?	
	No	Yes
<b>Individual Characteristics:</b>		
Age (years)	11.1	10.7
Years of Schooling Completed	2.7	3.9
Child Is Female (% of sample)	56.6	47.7
Participates in Labor Force (% of sample)	56.6	27.7
Time Worked (hours/week)	20.4	4.7
Time in School (hours/week)	0	21.3
Time in Household Activities (hours/week)	12.4	8.9
Income Earned (thousands of Intis/year)	0.39	0.21
<b>Household Characteristics:</b>		
Per Capita Household Income (Excluding Income from Children Aged 6-16) (thousands of Intis/year)	3.77*	5.07*
Household Size (number)	7.1	7.0
Household Head Is Male (% of sample)	84.2	87.4
Age of Household Head (years)	45.3*	44.7*
Schooling of Household Head (years)	3.7	6.5
Household Is in Rural Area (% of sample)	73.7	41.1

Source: Rodríguez and Abler (1998). An \* denotes a characteristic whose sample means for children attending school and children not attending school are not statistically different from each other at the 5% level.

**TABLE 16 / AVERAGE CHARACTERISTICS OF CHILDREN AGED 6-16 ACCORDING TO WHETHER OR NOT THEY ARE IN LABOR FORCE, PERU, 1985/86**

Characteristic	Is Child in Labor Force?	
	No	Yes
<b>Individual Characteristics:</b>		
Age (years)	10.3	11.8
Years of Schooling Completed	3.7*	3.7*
Child Is Female (% of sample)	50.3	46.7
Participates in Labor Force (% of sample)	89.4	71.3
Time Worked (hours/week)	0	27.8
Time in School (hours/week)	19.1	15.0
Time in Household Activities (hours/week)	9.0	10.5
Income Earned (thousands of Intis/year)	0	0.38
<b>Household Characteristics:</b>		
Per Capita Household Income (Excluding Income from Children Aged 6-16) (thousands of Intis/year)	5.13*	4.27*
Household Size (number)	7.0*	6.9*
Household Head Is Male (% of sample)	87.3*	86.1*
Age of Household Head (years)	44.4	45.8
Schooling of Household Head (years)	7.0	4.2
Household Is in Rural Area (% of sample)	32.5	75.3

Source: Rodríguez and Abler (1998). An \* denotes a characteristic whose sample means for children attending school and children not attending school are not statistically different from each other at the 5% level.

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