The impact of children's work on schooling

Multi-country evidence based on SIMPOC data

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1. Introduction

ILO Convention No. 138, Art 7(b) stipulates that light work may be permitted from the age of 12 or 13 provided it does not "prejudice attendance at school" nor the "capacity to benefit from the instruction received". This raises the question: Does a limited amount of children's work at these ages "prejudice attendance at school" and/or damage the child's "capacity to benefit from the instruction received"?

Much of the recent concern over child labour, as is evident from the rapidly expanding literature[1] on the subject, stems from the belief that it has a detrimental effect on human capital formation. This is reflected in the close attention that child schooling has received in several studies on child labour. Kanbargi and Kulkarni (1991), Psacharopoulos (1997), Patrinos and Psacharopoulos (1997), Jensen and Nielsen (1997), Ravallion and Wodon (2000), Ray (2000a, 2000b, 2002) are part of a large literature that provides evidence on the trade-off between children's work and schooling. Much of this evidence is on the impact of children's labour participation rates, rather than hours worked by children, on child schooling. This reflects the fact that data on child labour hours is much more difficult to obtain than that on child labour participation rates. However, from a policy viewpoint, knowledge of the impact of child labour hours on a child's school attendance and school performance is as important as that of child labour force participation rates. This raises the question: Is there an "acceptable" threshold of weekly hours of work beyond which school attendance and performance are negatively impacted? The principal motivation of this study is to provide multi-country evidence that helps to answer this crucial policy question.

With the increasing availability of good quality data sets on child labour, the literature has now moved on from estimating child labour participation rates to estimating child labour hours. The two main international providers of such data sets are the World Bank, via its Living Standards Measurement Studies (LSMS), and the International Labour Organisation via its Statistical Information and Monitoring Programme on Child Labour (SIMPOC). Grootaert and Patrinos (1999), Rosati and Tzannatos (2000) and Maitra and Ray (2002) use multinomial estimation procedures to study the interaction of child labour and child schooling participation/non-participation rates, extending the earlier studies that relied on bivariate logit estimation. Multinomial logit estimation extends bivariate logit estimation by allowing for more than two possibilities in the outcome variable that it estimates. Such an extension has been made possible by the recent availability of more disaggregated information on child participation rates than was previously available. The present study, in line with recent attempts, uses multinomial logit estimation to analyse the determinants of a child's participation/non-participation in schooling and employment in the selected SIMPOC countries.

The empirical literature on child labour has focussed attention on its causes (i.e. its determinants) rather than its effects. There is relatively little evidence in the published literature on the impact of a child's labour hours on his/her educational experience, especially on his/her performance at school. Using SIMPOC data collected by the ILO, the present study

[1] See Basu (1999), Basu and Tzannatos (2002) and Bhalotra and Tzannatos (2002) for recent surveys of the literature on child labour.

provides multi-country evidence on this issue, which is of national and international concern. The countries chosen are Belize, Cambodia, Namibia, Panama, Philippines, Portugal, and Sri Lanka. The children, who are considered here, are those in the age group 12-14 years. The choice of this age group is due to the fact that the minimum age for "light work" is set at twelve for countries "whose economy and educational facilities are insufficiently developed" (ILO Convention 138, Art. 2) and thirteen in other countries.

The results of the present study add to the growing evidence on the welfare cost that child labour entails on human capital. Previous investigations include the studies of Patrinos and Psacharopoulos (1995) on Paraguay, Akabayashi and Psacharopoulos (1999) on Tanzania, Singh (1998) on the U.S.A., Heady (2000) on Ghana and Rosati and Rossi (2001) on child labour data from Pakistan and Nicaragua.[2]. The general consensus that emerges from the results of these studies is that child labour is harmful to human capital accumulation. For example, using time-log data of children from a Tanzanian household survey, Akabayashi and Psacharopoulos (1999) observe (p.120) "that a trade off between hours of work and study exists….(;) hours of work are negatively correlated to reading and mathematical skills through the reduction of human capital investment activities". Heady (2000) similarly observes on Ghanaian data that "work has a substantial effect on learning achievement in the key areas of reading and mathematics….these results confirm the accepted wisdom of the negative effects of work on education". Rosati and Rossi (2001), using data from Pakistan and Nicaragua, conclude that an increase in the hours worked by children significantly affects their human capital accumulation. Ray (2000c), using information on educational attainment from the 50th round (July, 1993 – June, 1994) of India's National Sample Survey found that, in both rural and urban areas, the sample of children involved in economic activities recorded a lower mean level of educational experience than non-working children.

Based on the analysis of national surveys from seven countries, the present study seeks to determine the effect of work on children's schooling (in the age group 12-14 years). It examines whether a relationship exists between the hours of children's work and schooling outcomes, in different sectors, occupations and activities, broken down by gender. In addition, the paper provides evidence on the impact of hours of child work on other learning measures such as "time spent on studies at home", "hours of study at school and at home" and the "number of failures in school". There is reason to believe that hours of work are an important indicator in determining the nature of the link between school and work, but research to date has not provided clarity on the permissible amount of time. The results of this study will help to establish recommended thresholds of weekly hours of work, beyond which school attendance and performance are negatively impacted.

The points on which the present study departs from the above-mentioned literature, on the impact of child labour on education outcomes, are as follows:

(i) In basing the empirical exercise on the data sets from seven countries, the study is on a more ambitious scale than has been attempted before. The chosen countries span a wide geographical, cultural and political spectrum. They range from a European developed country context, such as Portugal, where child labour is not a particularly serious issue, to Asian developing country contexts such as Sri Lanka, Cambodia and the Philippines, where it is. While the cross-country comparisons

[2] See also Orazem and Gunnarsson (2003) for Latin American and other evidence on the impact of child labour hours on school achievement as measured by test scores.

between the comparable estimates are useful and interesting in their own right, they allow an assessment of whether the relationship between child work and learning outcomes varies between countries.

(ii) Much of the recent literature has used test scores as a measure of "learning achievement" in studying how this learning outcome variable is impacted by child labour hours. The present study departs from this practice for, principally, three reasons.

First, test scores are not available for children in any of the seven data sets that have been considered in this study. Second, the use of test scores leads to a potentially serious sample selectivity problem since, as Heady (2000) reports for Ghana, only a fraction[3] of the children in the sampling clusters take the tests. While no definite reasons are provided for a sizeable number of children not taking the test, the estimates from the reduced sample suffer from bias that does not appear to have been corrected in the reported estimations. Third, the possession of reading, language and mathematical skills that the test scores[4] measure, offers only a very limited picture of "learning achievement", especially in the context of a developing country. For example, in the non-English speaking Ghanaian context that Heady (2000) studies, the test scores on reading skills in the English language constitute an inappropriate measure of "learning achievement".

Of the alternative measures of "school outcomes" that have been listed in Patrinos and Psacharopoulos (1995) and in Orazem and Gunnarsson (2003), the only ones that are available for all the seven countries considered here are: "school attendance" (a binary variable)[5] and "years of schooling completed". The regressions using these measures of "school outcome" provide the basis for the cross-country comparisons. As Orazem and Gunnarsson (2003) point out, the "years of schooling completed" measure is only appropriate for parents and adults. A more appropriate measure for this study is the "schooling for age" (SAGE) variable that measures schooling attainment relative to age. It is given by

$$\text{SAGE} = \left(\frac{\text{Years of Schooling}}{\text{Age} - \text{E}}\right) \text{x100} \qquad (1)$$

where E represents the usual school entry age in the country.[6] Unfortunately, SAGE could not be calculated for three countries (Namibia, Portugal and the Philippines) since they do not report "years of schooling" as a continuous variable. Consequently, the SAGE based regressions are performed and reported for only four countries

[3] Heady (2000, p.19) reports that of the 1848 children between the ages of 9 and 18 in the sampling clusters where the tests were administered, only 1024 (55.41%) took the "easy mathematics" test and 585 (31.66%) took the "easy reading" test.

[4] See Glewwe (2002, pgs. 446-448) for a critical review of the literature on school performance that is based on the use of test scores.

[5] School attendance takes the value 1 if the child is reported to be enrolled in school, and 0, if otherwise.

[6] Patrinos and Psacharopoulos (1995) set the school entry age, E, at the somewhat high figure of 7 years for Paraguay. In the present study, we set E at 5 years for all countries to ensure uniformity and facilitate cross country comparison. An increase in E to 6, as suggested by a reviewer, has very little impact on the results.

(Belize, Cambodia, Panama, and Sri Lanka). Yet, the regression results that use "years of schooling" as an educational performance measure are reported for all seven countries.

Note, however, that in the three countries for which SAGE could not be constructed, the school years variable is based on the data codes and is not comparable with any of the other school years variables. In case of these three countries, this variable should not be interpreted literally as the "years of schooling".

Moreover, it is important to note that these measures used to grasp school achievements reflect past decisions and events. It is possible that children who are observed to be behind in school and working might be working because they had a bad performance at school. This is a caveat that could not be avoided given the available data.

(iii) The present study attempts to control for the likely endogeneity of child labour hours as an explanatory variable in an equation that estimates its impact on the child's educational outcomes and learning possibilities. By "endogeneity", we mean that child labour hours are determined by the child's schooling variables as well as vice versa. There are several reasons for this endogeneity. For example, a child's labour market status could reflect her school performance as much as the other way around. Consequently, the estimates in the regression of the child's schooling variables on her labour market status are likely to be inaccurate. Few studies have tried to correct for the endogeneity, mainly because of the lack of valid instruments or proxies in the data. For example, Heady (2000), in his study on Ghanaian data, recognises the endogeneity issue but does not tackle it in the estimation. Valid proxies in this case are those that vary with the child's labour market hours without directly affecting her schooling status or, in case of non-school measures, other learning possibilities such as "time spent on studies at home". Such variables are difficult to think of, let alone find, in the data sets. Child wage is one of the best candidates but, unfortunately, it is only available for some working children. Bhalotra (2000) attempts to overcome the problem by proxying child wages by community-level agricultural wages. However, she provides no justification for this strong and arbitrary assumption. Instead, we use the household's income status and its portfolio of assets and communal facilities such as radio, telephone, and access to water and electricity as instruments. The underlying assumption is that these "instrumental variables" affect learning possibilities and outcomes only through their impact on child labour hours and not directly.

In this exercise, we compare the estimates from different procedures and perform tests on whether the issue of endogeneity of child labour hours is as serious as is generally believed. The question can only be answered by hard empirical evidence. Such evidence is conspicuous by its absence in the literature.[7] From a policy viewpoint, the issue of robustness of the principal findings on the impact of child labour to its treatment as an explained or an explanatory variable is of considerable importance. This study will attempt to shed some light on this issue. We take this a step further by jointly estimating child schooling and child labour hours as a system of equations. The examination of the robustness of the impact of child labour hours on her schooling to the choice of estimation procedure adds to the policy interest of this study.

[7] See, for example, the recent survey by Bhalotra and Tzannatos (2002) who discuss the endogeneity issue but do not perform or report on any statistical tests on its significance.

While the primary focus of this study is on the impact of child labour on child schooling, we also include non-child labour variables such as the age and gender of the child, the number of siblings, the educational levels of the parents as explanatory variables in the child schooling regressions. As we report below, some of these, especially the adults' educational levels and the household's access to water and electricity, have significantly positive affects on the child's educational experience and outcomes. These results suggest that controlling a child's labour market activity is not the only way to enhance her schooling experience and learning achievement. It is possible to moderate the negative effects of child labour hours on child schooling by influencing the non-child labour variables.

The remainder of the paper is organised as follows. Section 2 presents the estimation methodology adopted in this study. Section 3 describes the chosen data sets and presents, via tables and graphs, the salient empirical features that throw light on the principal focus of this study, namely, the impact of child labour hours on her learning achievement. Section 4 presents and discusses the estimation results. Section 5 presents and discusses the Sri Lankan evidence on the impact of occupational category on the child's learning. Section 6 presents evidence on the robustness of the principal findings to the use of weighted data in the estimations. This section also reports the sensitivity of the findings to the recognition, via Tobit estimation, that hours of child work are truncated at zero. We end on the concluding note of Section 7.

2. Estimation methodology

The econometric analysis of the data sets is based on a three-part estimation methodology.

A. The study uses the multinomial logit model to estimate the determinants of the household's decision to put the child in one of four observable states, namely, the child (i) attends school and does not work, (ii) attends school and works, (iii) neither attends school nor works, and (iv) works and does not attend school.

B. The exercise, then, moves on from estimating participation/non-participation rates to estimating learning measures with special attention paid to the impact of child labour hours, consistent with the principal objective of this study. The single equation estimations initially ignore the endogeneity of child labour hours by using Ordinary Least Squares technique (OLS) but, then, tackle it by using the instrumental variables (IV) method of estimation. The OLS and IV estimates are compared and the Hausman test for the endogeneity of the child labour hours variables is performed and reported.

C. In the final part, the simultaneity between the schooling outcomes and child labour hours is recognised by jointly estimating them as a two-equation simultaneous equation system, using 3SLS method of estimation. The IV and 3SLS estimates are compared to establish the robustness or otherwise of the principal qualitative results of this study.

This three-part methodology is spelt out in more detail as follows.

The decision to send a child to work is described by the following latent variables model.

$$W_i^* = X_{1i}\beta_1 + \in_{1i} \tag{2}$$

W_i^* is the net benefit attained by the family by sending child i to work, X_{1i} is a vector of the child, family and community characteristics that determine W_i^*, and $\in_{1i}$ is a random error, with zero mean and unit variance. However, W_i^* is not observed – what we do observe is the following binary variable:

$$W_i = \begin{cases} 1, \text{ if the child works } \left(W_i^* > 0\right) \\ 0, \text{ otherwise} \end{cases} \tag{2a}$$

Correspondingly, the decision to send a child to school is described by the following latent variable model:

$$S_i^* = X_{2i}\beta_2 + \in_{2i} \tag{3}$$

S_i^* is the net benefit to the family from sending the child to school, X_{2i} is the vector of child, family and community characteristics that determine S_i^*, and $\in_{2i}$ is a random error with zero mean; S_i^* unit variance is not observed – what we do observe is the following binary variable:

$$S_i = \begin{cases} 1, \text{ if the child attends school } \left(S_i^* > 0\right) \\ 0, \text{ otherwise} \end{cases} \tag{3a}$$

In the multinomial logit estimation procedure we convert the two-equation system (given by equations (2a) and (3a)) into an observable form (Y) involving the four states as follows:

(i) $Y_i = 0 : W_i^* \leq 0, S_i^* > 0$ (child does not work, attends school)

(ii) $Y_i = 1 : W_i^* > 0, S_i^* > 0$ (child works and attends school)

(iii) $Y_i = 2 : W_i^* \leq 0, S_i^* \leq 0$ (child neither works nor attends school)

(iv) $Y_i = 3 : W_i^* > 0, S_i^* \leq 0$ (child works, does not attend school)

The estimated equation is given by:

$$Y_i^* = X_i\beta + \in_i \tag{4}$$

The reduced form parameters of this equation are estimated using maximum likelihood based on a multinomial logistic distribution of $\in$. Since the probabilities of being in the four states (i) – (iv) must add to unity for each child, the multinomial logit strategy involves estimating three equations. In this study, we have normalised category (i), i.e. adopted the state of the child not working but attending school as the baseline case in the multinomial logit regressions.

The second part of the study involves estimating the learning measures (Li) of the child i expressed as a linear function of her child labour hours (Hi), the square of her labour hours and a host of that child's individual (C_{ik}, $k = 1,.,m_1$) and (F_{ik}, $k = 1,.,m_2$) family characteristics. The estimating equation is given by:

$$\begin{aligned} L_i = \text{ constant} + \delta_1 H_i + \delta_2 \left(H_i\right)^2 + \sum_{k=1}^{m_1} \gamma_{1k} C_{ik} \\ + \sum_{k=1}^{m_2} \gamma_{2k} F_{ik} + U_{1i} \end{aligned} \tag{5}$$

where U_{1i} is the stochastic error term assumed to have the usual white noise properties.

As explained by Orazem and Gunnarsson (2003), the child labour hours variable Hi is likely to be endogenous. In that case, OLS estimation of (5) will yield biased estimates. (5) was, hence, also estimated using IV method of estimation, with Ii denoting the instrumental variables used to proxy Hi in the estimation. Besides comparing the OLS and IV estimates of (5), we also report below the Hausman test[8] (χ_1^2)of whether the two sets of estimates are systematically different, i.e. whether the OLS estimates suffer from inconsistency. The following points are worth noting:

(i) L_i refers to a variety of learning measures on the child's learning possibilities and learning outcomes. Examples of the former include the child's school enrolment variable, S, defined earlier, and "time spent on studies at home" (T_i). Examples of the latter include SAGE (see equation 1), "Years of Schooling" and, where available, the child's record on grade repetition due to failure at school.

It is important to appreciate the distinction between the two. The recent empirical literature on the impact of child labour on learning has focussed exclusively on the latter, overlooking the former. However, from a policy viewpoint, knowledge of both impacts is important since in many traditional developing countries non-formal (i.e. non-school) education is an important vehicle for learning. Similarly, those who argue against the use of a "learning possibility" measure such as school attendance in favour of a "learning outcome" measure such as test scores [see, for example, Heady (2000, p.2)] overlook this distinction between the two, namely, between the input into (school attendance) and output from (test scores, SAGE, etc.) education. As Weiner (1991) argues in his classic work on South Asian child labour, the immediate cost of child labour is that the child is kept away from school. A child's school attendance ought to be the first step in the political agenda and, only then, does the impact of child labour on outcomes such as SAGE or, more narrowly, "test scores", acquire any policy significance.

(ii) The inclusion of both the child labour hours variable (H_i) and its square (H_i^2) is designed to allow and test for the possibility that the impact of labour hours on the learning measure, L_i, changes direction beyond a certain critical value of child labour hours (H_i^*). That possibility exists if, as we generally observe in the estimations, $\hat{d}_1$ and $\hat{d}_2$ are each statistically significant and have reverse sign. In that case, the critical value of child labour hours, at which its impact on the learning measure reverses direction, is given by

$$H^* = -\frac{\hat{\delta}_1}{2\hat{\delta}_2} \qquad (6)$$

where $\hat{\delta}_1, \hat{\delta}_2$ are the estimated values.

(iii) Another measure, which is of policy interest in the present context, is the marginal rate of substitution (ϕ_k) between the child's labour hours and her individual or family characteristics, k, that keeps the child's learning measure unchanged. ϕ_k denotes the change in attribute k that will neutralise the harmful effects of an extra hour of child

[8] See Stewart and Gill (1998, pgs. 142-144) for a lucid exposition of this test. Since H_i is the only variable on the right hand side of (5) that is potentially endogenous, the test statistic has a Chi square distribution with one degree of freedom.

labour, keeping the value of the child's learning measure unchanged. From (5), it is easily checked that ϕ_k is given by:

$$\phi_k = -\frac{\hat{\gamma}_k}{\hat{\delta}_1 + 2\hat{\delta}_2 H} \tag{7}$$

where $\hat{\gamma}_k$ is the estimated co efficient of attribute k in the equation (5). At the initial point of child's entry into the labour market, (i.e. when H=0), (7) yields:

$$\phi_k = -\frac{\hat{\gamma}_k}{\hat{\delta}_1} \tag{8}$$

Suppose the attribute k is the educational level of the child's mother as measured by the years of her schooling. If $\hat{\gamma}_k$ is positive and significant, as is the case in most of the estimations, and $\hat{\delta}_1$ is negative (i.e. child labour is harmful at the entry point), then ϕ_k (>0) denotes the **increase** in the years of the mother's education that is needed to cancel out the adverse learning consequences of the first hour of her child's labour.

Since ϕ_k will be dependent on the units of measurement of child labour hours (e.g. weekly or daily hours) and of attribute k, for comparability between countries, it is better to express the child learning compensated interaction between child labour hours and attribute k in terms of elasticity, $\phi_k^{\%}$, as follows:

$$\phi_k^{\%} = -\frac{\hat{\gamma}_k}{\hat{\delta}_1 + 2\hat{\delta}_2 \bar{H}} \cdot \frac{\bar{A}_k}{\bar{H}} \tag{9}$$

where $\bar{H}$ and $\bar{A}_k$ denote, respectively, the levels of child labour hours and of attribute A_k at which the elasticity is being calculated. $\phi_k^{\%}$, which is invariant to units of measurement, will denote the percentage change (positive or negative) in attribute k that will be needed to exactly counteract the learning impact of a 1 per cent increase in child labour hours, so as to keep the child's learning measure unchanged.

(iv) The successful IV estimation of (5) requires the availability of instrumental variables (Ii) in the data set that can serve as valid instruments for the potentially endogenous labour hours variable, Hi.[9] Valid instruments are those that (a) are not in the list of predetermined variables that appear in (5), and (b) influence Hi but do not directly influence L_i. In the estimations reported below, we have used the household's access to water and electricity, and its ownership of radio, phone, etc. as instruments. The reader needs to keep in mind that the evidence from the IV estimations is conditional on the validity of the instruments used here.

In the final set of estimations, the study estimates (L_i, H_i) jointly as a set of simultaneous equations, consisting of (5), and the child labour hours equation (Hi)

[9] The situation is complicated by the presence in (5) of H^2 which needs to be instrumented as well. We ignore this complication in the present estimations.

expressed as a linear function of the child's individual (C_{ik}) his/her family characteristics (F_{ik}) and the instrumental variables (I_{ik}) that were previously used in the IV estimations.

$$H_i = \text{constant} + \sum_{k=1}^{m_1} \psi_{1k} C_{ik} + \sum_{k=1}^{m_2} \Psi_{2k} F_{ik} + \sum_{k=1}^{m_3} \Psi_{3k} I_{ik} + U_{2i} \qquad (10)$$

The 3SLS estimation used in the systems estimation allows for a non-diagonal covariance matrix, $\mathbf{\Omega}$, between the errors (U_1, U_2) in the two equations (5) and (10). An obvious rationale for this possibility is the presence of a common set of omitted variables from both equations that will introduce correlation between the two errors. Note that the 3SLS estimations were performed and reported for only the four countries for which the SAGE variable could be constructed.

3. Data sets and their salient features

In calculating the child's labour hours, the study uses the standard ILO definition of child work, i.e. economic activity, which includes work provided on the labour market and work for household farms and enterprises, even if it is unpaid. In the case of some of the countries for which such data is available we include, additionally and separately from the "child labour hours" variable, the hours spent by the child on household chores as a variable called "domestic hours". While there is mounting evidence on the adverse impact of a child's economic activity on learning, there is very little evidence on the impact of domestic duties. Since such duties can be quite significant for girls in some societies, a comparison of the impact of the two types of work is of considerable policy significance.

The present study is based on an analysis of the child labour data sets of the following seven countries: Belize, Cambodia, Namibia, Panama, the Philippines, Portugal and Sri Lanka. These data sets were collected under the ILO's Statistical Information and Monitoring Programme on Child Labour (SIMPOC). SIMPOC provides technical assistance to ILO member States to generate reliable, comparable and comprehensive child labour data in all its forms. SIMPOC was launched in 1998 in response to the growing need for more comprehensive quantitative information on child labour.

The Belize Child Labour Survey (2001) aimed at obtaining data on households with children between the ages of 5 and 17 years. 6,000 households participated in the sample.

The Panama data came from the Child Labour Survey 2003, conducted by the Ministry of Labour and Labour Development, State Inspector's Office in collaboration with ILO-IPEC. The Survey registered 755,032 children between the age of 5 and 17 years, representing 37.8 percent of the total population in households with children of that age. In urban areas they constituted 36.5 per cent of total population, 39.8 per cent in rural areas and 40.6 per cent in indigenous areas.

The Cambodian data was obtained from the Cambodia Child Labour Survey, 2001. The sampling plan, the survey schedule, the tabulation plan and other portions. of the survey were prepared in consultation with SIMPOC. The survey covered a sample of 12,000 households, which were interviewed on the nature of the economic activities of each child within the household, the consequences and challenges faced by each child while in employment, and the amount of time the child spent on his/her studies and recreational activities as well as on economic activities and household chores.

The Portuguese data came from the Child Labour in Portugal Survey in 1998. This first child labour estimation project in Portugal (phase one of three planned phases) was carried out in October 1998, with a questionnaire conducted of 16,518 families in mainland Portugal. Unlike most SIMPOC surveys, the Portuguese survey was funded by the country itself, and only the technical assistance was provided by IPEC/SIMPOC. The age group covered in the Portuguese study was children aged 6 to 15 years.

The Namibian data came from the National Child Activities Survey (NCAS), which was conducted on a sample basis covering 8,430 households in February/March 1999. The target group for this survey was the population of children aged 6 to 18 years. The objective of NCAS was to provide base line data on the activities of the child population in Namibia for planning purposes, policy implementation and monitoring and the evaluation of government development programmes aimed at improving the status of the vulnerable socio-economic groups of the Namibian child population.

The Philippines data came from the survey undertaken by the National Statistics Office in close collaboration with the Bureau of Labour Employment Statistics of the Department of Labour and Employment. The urban and rural areas of each province were the principal domains of the survey. The sample included approximately 25,500 households nationwide. All children aged 5 to 17 years old who were found to have worked at any time during the past twelve months at the time of the survey (August, 1994 – July 1995) were interviewed. Survey questionnaires were directed to the household head as well as at the child.

The Sri Lankan data came from the Child Activity Survey, Sri Lanka, 1999. The sampling plan, the survey schedule, the tabulation plan and other aspects of the survey were prepared in consultation with the ILO, Bureau of Statistics. The survey covered a sample of 14,400 households, which were interviewed on the nature of the economic activities of each child within the household, the consequences and challenges faced by each child while in employment, and the amount of time the child spent on his/her studies and recreational activities.

Table 1 presents some relevant summary statistics (at sample mean) for the seven data sets, disaggregated by gender of the child. Note that while not all the information is available for all the seven countries, the only variables that are fully comparable across all countries are: the mean age of the child in the sample, the current school attendance rates, and their disaggregation between the four mutually exclusive combinations of the child's participation/non-participation in schooling and in employment.[10] Moreover, the SAGE variable [see equation (1)] is comparable between the four countries for which this measure of learning outcome could be constructed. The following may be noted:

(i) The current school attendance rate varies a good deal between the chosen countries – from the low rates of Namibia to the relatively high rates of Portugal and Sri Lanka. Inspection of the rates of schooling/employment combinations shows that they vary even more between the countries – for example, between the low rate of 28.5 per cent for girls enrolled in school in Cambodia to the high rate of 96.1 per cent in case of Portuguese girls. In the Asian countries, Cambodia, the Philippines and Sri Lanka, a much greater percentage of children combine schooling with employment than in the other countries.

(ii) There are several instances of gender differentials between boys and girls in the data though we do not detect any uniform patterns. In Belize and Sri Lanka, for example, boys work longer hours than girls in economic activity, but girls work longer hours on household chores or domestic duties. The latter is the case for all the countries for which information on domestic hours is available.

(iii) Out of the four countries, for which SAGE is available, Sri Lankan children record the best schooling outcome. It is disappointing to note that children in the age group 12-14 years in Belize, Cambodia and Panama lag so far behind the Sri Lankan children. Alternatively, the Sri Lankan performance is quite impressive keeping

[10] See Appendix A (Table 39) for the child gender differentiated rates calculated separately for the age groups 12, 13 and 14 years.

in mind its developing country status. It is interesting to note that, on either measure of "school outcome", girls do better than boys in all the countries.

(iv) The weekly work hours vary a good deal between the compared countries. (Note, incidentally, that while the Sri Lankan figures on domestic duties are in "minutes a day", the economic activity figures for Belize are in terms of "hours a day"). All the other work figures are weekly and comparable between countries. Working children in the age group 12-14 years in Sri Lanka work considerably fewer hours than their counterpart in the other countries. The weekly child labour hours in Namibia and Panama are more than double than those in Sri Lanka. Notwithstanding Portugal's satisfactory school attendance rate, Portuguese working children in the age group 12-14 years record quite high weekly work hours.

(v) Another feature that is worth noting is that domestic chores constitute a significant share of the children's total workload. For example, in the cases of Cambodia and Portugal, a working child spends on average 35.40 per cent and 27.58 per cent respectively of her/his total working hours on domestic chores. In the four countries for which information on domestic chores is available, girls generally work longer hours than boys. Nowhere is this gender differential as strikingly high as in Sri Lanka. This has, however, not prevented the school enrolment rates in Sri Lanka from being virtually the same for boys and girls. The significant hours that children in the age group 12-14 years spend on domestic chores underline the need for empirical evidence, provided later in this paper, on the impact of domestic hours on the child's learning.

Figures 1(a) – 7(a) (See Appendix B) plot, for the seven data sets, the graphs of the mean current school attendance rate on the y-axis against the weekly work hours (daily in case of Belize) of the working child on the x-axis. (Note that since these graphs are based only on the observations on working children in the age group 12-14 years, the sample size falls sharply as the working hours increase.) Hence, these relationships, especially in the middle to upper range of labour hours, should not be taken too literally. Figures 1(b) – 7(b) plot the corresponding graphs of the school outcome variable, SAGE (wherever available) and "years of schooling" (for the others) against work hours. It is clear from these graphs that work hours do adversely affect both school enrolment rates and the school outcome variable we used here. However, the shape of these relationships varies between the countries. For example, in the cases of Namibia and Sri Lanka, the first few child labour hours do not seem to have much of an adverse impact on either school attendance or the school outcome, unlike in Belize where they do. However, all the data sets agree on the damage that long work hours inflict on a child's learning experience.

We have alternative and additional evidence on the adverse impact of child labour on the child's learning possibilities. Figure 8(a) shows the relationship between study time (at mean) and the child's age for non-working and working children in Sri Lanka. The mean study time of working children falls below that of non-working children around 11 years. The decline accelerates over the age group 12-14 years considered here, so that by the time a child reaches school-leaving age a large gap opens up between the mean study time of non-working and working children. Figure 8(b) shows the corresponding relationships for children in Sri Lanka who attend school. It is interesting to note that although non-working children continue to enjoy higher study time than working children in the later age groups, the mean study time increases with the child's age for both groups of children, unlike in the previous figure. This confirms that work combined with schooling is less harmful to the child's learning possibilities than work that is at the expense of schooling. Figure 9 shows, separately for working and non-working children in Cambodia, the percentages of children in the various age groups who can read and write. Once again, the cost of child work is evident in the higher percentage, which non-working children enjoy over working children in reading and writing literacy, in the target age group, 12-14 years, of this study.

The results of this section provide *prima facie* evidence on the damage caused to the child's learning by child labour. However, the summary measures provided here do not provide any clear evidence on the impact of child labour hours on human capital accumulation since they do not control for the other variables. To get a clearer picture, we turn to the results of estimation in the following section.

4. Estimation results

We present and discuss the estimation results of the seven countries in alphabetical order beginning with Belize. Table 2 presents the results of the multinomial logit estimation of equations (2a, 3a) with the category of children who attend school but do not work being adopted as the normalised category. (Note that the estimate of the constant term, which was included in all the regressions, has not been presented in the tables.) The sign of the estimated coefficient shows the direction of change in the probability of a child aged 12-14 years being in that category, relative to the normalised category, if the determinant goes up by one unit. Of particular interest in the present context is the estimated coefficient of the "years of schooling" variable. The negative and significant coefficient estimates of this variable in categories 3 and 4 suggest that an increase in the years of schooling pushes children from these categories into category 1. In other words, school attendance can be "habit forming" in the sense that, *ceteris paribus*, the more schooling experience a child gets, the less likely that she/he will drop out of school. An increase in the household's access to water and light and its possession of assets such as television and telephone helps to put its children in category 1, i.e. a "school only" status with no labour market participation.

The marginal probabilities, implied by the multinomial logit parameter estimates of Belize presented in Table 2, are reported in Appendix A (Table 40). These are easier to interpret than the multinomial logit parameter estimates. The marginal probabilities in Table 40 show that boys in Belize are less likely than girls to be in the "school only" category and more likely to be in the "work only" category. This is explained by the fact that "work" does not include domestic duties. The marginal probabilities also confirm that access to lighting, water, and other facilities encourages the household to put its children in the "school only" category. The base probabilities show that, free from the influences of the various explanatory variables listed in Table 40, a child in Belize is much more likely to be in the "school only" category than in the other categories.

Tables 3, 4 and 5 present the results of OLS and IV estimation of the child's school enrolment status, "years of schooling" and SAGE, respectively, in Belize on a select set of determinants. The Wu-Hausman statistics confirm that in case of all these three dependent variables the OLS estimates for Belize are inconsistent. The result is conditional on the validity of the instruments used here. The IV estimates show that, ceteris paribus, boys enjoy superior school enrolment rates than girls but not on the "years of schooling" or SAGE criterion.

On the principal focus of this study, the IV estimates show that work hours adversely affect both school enrolment (i.e. the probability of the child attending school) and the school outcome variables from the first hour. However, the estimated positive coefficient of the work hours square variable suggests that the adverse marginal impact of child labour hours on the schooling variables weakens as the labour hours increase. The IV regressions agree that beyond five hours a day the marginal impact changes direction, i.e. child labour hours impact positively on her school enrolment and the measures of school outcome. (Note, incidentally, that the OLS coefficient estimates of the work-hours variables, due to the inconsistency, yield quite different qualitative results from the IV estimates.) The gender disaggregated IV estimates of the "years of schooling" equation for boys and girls in Belize, presented in Table 6, present a similar picture. It is interesting to note that the turning point where the incremental impact of child labour hours on schooling years changes direction is remarkably robust – 4.37 hours a day for boys, 4.51 hours for girls and 4.40 hours for all children. The turning points for the impact of labour hours on school attendance is 4.65 hours, and on the SAGE measure is 4.39 hours. Note, however, that as the Belize data analysis shows, these turning points will rarely be reached since very few children will clock such high work hours. The point to note from the Belize evidence is that the disutility to the child from the first labour hour, as she starts working, is quite high. For example, the first hour of child labour reduces the probability of the child's school attendance by approximately 50 per cent.[11] Alternatively, it leads to a reduction in the "years of schooling" by 2.57 years. The gender differential is quite noticeable – the reduction in the years of schooling of boys is 2.13 years, while that of girls is 3.69 years. It is mildly reassuring that the marginal impact weakens with each additional hour a child works, but it will take absurdly long working hours for the marginal adverse effects on learning to disappear altogether. To examine whether these results are robust to the data set, let us now turn to the Cambodian regressions.

The multinomial logit estimation results for Cambodia are presented in Table 7. The results are similar in several respects to those of Belize presented in Table 2. Note the strong role that parental educational levels, the household's possession of assets such as TV, phone, and access to amenities, such as light and water, play in encouraging its children to stay in school. The marginal probabilities for Cambodia are presented in Table 41. These show the strong role that adult education plays in pushing children into the "school only" category. A comparison of the base probabilities in Tables 40 and 41 shows that Cambodian children are much more likely to combine schooling with employment than children in Belize. This is consistent with the picture presented in Table 1.

Tables 8-11 present the OLS and IV estimates of, respectively, the Cambodian child's school enrolment status, years of schooling, SAGE and ability to read or write variables regressed on a selected list of determinants. In keeping with the main objective of this study, we focus our attention on the impact of child labour hours on the school attendance and school outcome measures mentioned above. Unlike in the Belize case, the IV estimates of the school enrolment equation are not statistically significantly different form the OLS estimates, as the Wu-Hausman statistics confirm. This is, however, not true of the school outcome regression equation estimates (Tables 9 and 10). Also, unlike in Belize, the IV estimates do not find the work hours impact on current school attendance to be significant. In contrast, rising levels of adult education in the household have very strong impact on the child's school enrolment. Tables 9 and 10 confirm, via the IV coefficient estimates of the work hours and (work-hours)2 variables, that child labour does impact quite negatively on the principal alternative learning measures, namely, "years of schooling" and SAGE, though this adverse impact weakens with each additional hour worked over the week by the child. For example, at the entry point to the labour market, the first hour worked over the week by the child reduces her/his "years of schooling" by 0.30 of a year.[12] It is interesting to note that the turning point of the

[11] This figure and the ones mentioned below were obtained by calculating $\hat{\delta}_1 + 2\hat{\delta}_2$ where $\hat{\delta}_1 + 2\hat{\delta}_2$ are the estimated coefficients of labour hours and (labour hours)[2] in the relevant regressions.

[12] Note that the magnitudes of the labour hour coefficients in Cambodia and Belize are not directly comparable since, while the Cambodian child hour figures are on a weekly basis, those in Belize are daily figures.

U-shaped relationship occurs at approximately 30 hours per week, which is consistent with the figure of approximately 4.50 hours a day that we reported for Belize. Table 11 reports that child labour also impacts negatively on the child's ability to read or write. While the IV estimates show that this impact is only weakly significant, the OLS estimates register higher levels of significance. However, the magnitudes of the coefficients of the linear and quadratic child labour hour variables are so small that the damage caused by child labour to the child's ability to read and write is of a negligible order of magnitude. The gender disaggregated regression estimates of the SAGE equation, presented in Table 12, yield a picture which is quite similar to that implied by Table 10, namely, that for boys and girls, labour hours initially impact negatively and non-linearly on SAGE and that the turning points for the U-shaped relationship between SAGE and child labour hours occurs around 28-30 hours a week for both boys and girls.

Let us now turn to the results of Namibia. To focus on the principal objective of this study, which is the impact of child labour hours on children's learning, we do not present the results of the multinomial logit estimations for Namibia and the remaining countries. (These estimates can be made available on request.) Table 13-15 present the OLS and IV regression estimates of the Namibian child's school enrolment status, years of schooling and reading/writing ability, respectively, as a linear function of the selected list of determinants. In case of the reading/writing equation (Table 15), while the OLS estimates[13] provide evidence of a statistically significant negative impact on the child's literacy status, there is no such evidence in the IV results. This is consistent with the Cambodian results presented and discussed above. Note that the regressions were performed on the target group of 12 to14-year-old children. Since a child's literacy status is established by the time she/he reaches this age group, this result simply confirms that child labour does not significantly alter the literacy status of this older group of children. We expect the adverse impact, if any, of child labour on the read/write variable to be felt by the younger children in the sample. This issue can be investigated by running regressions on, say, 5 to 8-year-old children in the sample.

The IV estimates of Tables 13 and 14 do not provide convincing evidence of any negative impact of child labour hours on either school enrolment or years of schooling in Namibia. The Namibian results are inconsistent with much of the above evidence. However, from the gender-disaggregated regression estimates of the "years of schooling" variable presented in Table 16, Namibian boys seem to experience stronger negative impact (in both size and significance) than Namibian girls in terms of child labour hours on the measure of school outcome. Note, also, from Tables 13 and 14 that the OLS estimates provide much stronger evidence of the adverse impact of child labour hours on the child's learning for the target group of 12 to14-year-old children that have been considered in this study. The validity of the instruments, used here, has not been tested in this study. Consequently, the IV results should not necessarily be considered to be more reliable than the OLS ones. As Hoddinott and Kinsey (2001) report in the context of child health, with poorly chosen instruments, the bias found in 2SLS or 3SLS estimates is as large as that found in the OLS results. The issue merits a separate investigation on the sensitivity of the regression results to different selections of instruments, calculation of the Sargan tests for validity of instruments [see Stewart and Gill (1998, pgs. 135-144)], etc. Such an investigation is best left for a separate exercise.

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[13] It might be argued that the OLS estimates should be taken more seriously than the IV estimates in case of the read/write regressions, since there is unlikely to be any reverse causation between the literacy status and labour hours of a child in 12-14 year age group.

Turning now to Panama, Tables 17-19 present, respectively, the estimates of the school enrolment status, years of schooling and SAGE regressions of Panamanian children in the age group 12-14 years. Table 20 presents the gender-disaggregated estimates of the SAGE regressions of children. The results are in line with previous evidence that suggests that child labour impacts negatively on the child's learning, though the magnitude of the negative marginal impact weakens with each additional labour hour that the child works. The turning point for the U-shaped relationship between the child's labour hours and learning occurs around 30 hours a week, which is in the range witnessed earlier in the Cambodian regressions. Note from the gender disaggregated estimates of the SAGE regressions presented in Table 20 that, on both OLS and IV results, the negative impact of child labour hours on learning is much higher for girls than for boys in Panama. However, the IV estimates show that the turning point is earlier for girls (25.06 weekly labour hours) than for boys (30.38 weekly labour hours). Note that, of the other determinants, the level of both adult male and adult female education plays a strong role in improving the child's educational performance.

Turning to the Philippines, we were unable to link the information on the child with the household characteristics of that child, due to lack of the relevant identifying variable in the data. Consequently, the regressions for the Philippines did not include household-level variables. While Tables 21 and 22 present the regression estimates of school enrolment and the "years of schooling" variables, Table 23 presents the corresponding gender-disaggregated estimates of the latter. The results are supportive of the previous evidence of a U-shaped impact of child labour hours on years of schooling. The turning point occurs at 34.19 weekly hours for all children, 33.35 weekly hours for boys and 36.15 weekly hours for girls. These turning points occur somewhat later than what was observed previously. This may be the consequence of our failure to include the household-level variables in the Philippine regressions, unlike for the other country data sets, due to the lack of a relevant identifying code in the data. However, in contrast to the Panamanian evidence, the negative impact of child labour hours on the years of schooling of the child is much smaller (in both size and significance) for girls than for boys.

Tables 24 and 27 present the evidence for Portugal. Tables 24 and 25 present, respectively, the regression equation estimates of the school enrolment status and the "years of schooling". Table 26 presents the gender-disaggregated regression estimates of the latter. Table 27 presents the Portuguese evidence on the impact of child labour hours on the number of failures of school children in the age group 12-14 years. The latter is probably the most satisfactory measure to use in assessing the impact of child labour hours on the educational performance of high school children. The Portuguese data set provides a distinctive and useful set of information in this regard. The results are generally consistent with the idea of a U-shaped relationship between learning outcome and child labour hours among children in the target age group 12-14 years. A significant exception is provided by the regression estimates of the "years of schooling" received by Portuguese girls. Their estimates point to an inverted U-shaped relationship rather than a U-shaped one. Table 27 confirms that a *ceteris paribus* unit increase in the child labour hours leads to a worsening of the child's school performance that is reflected in a 0.34 increase in the failure rate. The effect flattens out at a weekly level of 26.27 child labour hours. Another useful piece of evidence that the Portuguese results provide is on the impact of domestic hours on the child's learning. The IV estimates show that, similar to the ILO-defined child labour hours, domestic hours impact negatively on learning by significantly reducing the school enrolment and the years of schooling received by the child and by increasing the number of failures that the child experiences at high school.

However, the magnitude of the adverse impact of domestic hours on learning is generally less than that of market hours.

Let us now turn to the Sri Lankan results. Sri Lanka is quite unique in the sense that, not withstanding its status as a developing country, it does quite well on several indicators of human development approaching the rates of developed countries [see, for example, Sen (1999)]. As Table 1 shows, Sri Lanka has a school attendance rate of 94 per cent, which is only marginally below that of a developed European country such as Portugal. Hence, the Sri Lankan evidence should be of particular interest for this study. Tables 28 and 32 contain the Sri Lankan results. The impact of child labour hours on the child's current school attendance status, years of school, the child's study time, SAGE and the gender disaggregated estimates of the latter are presented in Tables 28 and 32, respectively. The estimates show that the Sri Lankan results on the impact of child labour hours on the child's learning outcomes (as measured by SAGE, for example) and learning possibilities (as measured by the child's study time) is at odds with much of the previous evidence. The coefficient estimate of the work hours variable is positive and significant while that of its square term is significantly negative, thus suggesting an inverted U-shaped relationship in Sri Lanka between the child's labour hours and her/his learning, unlike much of the evidence for the other countries presented above. In other words, a small amount of child work is actually quite beneficial to the child's learning in Sri Lanka. Table 32 confirms that this result is true for both boys and girls and holds for both the OLS and the IV estimates. The SAGE estimates imply that the turning point, i.e. the point at which child work starts to impact negatively on learning, is 18.79 labour hours per week for boys and 14.17 labour hours per week for girls. The Sri Lankan experience is, also, evident from the graphs [Figures 7(a) and 7(b)] and the summary statistics, which show that the child's learning measures do not register a significant decline until child labour hours register weekly levels of 15 hours or more. Of course, the fact that a large workload does impact negatively on learning is also clear from the graphs, especially of the school attendance rate, which falls sharply at high levels of work hours. The fact that a sizeable section of the Sri Lankan child labour force works less than 17.85 hours a week, which is the turning point implied for all children by the SAGE regression estimates of Table 31, suggests that child labour is less destructive of the child's development in Sri Lanka than in other countries. We do not have any ready explanation for this puzzling but interesting result. One possible explanation is that, as Table 1 shows, relatively fewer Sri Lankan children are in the "work only" category than in the other developing countries. Alternatively, a greater percentage of the child population in Sri Lanka combine schooling with employment than in other developing countries.[14] This helps to ameliorate, at moderate levels of work hours, the harmful effects of child labour. This result merits further investigation as it is of significant policy interest.

One result that all the data sets agree on is the strong positive role that the level of adult education in the household plays in keeping the child enrolled in school and in improving her learning performance. The paper has earlier introduced, via equation (9), an elasticity measure ϕ_k that calculates the percentage change in the level of adult education that will exactly counteract the damage to learning caused by a 1 per cent marginal increase in child labour hours. Table 33 reports the IV-based illustrative estimates of ϕ_k for Cambodia and Panama calculated at the mean levels of child labour hours and adult education levels in these countries. In Panama, for example, a 0.54 per cent increase in adult male education is needed to counteract the harmful effect of a 1 per cent increase in the child labour

[14] See Ray (2000a) for similar evidence on difference in the nature of child labour between Peru and Pakistan. Children in Peru combine schooling with employment far more than in Pakistan.

hours of boys, compared to a figure of 1.22 per cent for Panamanian girls. The estimates in Table 33 suggest that a much higher percentage change in adult education levels is needed in Panama than in Cambodia to counteract the harmful effects of child labour on the child's learning. The gender differential between boys and girls is reversed between the two countries. Note, however, that in both countries adult female education levels need to increase by a higher percentage than adult male education levels to counteract the harmful effects of a 1 per cent increase in child labour hours.

The estimates of the school outcome (L_i) and labour hours (H_i) equations [equations (5) and (10)], estimated as a system of equations using 3SLS, are presented in Table 34. For clarity of presentation, we only reported the 3SLS estimates of the SAGE (L_i) equation for the four countries (Belize, Cambodia, Panama and Sri Lanka) for which SAGE could be constructed and compared. (The 3SLS estimates of the child labour hours (Hi) equation are available on request.) Since the child labour hours are daily figures for Belize and weekly for others, the labour hour coefficients in Belize are not comparable with those in the other countries. The following points are worth noting:

(i) *Ceteris paribus*, boys complete significantly less years of schooling than girls, on the age-corrected measure of schooling, in Cambodia and Sri Lanka. In contrast, no significant gender differential exists in Belize or Panama. The former result can, also, be contrasted with the evidence, based on test scores, presented in Heady (2000), for Ghana where girls perform worse than boys.

(ii) Sri Lanka's isolated example as the only country in our data set where a child's work hours initially impact positively on the child's learning is reaffirmed by the 3SLS estimates. The inverted U-shaped relationship between the child's learning and her/his work hours in Sri Lanka reverses to a U-shaped relationship in case of the other countries. The turning points are 13.55 weekly hours in Sri Lanka, 4.96 daily hours in Belize, 41.38 weekly hours in Cambodia and 37.52 weekly hours in Panama[15]. The turning point for Sri Lanka, unlike in the other countries, is more than of academic interest, as a significant number of the child workers work in the range of 0-15 weekly hours. Consequently, a much greater percentage of child workers in Sri Lanka is on the upward-rising segment of the relationship between child learning and child labour hours than in the other countries.

(iii) In contrast to the figures for economic activity, hours spent by the child on domestic duties impact negatively on learning in Sri Lanka but less significantly so in Belize and the other countries for which data on domestic hours is available in the data set. It is interesting to contrast this with the Cambodian experience, which suggests the reverse, i.e. that domestic hours increase the child's schooling experience.

(iv) There is general agreement that rising levels of adult education promote child welfare by reducing the child's work hours and by increasing the SAGE measure of school outcome of that child. In all four countries, reported in Table 34, adult female education levels exert a stronger impact than adult male education on the child's learning. In this and other key respects, the qualitative results are reasonably robust between the OLS, IV and 3SLS results. Note, also, from Table 34, that there

[15] These estimates do not disaggregate the working children between the various occupation categories. Such disaggregation was subsequently performed for the Philippines and Sri Lanka and the results incorporating the occupation specific affects are presented in Appendix B (the Philippines) and Section 5 (Sri Lanka).

is general agreement between the four countries that an increase in the number of children in the household adversely affects the learning outcomes of the child.

With the exception of Belize, all the 3SLS estimates of Table 34 are based on the weekly hours data of child work. Table 35 reports the corresponding 3SLS estimates for Cambodia and Sri Lanka based on daily hourly data for child work. The Sri Lankan regression estimates are reported both when one controls for the days worked per week and when one does not. Tables 34 and 35 agree on the qualitative difference between the Cambodian and Sri Lankan estimates. Child work impacts negatively on the child's schooling in Cambodia right from the first hour of her/his employment. In contrast, child work impacts negatively on the schooling in Sri Lanka only beyond three to four hours of non-domestic child work a day. Table 35 also shows that, *ceteris paribus*, an increase in child labour due to an increase in the number of days worked by the child in the week can have a sharply negative impact on the child's schooling experience. The policy implication of this result is that, to minimise the negative impact of child work on the child's education, it may be better to control, first, the number of days in the week the child works rather than the length of the working day.

5. Impact of the occupational category on the child's learning: The Sri Lankan evidence

We extend the discussion on the implication of disaggregation of the employed children by their occupational categories for the estimated relationships to the case of Sri Lanka. Table 36 presents the mean values of school enrolment rates, SAGE and study time for Sri Lankan child labourers in the age group 12-14 years, disaggregated by the following four occupational categories: (i) Service workers, shop and market sales workers; (ii) craft and related workers; (iii) sales and services workers in elementary occupations[16]; and (iv) agricultural workers. This table also reports, for use as a benchmark, the corresponding mean values for children who are not working in economic activities. Similar to the evidence from the Philippines presented in Appendix C (Table C1), the school enrolment rate shows considerable variation between the four occupational categories, namely, from the low rate of 39.5 per cent for children employed as sales and services workers in "elementary occupations" to the high rate of 94.3 per cent experienced by children who are agricultural workers. Note that the latter rate is only marginally below the school enrolment rate of 96.3 per cent recorded by the non-working children. Note, also, that the school enrolment rate of agricultural child workers in Sri Lanka (94.3 per cent) is much higher than the comparable rate (78.6 per cent) in the Philippines presented in Table C1. This is consistent with our earlier remark on the high aggregate school enrolment rates in Sri Lanka, notwithstanding its status as a developing country. The age-corrected schooling measure, SAGE, varies less than the school enrolment rates though this variable, along with the mean study time, also registers a substantial drop for children employed in "elementary occupations".

Table 37 presents the OLS estimates of the regressions of SAGE (a measure of learning output) and study time (a measure of learning input) on the various determinants used earlier (see Tables 30 and 31) along with interaction terms between the four occupational dummies and the labour hours, (labour hours)2 variables. Focussing initially on the estimated coefficients of the interaction term involving the labour hours variable, it is clear that in the case of only two of the four occupational categories do the first few hours of employment negatively impact, in a significant way, the schooling measure, SAGE. Indeed, for agricultural workers, the impact is significantly positive and, since this category constitutes nearly 20 per cent of the working children in the age group 12-14 years, it explains the positive coefficient estimate of the labour hours variable in the aggregate estimations reported in Table 31. The negative coefficient estimates of the interaction terms between the labour hours square variable and the occupational dummies reported in Table 37 show that a heavy workload eventually adversely affects the schooling of children in all the occupational categories. Recalling the identification of turning point in the relationship between learning and labour hours (see equation (6)), Table 37 suggests that "light work", defined as child work that does not negatively impact on the child's "capacity to benefit from the instruction received", should mean a maximum work load of 10.54 hours a week for service workers, shop and market sales workers and 10.88 hours a week for agricultural workers. These cut-off points are somewhat lower than those suggested by the IV estimates of Tables 29, 31

[16] See Appendix D for a complete list of the "elementary occupations" as mentioned in the Sri Lankan survey.

and 32, which ignored the occupational disaggregation. While the IV estimates suggest a definition of “light work” as one involving a maximum work load of 15-18 hours a week, the OLS estimates imply a maximum workload in the range of 9-11 hours a week. The gender-disaggregated estimations on Sri Lankan data done in this study (see Table 32) suggest a lower maximum weekly work load for girls than for boys in defining “light work” as one that does not negatively impact on schooling. Table 37 shows that, with the significant exception of child workers in occupational category III, study time is not much affected by the child labour hours. Table 38 reports, separately for the four occupation groups, the SAGE regression estimates for Sri Lanka based on the daily hourly data for child labour. These occupation-disaggregated estimates are supportive of the proposition that, in Sri Lanka, a small amount of work need not be harmful to the child’s education. This contrasts sharply with the Cambodian experience.

6. Robustness of the findings to the use of weights and to the estimation procedure

The estimates that we have presented and discussed so far are based on the raw, unweighted data. Any measurement errors in the weights or possible non-uniformity in their calculations between countries may affect the cross-country comparisons. Thus, the issue of sensitivity of the principal results to the use of weights is of interest. In this section, we report the results of estimation on the weighted data and compare them with the earlier evidence. As the following discussion shows, the principal qualitative conclusions are fairly insensitive to the use of weights.

Table 42 presents the key summary statistics for five of the seven countries, based on the weighted data. A comparison of Tables 1 and 42 shows that the weights have very little impact on the summary statistics, especially in the cases of Belize and the Philippines. This is confirmed by Table 43, which reports the difference between the weighted and the unweighted estimates. The differences are most noticeable in the case of the school enrolment rate, especially in Cambodia and Namibia. For example, in Cambodia, the weighted figures underestimate, in relation to the unweighted figures, the percentage of children who are in school and do not work and overestimate the number of children who combine schooling with employment.

Table 44 presents the IV and OLS estimates of the current school attendance variable in Namibia, based on the weighted data. These estimates are comparable to those based on the unweighted data presented in Table 13. The numerical magnitudes of the coefficient estimates, though very rarely the sign, do vary between the comparable estimates. Given the focus of interest of this study, we restrict our attention to the coefficient estimates of the work hours, i.e. (work hours)^2 variables. In case of both the IV and the OLS estimates, the statistical significance of the estimated impact of child labour hours on current school attendance in Namibia increases with the use of weighted data in the estimation. Also, Table 44 confirms that long hours of child labour have indeed a detrimental effect on school attendance. Table 45 presents the corresponding estimates, on weighted data, for the Philippines. These are comparable with the unweighted data-based estimates presented in Table 21. A comparison shows that, unlike in the case of Namibia, the estimated impact of child labour hours on schooling is quite robust between the weighted and the unweighted data, with respect to both size and significance. Once again, the highly significant coefficient estimate of the work hours variable in Philippines shows that child labour has a negative impact on child schooling at the point of the child's entry into the labour market.

The 3SLS coefficient estimates of the SAGE equation, using the weighted data, for Belize, Cambodia and Sri Lanka are presented in Table 46. A comparison with the corresponding unweighted data-based estimates presented in Table 34 shows that, while the magnitudes change somewhat, the direction of impact of child labour on SAGE is robust between the weighted and the unweighted data. For example, Sri Lanka continues to differ from the other countries in the sense that the first few hours of child labour impact positively on SAGE, although eventually the impact does become negative because of the negative sign of the $(\text{work hours})^2$ coefficient. Note also that in Sri Lanka, the turning point, i.e. the weekly work hours beyond which child labour impacts negatively on SAGE, declines from 13.21 hours on the unweighted data to 9.15 hours on the weighted one.

The 3SLS estimates of SAGE presented in Tables 34 and 46 ignore the truncation of hours of child work at zero. Table 47 presents the corresponding 3SLS estimates of SAGE in the presence of Tobit estimation of the child labour hours equation. These estimates strengthen the findings of the negative impact of child labour on schooling. In the case of Sri Lanka, the inverted U-shaped relationship, witnessed earlier, between child schooling and child labour now gives way to a monotonically decreasing relationship.

Before concluding, we wish to comment on the wide divergence that exists in many cases between the IV and the OLS estimates. We attribute this primarily to two factors:

(A) The IV estimates of the schooling equation take into account the potential "endogeneity" of the child labour hours variable on the *rhs* of the estimating equation. The larger the "endogeneity"[17] presented in the tables, the greater will be the divergence between the IV and the OLS estimates. The reader can readily verify this by examining the Hausman statistic (χ^2_1) for testing for statistical significance of the difference between the OLS and IV estimates presented in the tables.

(B) The weaker the correlation between child labour hours and its instruments, the greater will be the divergence between the IV and OLS estimates of the impact of child labour on child schooling. Given the cross-sectional nature of the data sets that are used here, the wide difference between the OLS and the IV estimates, in some cases, reflects the absence of strong correlation. One needs to keep this in mind in interpreting both the OLS and the IV estimates with care.

[17] See Stewart and Gill (1998) for a lucid discussion of the possible causes of such "endogeneity" and on their econometric implications that help to explain the difference between the OLS and the IV estimates.

7. Summary and conclusion

Unfortunately, the existing child labour literature does not provide any definitive answer to the question to what extent children's work at the ages 12 to 14 has a negative influence on school attendance and performance, since (a) much of it is concerned with analysing the causes or determinants of child labour rather than its consequences, especially on human capital, and (b) the few published studies that attempt to answer this question do not address the issue of endogeneity of child labour hours in the estimation. The latter follows from the possibility that a child's school performance today can determine her labour market status in the future.

The principal motivation of this study is to answer the above question, whose policy importance can be seen in the context of ILO Convention No. 138. A summary of the principal features of this study is presented in Table 48. In basing the study on multi-country SIMPOC data sets and in using alternative estimation methods, the exercise examines the robustness of the evidence on the impact of child labour hours on the child's school attendance and performance. The central message from this study is that children's work, even in limited amounts, does adversely affect the child's learning as reflected in a reduction in the school attendance rate and in the length of schooling received by the child. The damage done by children's work to the child's learning is further underlined by the adverse impact of work hours on the child's ability to read and write in Cambodia (Table 11) and in Namibia (Table 15), with the latter result holding true only under simplifying estimation assumptions. Further support for the proposition that child work is detrimental to the child's learning comes from the result that work hours significantly increase the rate of failures experienced by the child in Portugal (Table 27).

With one significant exception (Sri Lanka) and a less significant one (Namibia), the result on the negative impact of child work on his/her learning is remarkably robust to the data set, to the use of weights in the data, to the gender of the child and to the estimation procedure adopted. On the latter, the recognition of the possibility that a child's current school performance affects her future labour market involvement seems to worsen the impact of child work on human capital formation. The gender-disaggregated estimates generally suggest that the marginal impact of child work is more detrimental to the learning experience of girls than boys, though there are some exceptions to this result. In contrast to the ILO-defined child labour hours, the domestic hours clocked up by the child improves her schooling experience in Cambodia but reduces it in Sri Lanka. The contrast between the effects of these two types of child work on learning could not be more marked in these countries.

A significant exception to the result that children's work, even in limited amounts, damages the child's learning is provided by the Sri Lankan experience. Sri Lanka stands alone in providing evidence that children aged 12 to 14 can combine work and school in such a way that school performance does not suffer. The Sri Lankan results suggest that a child of this age group can work up to somewhere between 12-15 hours a week without suffering a loss in her school attendance rate or in the length of her schooling. While the former result is true only of one set of estimates (Table 28), the latter result is true under all estimation procedures (Tables 31 and 34). Another reason to take this latter result seriously is provided by the fact that it holds true for both boys and girls in Sri Lanka as the gender-disaggregated estimates of Table 32 show. We have no ready explanation as to why Sri Lanka stands alone in this respect besides noting that Sri Lanka has high school attendance rates (Table 1). Note, incidentally, that even in Sri Lanka the child's school performance deteriorates sharply at high work hours.

Although the focus of this study is on the impact of children's work on learning, there are other features of our results that deserve special mention. In general, boys fare worse than girls on the length of their schooling (Table 1). Children in female-headed households and in households with low levels of adult education tend to perform worse than other children. The result on the strong positive impact of adult education on the child's schooling variables holds true for all the data sets and is robust to the estimation method. The Portuguese and Sri Lankan results drive home the importance of child's learning by providing evidence that suggests that increases in the adult education levels reduce the number of failures experienced by the child in Portugal (Table 7) and increases the child's study time in Sri Lanka (Table 30).

There is a policy message in the result on the strong and positive role that adult education plays in improving the child's learning. If some "light work" is permitted for children in the ages of 12 and 13 years, as suggested in ILO Convention 138, Art. 7, then it should be accompanied by a campaign to improve the adult education levels. Better-educated adults will, by ensuring that their children make more efficient use of the non-labour time for study, will help to reduce the damage done to the child's learning by her work hours. The compensated elasticities of substitution between adult education levels and child labour hours that keep the child's schooling unchanged, calculated for Cambodia and Panama (Table 33), should give policymakers some idea of the task involved.

In conclusion, the following recommendations for future surveys emanate from this study:

(a) Questions on whether work affects study should be asked more regularly and uniformly across countries.

(b) There should be information, where currently there is none, on community variables such as whether there is an active school enrolment program in the community, location of schools in the community, travelling times to work/school. Also, there should be information at the community level, rather than only at the household level, on water, electricity and other variables indicating the nature of infrastructure in the community.

(c) The data sets should contain information on non-school education that is an important source of learning in many traditional rural communities. The importance of non-formal education, such as the learning transmitted at home by the parents or elders, cannot be overstated.

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Appendix A: Tables

Table 1: Summary statistics: Means of some key variables (unweighted)

Variable	Belize		Cambodia		Namibia		Panama		Philippines		Portugal		Sri Lanka	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Number of children aged 12-14 years	3.56	3.50	3.72	3.69	4.65	4.62	3.68	3.67	3.97	3.98	1.90	1.87	3.03	3.08
Child age	12.97	12.98	12.98	12.96	13.01	13.01	12.98	12.98	12.99	13.01	13.06	13.05	12.97	12.99
School enrolment rate	91%	88%	89%	85%	83%	89%	88%	90%	89%	92%	98%	98%	94%	95%
Hours of economic activity[a]	4.85	3.62	18.06	18.15	24.56	20.43	23.87	24.48	16.84	15.70	20.79	27.74	11.80	9.93
Hours of domestic child duties[b]	6.55	9.29	9.89	10.71	-	-	-	-	-	-	7.93	10.04	47.87	67.97
SAGE	74.56	77.09	46.43	47.87	-	-	69.30	72.18	-	-	-	-	86.71	89.26
Number of years of Schooling[c]	5.93	6.19	3.26	3.36	1.04[d]	1.09[d]	5.53[d]	5.77[d]	3.57[d]	3.83[d]	2.78	2.86	6.92	7.14
% age of children who are														
(i) In school, but don't work	72.0%	79.7%	30.9%	28.5%	73.3%	79.6%	81.0%	87.9%	70.4%	79.6%	95.2%	96.1%	65.5%	77.3%
(ii) In school and work	18.6%	7.7%	57.7%	56.6%	9.8%	9.4%	6.8%	1.7%	18.4%	12.0%	3.2%	1.9%	28.5%	18.1%
(iii) Neither in school nor in work	3.8%	9.5%	2.4%	2.6%	11.5%	8.8%	5.5%	9.1%	4.3%	5.4%	1.0%	1.4%	2.6%	2.9%
(iv) Not in school but work	5.1%	2.6%	9.0%	12.3%	5.5%	2.3%	6.7%	1.4%	7.0%	2.9%	0.6%	0.6%	3.4%	1.7%

(a) The figures are weekly hours for all countries except Belize for whom the figures are daily hours.

(b) The figures on domestic hours are weekly for all countries except Sri Lanka where the figures are expressed in "minutes per day".

(c) Not comparable between the countries

(d) The figures on the length of schooling received in Namibia, Panama and the Philippines are based on the codes in these data sets. They should not be literally interpreted as "years of schooling" and are, thus, non comparable with one another and with the other countries' figures.

Table 2: Multinomial logit coefficient estimates[a]: Belize[e], [f], [g]

Variable	Category[b]		
	School and Work	Neither in School Nor in Work	Work Only
Age of child	7.93[c] (3.86)	-2.13 (6.97)	-4.58 (11.42)
(Age of child)^2	-0.30[c] (0.15)	0.14 (0.26)	0.25 (0.43)
No. of children in the household	0.09[c] (.04)	0.06 (0.06)	0.00 (0.08)
Gender of household head (1 = male, 2 = female)	-0.35 (.18)	-0.49 (0.30)	-0.46 (0.38)
Gender of child (0 = girl,1 = boy)	1.08[d] (0.16)	-0.86[d] (0.22)	0.78[d] (0.27)
Years of schooling	0.06 (0.06)	-0.34[d] (0.07)	-0.28[d] (0.09)
Dummy for lighting	-1.30[e] (0.63)	0.32 (0.52)	-0.44 (0.81)
Dummy for water	-0.46[d] (0.17)	0.98[d] (0.21)	0.34 (0.28)
Dummy for TV	-.95[d] (0.17)	-0.74[d] (0.24)	-0.85[d] (0.28)
Dummy for radio	-.39 (0.22)	-0.45 (0.28)	0.44 (0.45)
Dummy for telephone	-.39[c] (0.18)	-1.02[d] (0.30)	-2.60[d] (0.61)

(a) Figures in brackets are standard errors.

(b) The "school only" category is the normalised category.

(c) Statistically significant at 5% significance level.

(d) Statistically significant at 1% significance level.

(e) Number of observations = 1894.

(f) Likelihood Ratio Test of Joint Significance: $\chi_{33}^2 = 529.13$

(g) Pseudo $R^2 = 0.1790$

Table 3: Regression coefficient estimates[a] of current school attendance: Belize[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	1.667[c] (0.480)	1.445[c] (0.365)
(Age of child)^2	-0.067[c] (0.018)	-0.059[c] (0.014)
Number of children in the household	-0.001 (0.005)	-0.010[b] (0.004)
Gender of household head (1 = male, 2 = female)	-0.006 (0.023)	0.042[c] (0.016)
Gender of child (0 = girl,1 = boy)	0.096[c] (0.020)	.049[c] (0.013)
Work hours	-0.510[c] (0.098)	-0.049[c] (0.013)
(Work hours)^2	0.055[c] (0.011)	0.002 (0.001)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 38.88$[c]	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 1894

(e) F-tests for Joint Significance: IV: F(7,1886) = 28.32[c], OLS: F(7,1886) = 44.26[c]

(f) IV: Root MSE = 0.373

(g) OLS: $R^2 = 0.1411$, $\bar{R}^2 = 0.1379$, Root MSE = 0.285

Table 4: Regression coefficient estimates[a] of years of schooling: Belize[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	1.049 (2.698)	-0.506 (1.571)
(Age of child)^2	-0.013 (0.104)	0.043 (0.060)
Number of children in the household	-0.029 (0.030)	-0.090[c] (0.017)
Gender of household head (1 = male, 2 = female)	-0.237 (0.129)	0.100 (0.068)
Gender of child (0 = girl,1 = boy)	0.151 (0.113)	-0.183[c] (0.057)
Work hours	-3.326[c] (0.552)	-0.080 (0.053)
(Work hours)^2	0.378[c] (0.063)	0.007 (0.006)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 103.98$[c]	

[a] Figures in brackets are standard errors.

[b] Statistically significant at 5% significance level.

[c] Statistically significant at 1% significance level.

[d] Number of observations = 1894

[e] F-tests for Joint Significance: IV: F(7,1886) = 22.93[c], OLS: F(7,1886) = 52.16[c]

[f] IV: Root MSE = 2.0962

[g] OLS: $R^2 = 0.1622$, $\bar{R}^2 = 0.1591$, Root MSE = 1.2261

Table 5: Regression coefficient estimates[a] of SAGE: Belize[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	-2.461 (34.33)	-22.24 (19.98)
(Age of child)^2	0.068 (1.32)	0.783 (0.769)
Number of children in the household	-0.369 (0.384)	-1.150[c] (0.21)
Gender of household head (1 = male, 2 = female)	-3.040 (1.65)	1.24 (0.87)
Gender of child (0 = girl,1 = boy)	1.90 (1.43)	-2.35[c] (0.73)
Work hours	-42.17[c] (7.02)	-0.869 (0.686)
(Work hours)^2	4.80[c] (0.80)	0.070 (0.082)
	Test for H_o: Difference in coefficients is not systematic χ_1^2 = 104.07[c]	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 1894

(e) F-tests for Joint Significance: IV: $F(7,1886) = 8.67$[c], OLS: $F(7,1886) = 10.51$[c]

(f) IV: Root MSE = 26.672

(g) OLS: $R^2 = 0.0376$, $\bar{R}^2 = 0.0340$, Root MSE = 15.597

Table 6: Gender-disaggregated IV coefficient estimates[a] of years of schooling: Belize[d]

Variable	Boys[e], [f]	Girls[e], [f]
Age of child	-0.381 (3.74)	3.279 (3.718)
(Age of child)^2	-0.040 (0.144)	-0.097 (0.143)
Number of children in the household	-0.003 (0.045)	-0.087[b] (0.040)
Gender of household head (1 = male, 2 = female)	-0.378[b] (0.190)	0.010 (0.167)
Work hours	-2.76[c] (0.655)	-3.97[c] (0.90)
(Work hours)^2	0.316[c] (0.075)	0.44[c] (0.101)

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations: (Boys) = 959, (Girls) = 935

(e) F-tests for Joint Significance: (Boys): $F(6,952) = 14.10$[c], (Girls): $F(6,928) = 13.22$[c]

(f) IV: Root MSE: (Boys) = 2.0475, (Girls) = 2.0312

Table 7: Multinomial logit coefficient estimates[(a)]: Cambodia[(e), (f), (g)]

Variable	Category[(b)] School and Work	Neither in School Nor in Work	Work Only
Age of child	2.53 (1.66)	-8.66 (5.11)	-2.35 (2.93)
(Age of child)^2	-0.090 (0.064)	0.359 (0.197)	0.131 (0.113)
No. of children in the household	0.011 (0.022)	-0.038 (0.061)	0.051 (0.036)
Gender of household head (1 = male, 0 = female)	0.210[(c)] (0.101)	-0.398 (0.258)	-0.230 (0.169)
Age of household head	-0.003 (0.004)	0.012 (0.010)	0.010 (0.006)
Gender of child (0 = girl,1 = boy)	-0.028 (0.061)	-0.219 (0.176)	-0.437[(d)] (0.105)
Years of schooling	-0.015 (0.019)	-0.700[(d)] (0.064)	-0.608[(d)] (0.036)
Education level of most educated male adult	-0.031[(d)] (0.009)	-0.057[(c)] (0.028)	-0.091[(d)] (0.017)
Education level of most educated female adult	-0.017 (0.010)	-0.093[(d)] (0.035)	-0.061[(d)] (0.020)
Domestic hours	0.037[(d)] (0.006)	0.034[(c)] (0.014)	0.054[(d)] (0.008)
Rural dummy	0.479[(d)] (0.08)	-0.221 (0.215)	0.324[(d)] (0.123)
Lighting dummy	-0.797 (0.081)	-0.219 (0.238)	-0.479[(d)] (0.148)
Water dummy	-0.167 (0.092)	-0.034 (0.369)	-0.017 (0.231)
TV dummy	-0.002 (0.068)	-0.247 (0.208)	-0.368[(d)] (0.122)
Radio dummy	-0.264[(d)] (0.078)	-0.114 (0.361)	-0.198 (0.239)
Phone dummy	0.163[(d)] (0.054)	-0.032 (0.178)	0.073 (0.091)

(a) Figures in brackets are standard errors.

(b) The "school only" category is the normalised category.

(c) Statistically significant at 5% significance level.

(d) Statistically significant at 1% significance level.

(e) Number of observations = 6318

(f) Likelihood Ratio Test of Joint significance: $\chi_{48}^2 = 1817.86$

(g) Pseudo $R^2 = 0.1443$

Table 8: Regression coefficient estimates[a] of current school attendance: Cambodia[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	0.684[c] (0.213)	0.661[c] (0.211)
(Age of child)^2	-0.028[c] (0.008)	-0.027[c] (0.008)
Number of children in the household	-0.007[b] (0.003)	-0.007[b] (0.003)
Gender of household head (1 = male, 0 = female)	0.057[c] (0.013)	0.055[c] (0.013)
Gender of child (0 = girl,1 = boy)	0.027[c] (0.008)	0.028[c] (0.008)
Age of household head	-0.001[c] (0.0005)	-0.001[c] (0.0004)
Education level of most educated male adult	.010[c] (0.001)	0.010[c] (0.001)
Education level of most education female adult	.010[c] (0.001)	0.010[c] (0.001)
Work hours	-0.002 (0.003)	.0004 (0.0006)
(Work hours)^2	-.0001 (.0001)	-0.0001[c] (.00001)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 0.76$	

[a] Figures in brackets are standard errors.
[b] Statistically significant at 5% significance level.
[c] Statistically significant at 1% significance level.
[d] Number of observations = 6318
[e] F-tests for Joint Significance: IV: $F(10,6307) = 98.09$[c], OLS: $F(10,6307) = 98.36$[c]
[f] IV: Root MSE = 0.30583
[g] OLS: $R^2 = 0.1349$, $\bar{R}^2 = 0.1335$, Root MSE = 0.30539

Table 9: Regression coefficient estimates[a] of years of schooling: Cambodia[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	4.28[c] (1.67)	1.83 (1.15)
(Age of child)^2	-0.135[b] (0.064)	-0.044 (0.044)
Number of children in the household	-0.107[c] (0.022)	-0.134[c] (0.015)
Gender of household head (1 = male, 0 = female)	0.363[c] (0.103)	0.203[c] (0.071)
Age of household head	-0.010[c] (0.004)	-0.008[c] (0.002)
Gender of child (0 = girl,1 = boy)	-0.158[c] (0.060)	-0.114[c] (0.042)
Education level of most educated male adult	0.088[c] (0.010)	0.126[c] (0.006)
Education level of most educated female adult	.021[c] (0.010)	0.148[c] (0.007)
Work hours	-0.304[c] (0.025)	-0.014[c] (0.004)
(Work hours)^2	0.005[c] (0.0005)	-0.00007 (0.00007)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 282.97$[c]	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 6318

(e) F-tests for Joint Significance: IV: F(10,6307) = 158.78[c], OLS: F(10,6307) = 302.28[c]

(f) IV: Root MSE = 2.3953

(g) OLS: $R^2 = 0.3240$, $\bar{R}^2 = 0.3229$, Root MSE = 1.6601

Table 10: Regression coefficient estimates[a] of SAGE: Cambodia[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	66.36[c] (24.04)	30.84 (16.42)
(Age of child)^2	-2.40[c] (0.92)	-1.08 (0.63)
Number of children in the household	-1.51[c] (0.31)	-1.89[c] (0.22)
Gender of household head (1 = male, 0 = female)	5.14[c] (1.49)	2.82[c] (1.01)
Age of household head	-0.13[c] (0.05)	-0.109[c] (0.035)
Gender of child (0 = girl,1 = boy)	-2.22[b] (0.87)	-1.58[c] (0.60)
Education level of most educated male adult	1.25[c] (0.14)	1.80[c] (0.09)
Education level of most educated female adult	1.74[c] (0.14)	2.14[c] (0.10)
Work hours	-4.40[c] (0.37)	-0.194[c] (0.050)
(Work hours)^2	0.077[c] (0.007)	-0.0007 (0.001)
	Test for H_o: Difference in coefficients is not systematic χ_1^2 = 290.62[c]	

[a] Figures in brackets are standard errors.

[b] Statistically significant at 5% significance level.

[c] Statistically significant at 1% significance level.

[d] Number of observations = 6318

[e] F-tests for Joint Significance: IV: F(10,6307) = 126.00[c], OLS: F(10,6307) = 236.95[c]

[f] IV: Root MSE = 34.452

[g] OLS: R2 = 0.2731, $\bar{R}^2$ = 0.2719, Root MSE = 23.711

Table 11: Regression coefficient estimates[a] of the child's ability to read and write: Cambodia[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	0.460 (0.237)	0.367 (0.231)
(Age of child)^2	-0.016 (0.009)	-0.013 (0.009)
Number of children in the household	-0.013[c] (0.003)	-0.014[c] (0.003)
Gender of household head (1=male, 0=female)	0.064[c] (0.015)	0.058[c] (0.014)
Age of household head	-0.0005 (0.0005)	-0.0004 (0.0004)
Gender of child (0=girl,1=boy)	-0.013 (0.009)	-0.011 (0.008)
Education level of most educated male adult	0.010[c] (0.001)	0.011[c] (0.001)
Education level of most educated female adult	0.015[c] (0.001)	0.016[c] (0.001)
Work hours	-0.012[c] (0.004)	-0.0015[b] (0.0007)
(Work hours)^2	0.0002[c] (0.0001)	-0.00003 (0.00001)
	Test for H_o: Difference in coefficients is not systematic χ_1^2 = 10.00[c]	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 6318

(e) F-tests for Joint Significance: IV: F(10,6307) = 65.45[c], OLS: F(10,6307) = 67.15[c]

(f) IV: Root MSE = 0.34011

(g) OLS: R^2 = 0.0962, $\bar{R}^2$ = 0.0948, Root MSE = 0.33379

Table 12: Gender-disaggregated IV coefficient estimates[a] of SAGE: Cambodia[d]

Variable	Boys[e], [f]	Girls[e], [f]
Age of child	61.52 (32.44)	67.95 (35.13)
(Age of child)^2	-2.20 (1.25)	-2.47 (1.35)
Number of children in the household	-1.47[c] (0.42)	-1.64[c] (0.47)
Gender of household head (1=male, 0=female)	4.20[b] (1.92)	6.37[c] (2.28)
Age of household head	-0.185[c] (0.067)	-0.074 (0.074)
Education level of most educated male adult	1.43[c] (0.18)	1.08[c] (0.20)
Education level of most educated female adult	1.85[c] (0.19)	1.62[c] (0.21)
Work hours	-3.94[c] (0.47)	-4.74[c] (0.55)
(Work hours)^2	0.069[c] (0.009)	0.084[c] (0.010)

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations: (Boys) = 3227, (Girls) = 3091

(e) F-tests for Joint Significance: (Boys): $F(9,3217) = 78.84$[c], (Girls): $F(9,3081) = 63.93$[c]

(f) Root MSE: (Boys) = 33.023, (Girls) = 35.382

Table 13: Regression coefficient estimates[a] of current school attendance: Namibia[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	0.568 (1.24)	-0.286 (0.329)
(Age of child)^2	-0.023 (0.049)	0.010 (0.013)
Number of children in the household	0.015[b] (0.007)	0.011[c] (0.002)
Gender of household head (0=male, 1=female)	-0.001 (0.066)	0.050 (0.013)
Age of household head	-0.001 (0.004)	.002[c] (0.0004)
Gender of child (1=girl,0=boy)	0.097 (0.066)	0.044[c] (0.012)
Education level of most educated male adult	0.027 (0.014)	0.031[c] (0.005)
Education level of most educated female adult	0.040[c] (0.012)	0.040[c] (0.005)
Rural dummy	-0.401 (0.357)	-0.091 (0.014)
Work hours	0.161 (0.192)	-0.006[c] (0.001)
(Work hours)^2	-0.003 (0.003)	-0.00003 (0.00002)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 4.12$[b]	

[a] Figures in brackets are standard errors.

[b] Statistically significant at 5% significance level.

[c] Statistically significant at 1% significance level.

[d] Number of observations = 2953

[e] F-tests for Joint Significance: IV: $F(11,2941) = 10.14$[c], OLS: $F(11,2941) = 56.24$[c]

[f] IV: Root MSE = 0.7396

[g] OLS: $R^2 = 0.1738$, $\bar{R}^2 = 0.1707$, Root MSE = 0.3175

Table 14: Regression coefficient estimates[a] of years of schooling: Namibia[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	-1.79 (1.52)	-0.762 (0.43)
(Age of child)^2	0.073 (0.059)	0.033 (0.017)
Number of children in the household	-0.006 (0.009)	-0.0003 (0.003)
Gender of household head (0=male, 1=female)	0.077 (0.080)	0.016 (0.017)
Age of household head	0.007 (0.005)	0.002[c] (0.0006)
Gender of child (1=girl,0=boy)	-0.025 (0.081)	0.038[b] (0.015)
Education level of most educated male adult	0.057[c] (0.017)	0.052[c] (0.007)
Education level of most educated female adult	0.043[c] (0.015)	0.044[c] (0.007)
Rural dummy	0.233 (0.436)	-0.139[c] (0.018)
Work hours	-0.205 (0.234)	-0.004[b] (0.002)
(Work hours)^2	0.003 (0.004)	-0.00002 (0.00003)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 3.48$	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 2953

(e) F-tests for Joint Significance: IV: F(11,2941) = 10.94[c], OLS: F(11,2941) = 51.93[c]

(f) IV: Root MSE = 0.90211

(g) OLS: $R^2 = 0.1626$, $\bar{R}^2 = 0.1595$, Root MSE = 0.41435

Table 15: Regression coefficient estimates[a] of the child's ability to read and write: Namibia[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	1.08 (1.79)	-0.208 (0.361)
(Age of child)^2	-0.042 (0.070)	0.008 (0.014)
Number of children in the household	0.009 (0.011)	0.002 (0.002)
Gender of household head (0=male, 1=female)	-0.044 (0.095)	0.033[b] (0.014)
Age of household head	-0.003 (0.006)	0.003[c] (0.0005)
Gender of child (1=girl,0=boy)	0.101 (0.095)	0.021 (0.013)
Education level of most educated male adult	0.019 (0.020)	0.026[c] (0.006)
Education level of most educated female adult	0.041[b] (0.018)	0.040[c] (0.006)
Rural dummy	-0.531 (0.515)	-0.064[c] (0.015)
Work hours	0.248 (0.276)	-0.004[b] (0.002)
(Work hours)^2	-0.004 (0.004)	-0.00002 (0.00003)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 7.82$[c]	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 2953

(e) F-tests for Joint Significance: IV: $F(11,2941) = 2.96$[c], OLS: $F(11,2941) = 27.58$[c]

(f) IV: Root MSE = 1.0652

(g) OLS: $R^2 = 0.0935$, $\bar{R}^2 = 0.0901$, Root MSE = 0.3475

Table 16: Gender-disaggregated IV coefficient estimates[(a)] of years of schooling: Namibia[(d)]

Variable	Boys[(e), (f)]	Girls[(e), (f)]
Age of child	-0.441 (1.061)	-1.609[(b)] (0.772)
(Age of child)^2	0.021 (0.041)	0.066[(b)] (0.030)
Number of children in the household	0.001 (0.007)	-0.005 (0.005)
Gender of household head (0=male, 1=female)	0.028 (0.043)	0.012 (0.046)
Age of household head	0.006[(b)] (0.003)	0.003[(c)] (0.001)
Education level of most educated male adult	0.048[(c)] (0.018)	0.060[(c)] (0.011)
Education level of most educated female adult	0.051[(c)] (0.018)	0.041[(c)] (0.011)
Rural dummy	0.113 (0.161)	-0.058 (0.102)
Work hours	-0.152 (0.081)	-0.033 (0.056)
(Work hours)^2	0.002 (0.001)	0.0004 (0.0008)

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations: (Boys) = 1465, (Girls) = 1488

(e) F-tests for Joint Significance: (Boys): F(10,1454) = 9.25[(c)], (Girls): F(10,1477) = 27.64[(c)]

(f) Root MSE: (Boys) = 0.72315, (Girls) = 0.43129

Table 17: Regression coefficient estimates[a] of current school attendance: Panama[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	-0.138 (0.310)	-0.387 (0.244)
(Age of child)^2	0.004 (0.012)	0.013 (0.009)
Number of children in the household	-0.003 (0.003)	-0.008[c] (0.002)
Gender of household head (1=male, 0=female)	0.018 (0.020)	-0.008 (0.016)
Age of household head	0.00005 (0.0005)	-0.0008[b] (0.0004)
Gender of child (0=girl,1=boy)	0.091[c] (0.015)	0.029[c] (0.009)
Education level of most educated male adult	0.001[b] (0.0005)	0.002[c] (0.0004)
Education level of most educated female adult	0.001[b] (0.0005)	0.002[c] (0.0004)
Work hours	-0.082[c] (0.010)	-0.018[c] (0.001)
(Work hours)^2	0.001[c] (0.0002)	0.00006[b] (.00003)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 60.76$[c]	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 4037

(e) F-tests for Joint Significance: IV: F(10,4026) = 73.77[c], OLS: F(10,4026) = 125.40[c]

(f) IV: Root MSE = 0.35257

(g) OLS: $R^2 = 0.2375$, $\bar{R}^2 = 0.2356$, Root MSE = 0.28071

Table 18: Regression coefficient estimates[a] of years of schooling: Panama[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	1.84 (1.37)	1.15 (1.26)
(Age of child)^2	-0.039 (0.052)	-0.015 (0.048)
Number of children in the household	-0.139[c] (0.013)	-0.152[c] (0.012)
Gender of household head (1=male, 0=female)	0.308[c] (0.089)	0.237[c] (0.081)
Age of household head	-0.001 (0.002)	-0.004 (0.002)
Gender of child (0=girl,1=boy)	-0.003 (0.067)	-0.174[c] (0.046)
Education level of most educated male adult	0.012[c] (0.002)	0.015[c] (0.002)
Education level of most educated female adult	0.020[c] (0.002)	0.022[c] (0.002)
Work hours	-0.198[c] (0.046)	-0.023[c] (0.007)
(Work hours)^2	0.0033[c] (0.0008)	0.0002 (0.0001)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 17.54$[c]	

[a] Figures in brackets are standard errors.

[b] Statistically significant at 5% significance level.

[c] Statistically significant at 1% significance level.

[d] Number of observations = 4037

[e] F-tests for Joint Significance: IV: $F(10,4026) = 146.57$[c], OLS: $F(10,4026) = 169.95$[c]

[f] IV: Root MSE = 1.5575

[g] OLS: $R^2 = 0.2968$, $\bar{R}^2 = 0.2951$, Root MSE = 1.442

Table 19: Regression coefficient estimates[a] of SAGE: Panama[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	17.81 (17.24)	8.94 (15.76)
(Age of child)^2	-0.63 (0.663)	-0.309 (0.606)
Number of children in the household	-1.73[c] (0.16)	-1.90[c] (0.146)
Gender of household head (1=male, 0=female)	4.11[c] (1.12)	3.19[c] (1.01)
Age of household head	-0.018 (0.028)	-0.049 (0.025)
Gender of child (0=girl,1=boy)	0.167 (0.841)	-2.047[c] (0.58)
Education level of most educated male adult	0.146[c] (0.029)	0.188[c] (0.024)
Education level of most educated female adult	0.247[c] (0.028)	0.283[c] (0.024)
Work hours	-2.55[c] (0.58)	-0.281[c] (0.085)
(Work hours)^2	0.044[c] (0.01)	0.003[b] (0.002)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 18.62$[c]	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 4037

(e) F-tests for Joint Significance: IV: F(10,4026) = 78.52[c], OLS: F(10,4026) = 91.21[c]

(f) IV: Root MSE = 19.642

(g) OLS: $R^2 = 0.1847$, $\bar{R}^2 = 0.1827$, Root MSE = 18.105

Table 20: Gender-disaggregated IV coefficient estimates[a] of SAGE: Panama[d]

Variable	Boys[e], [f]	Girls[e], [f]
Age of child	-2.29 (23.41)	32.88 (22.91)
(Age of child)^2	0.109 (0.90)	-1.19 (0.88)
Number of children in the household	-1.61[c] (0.22)	-1.99[c] (0.21)
Gender of household head (1=male, 0=female)	5.21[c] (1.54)	1.98 (1.46)
Age of household head	0.034 (0.038)	-0.109[c] (0.037)
Education level of most educated male adult	0.152[c] (0.040)	0.176[c] (0.035)
Education level of most educated female adult	0.285[c] (0.037)	0.237[c] (0.035)
Work hours	-1.42[c] (0.48)	-3.53[b] (1.71)
(Work hours)^2	0.023[c] (0.008)	0.07 (0.037)

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations: (Boys) = 2098, (Girls) = 1939

(e) F-tests for Joint Significance: (Boys): F(9,2088) = 49.86[c], (Girls): F(9,1929) = 45.25[c]

(f) IV: Root MSE (Boys) = 19.14, (Girls) = 18.197

Table 21: Regression coefficient estimates[a] of current school attendance: Philippines[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	-2.17 (1.82)	0.196 (0.478)
$(\text{Age of child})^2$	0.085 (0.071)	-0.009 (0.018)
Seasonal dummy (1=if the child work is seasonal, 0=otherwise)	-0.183 (0.143)	0.115[c] (0.019)
Years of work	0.014 (0.016)	0.016[c] (0.005)
Gender of child (1=boy, 2=girl)	-0.068 (0.085)	0.081[c] (0.017)
Rural dummy	-0.004 (0.059)	-0.061[c] (0.017)
Work hours	-0.220[b] (0.088)	-0.020[c] (0.0016)
$(\text{Work hours})^2$	0.003[b] (0.0013)	0.0001[c] (0.00003)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 50.16$[c]	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 1710

(e) F-tests for Joint Significance: IV: $F(8,1701) = 10.86$[c], OLS: $F(8,1701) = 117.01$[c]

(f) IV: Root MSE = 1.0738

(g) OLS: $R^2 = 0.3550$, $\bar{R}^2 = 0.3519$, Root MSE = 0.34466

Table 22: Regression coefficient estimates[a] of years of schooling: Philippines

Variable	IV	OLS
Age of child	-7.08 (9.40)	5.51[c] (1.70)
(Age of child)^2	0.314 (0.365)	-0.186[c] (0.065)
Seasonal dummy (1=if the child work is seasonal, 0=otherwise)	-1.31 (0.74)	0.27[c] (0.066)
Years of work	-0.020 (0.082)	-0.007 (0.018)
Gender of child (1=boy, 2=girl)	-0.332 (0.441)	0.462[c] (0.062)
Rural dummy	-0.016 (0.304)	-0.321[c] (0.061)
Work hours	-1.10[b] (0.46)	-0.033[c] (0.006)
(Work hours)^2	0.016[b] (0.007)	0.0003[c] (0.0001)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 112.34$[c]	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 1710

(e) F-tests for Joint Significance: IV: $F(8,1701) = 3.50$[c], OLS: $F(8,1701) = 60.78$[c]

(f) IV: Root MSE = 5.5527

(g) OLS: $R^2 = 0.2223$, $\bar{R}^2 = 0.2186$, Root MSE = 1.2264

Table 23: Gender-disaggregated IV coefficient estimates[a] of years of schooling: Philippines[d]

Variable	Boys[e], [f]	Girls[e], [f]
Age of child	-8.95 (12.42)	-2.12 (11.48)
$(\text{Age of child})^2$	0.394 (0.485)	0.108 (0.44)
Seasonal dummy (1=if the child work is seasonal, 0=otherwise)	-1.558 (1.019)	-0.730 (0.757)
Years of work	0.151 (0.134)	-0.280 (0.216)
Rural dummy	0.187 (0.417)	-0.433 (0.371)
Work hours	-1.134[b] (0.560)	-0.897 (0.589)
$(\text{Work hours})^2$	0.017[b] (0.009)	0.012 (0.008)

[a] Figures in brackets are standard errors.

[b] Statistically significant at 5% significance level.

[c] Statistically significant at 1% significance level.

[d] Number of observations: (Boys) = 1099, (Girls) = 611

[e] F-tests for Joint Significance: (Boys): $F(7,1091) = 2.18$[b], (Girls): $F(7,603) = 1.92$[b]

[f] Root MSE: (Boys) = 5.6903, (Girls) = 4.5251

Table 24: Regression coefficient estimates[a] of current school attendance: Portugal[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	0.085 (.084)	0.114 (.079)
(Age of child)^2	-0.004 (0.003)	-0.005 (0.003)
Gender of child (1=boy, 2=girl)	0.006 (0.003)	0.008[c] (0.003)
Gender of household head (1=male, 2=female)	-0.005 (0.005)	-0.004 (0.005)
Education level of most educated male adult	0.0010 (0.0012)	0.0017 (0.0010)
Education level of most educated female adult	0.0036[c] (0.0012)	0.0042[c] (0.0011)
Domestic hours	-0.0058[c] (0.0003)	-0.0061[c] (0.0002)
Work hours	-0.0293[b] (0.0137)	-0.0044[c] (0.0010)
(Work hours)^2	0.0004 (0.0003)	-0.0001[c] (0.00002)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 3.63$[b]	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 6753

(e) F-tests for Joint Significance: IV: F(9,6743) = 160.52[c], OLS: F(9,6743) = 177.63[c]

(f) IV: Root MSE = 0.12239

(g) OLS: $R^2 = 0.1916$, $\bar{R}^2 = 0.1906$, Root MSE = 0.11691

Table 25: Regression coefficient estimates[(a)] of years of schooling: Portugal[(d)]

Variable	IV[(e), (f)]	OLS[(e), (g)]
Age of child	-0.110 (0.388)	-0.143 (0.380)
(Age of child)^2	0.011 (.015)	0.013 (0.015)
Gender of child (1=boy, 2=girl)	0.088[(c)] (0.015)	0.085[(c)] (0.014)
Gender of household head (1=male, 2=female)	-0.079[(c)] (0.022)	-0.079[(c)] (0.022)
Education level of most educated male adult	0.040[(c)] (0.005)	0.039[(c)] (0.005)
Education level of most educated female adult	0.037[(c)] (0.005)	0.037[(c)] (0.005)
Domestic hours	-0.005[(c)] (0.001)	-0.005[(c)] (0.001)
Work hours	0.022 (0.063)	-0.007 (0.005)
(Work hours)^2	-0.0005 (0.0012)	0.00006 (0.00009)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 0.21$	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 6753

(e) F-tests for Joint Significance: IV: F(9,6743) = 88.98[(c)], OLS: F(9,6743) = 89.71[(c)]

(f) IV: Root MSE =0.56202

(g) OLS: $R^2 = 0.1069$, $\bar{R}^2 = 0.1057$, Root MSE = 0.56046

Table 26: Gender-disaggregated iv coefficient estimates[(a)] of years of schooling: Portugal[(d)]

Variable	Boys[(e), (f)]	Girls[(e), (f)]
Age of child	0.282 (0.596)	-0.033 (0.804)
(Age of child)^2	-0.003 (0.023)	0.007 (0.031)
Gender of household head (1=male, 2=female)	-0.097[(c)] (0.035)	-0.066 (0.045)
Education level of most educated male adult	0.047[(c)] (0.008)	0.040[(c)] (0.011)
Education level of most educated female adult	0.043[(c)] (0.008)	0.041[(c)] (0.012)
Domestic hours	-0.004 (0.002)	-0.009[(c)] (0.002)
Work hours	-0.154[(b)] (0.070)	0.415[(c)] (0.150)
(Work hours)^2	0.003[(b)] (0.002)	-0.007[(c)] (0.003)

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations : (Boys) = 3466, (Girls) = 3287

(e) F-tests for Joint Significance: (Boys): F(8,3457) = 52.26[(c)], (Girls): F(8,3278) = 17.89[(c)]

(f) Root MSE: (Boys) = 0.63006, (Girls) = 0.80585

Table 27: Regression coefficient estimates[a] of number of failures experienced by the child: Portugal[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	-0.049 (0.665)	-0.426 (0.569)
(Age of child)^2	0.006 (0.026)	0.021 (0.022)
Gender of child (1=boy, 2=girl)	-0.211[c] (0.027)	-0.246[c] (0.021)
Gender of household head (1=male, 2=female)	0.098[c] (0.038)	0.095[c] (0.033)
Education level of most educated male adult	-0.083[c] (0.009)	-0.093[c] (0.008)
Education level of most educated female adult	-0.084[c] (0.009)	-0.092[c] (0.008)
Domestic hours	0.004[b] (0.002)	0.008[c] (0.002)
Work hours	0.334[c] (0.108)	0.009 (0.007)
(Work hours)^2	-0.006[c] (0.002)	-0.0001 (0.0001)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 11.98$[c]	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 6753

(e) F-tests for Joint Significance: IV: F(9,6743) = 78.66[c], OLS: F(9,6743) = 102.38[c]

(f) IV: Root MSE = 0.96397

(g) OLS: $R^2 = 0.1202$, $\bar{R}^2 = 0.1191$, Root MSE = 0.83991

Table 28: Regression coefficient estimates[a] of current school attendance: Sri Lanka[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	-0.149 (.163)	-0.106 (0.159)
(Age of child)^2	0.005 (0.006)	0.003 (0.006)
No. of children in the household	-0.004 (0.002)	-0.0037 (0.0021)
Gender of child (0=girl, 1=boy)	-0.014[b] (0.006)	-0.003 (0.006)
Gender of household head (0=female, 1=male)	0.002 (0.009)	0.0068 (0.0087)
Age of household head	-0.0007[b] (0.0003)	-0.0006[b] (0.0003)
Education level of most educated male adult	0.0050[c] (0.0010)	0.0039[c] (0.0010)
Education level of most educated female adult	0.0073[c] (0.0009)	0.0067[c] (0.0009)
Work hours	0.0071[c] (0.0013)	-0.0039[c] (0.0008)
(Work hours)^2	-0.0003[c] (0.00002)	-0.0001[c] (0.00001)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 119.97$[c]	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 4672

(e) F-tests for Joint Significance: IV: F(10,4661) = 121.38[c], OLS: F(10,4661) = 126.22[c]

(f) IV: Root MSE = 0.19955

(g) OLS: $R^2 = 0.2131$, $\bar{R}^2 = 0.2114$, Root MSE = 0.19528

Table 29: Regression coefficient estimates[a] of years of schooling: Sri Lanka[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	0.615 (1.103)	0.778 (1.096)
(Age of child)^2	0.012 (0.042)	0.006 (0.042)
No. of children in the household	-0.057[c] (0.015)	-0.057[c] (0.015)
Study time	0.002[c] (0.0002)	0.002[c] (0.0002)
Gender of child (0=girl, 1=boy)	-0.204[c] (0.041)	-0.166[c] (0.040)
Gender of household head (0=female, 1=male)	0.085 (0.061)	0.105 (0.060)
Age of household head	-0.003 (0.002)	-0.003 (0.002)
Education level of most educated male adult	0.052[c] (0.007)	0.048[c] (0.007)
Education level of most educated female adult	0.073[c] (0.006)	0.071[c] (0.006)
Work hours	0.056[c] (0.009)	0.017[c] (0.005)
(Work hours)^2	-0.0015[c] (0.0001)	-0.0010[c] (0.0001)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 31.43$[c]	

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations = 4672

(e) F-tests for Joint Significance: IV: F(11,4660) = 230.51[c], OLS: F(11,4660) = 230.40[c]

(f) IV: Root MSE = 1.3535

(g) OLS: $R^2 = 0.3523$, = 0.3507, Root MSE = 1.3457

Table 30: Regression coefficient estimates[a] of study time: Sri Lanka[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	141.86 (75.89)	146.92 (75.76)
(Age of child)^2	-5.28 (2.92)	-5.46 (2.91)
No. of children in the household	-0.154 (1.02)	-0.149 (1.021)
Gender of child (0=girl, 1=boy)	-16.02[c] (2.80)	-14.71[c] (2.75)
Gender of household head (0=female, 1=male)	10.10[b] (4.18)	10.72[b] (4.16)
Age of household head	-0.176 (0.135)	-0.169 (0.135)
Education level of most educated male adult	1.76[c] (0.46)	1.63[c] (0.46)
Education level of most educated female adult	2.58[c] (0.41)	2.51[c] (0.41)
Work hours	0.117 (0.607)	-1.18[c] (0.37)
(Work hours)^2	-0.024[c] (0.010)	-0.004 (0.007)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 7.25$[c]	

[a] Figures in brackets are standard errors.

[b] Statistically significant at 5% significance level.

[c] Statistically significant at 1% significance level.

[d] Number of observations = 4672

[e] F-tests for Joint Significance: IV: F(10,4661) = 22.50[c], OLS: F(10,4661) = 23.60[c]

[f] IV: Root MSE = 93.163

[g] OLS: $R^2 = 0.0482$, $\bar{R}^2 = 0.0461$, Root MSE = 93.038

Table 31: Regression coefficient estimates[a] of SAGE: Sri Lanka[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	-0.622 (13.83)	1.29 (13.75)
$(\text{Age of child})^2$	0.043 (0.532)	-0.025 (0.529)
No. of children in the household	-0.708[c] (0.186)	-0.706[c] (0.185)
Study time	0.027[c] (0.003)	0.027[c] (0.003)
Gender of child (0=girl, 1=boy)	-2.511[c] (0.511)	-2.061[c] (0.501)
Gender of household head (0=female, 1=male)	0.966 (0.761)	1.194 (0.756)
Age of household head	-0.043 (0.025)	-0.041 (0.025)
Education level of most educated male adult	0.651[c] (0.084)	0.607[c] (0.083)
Education level of most educated female adult	0.935[c] (0.075)	0.910[c] (0.075)
Work hours	0.689[c] (0.111)	0.228[c] (0.067)
$(\text{Work hours})^2$	-0.019[c] (0.002)	-0.012[c] (0.001)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 27.69$[c]	

[a] Figures in brackets are standard errors.

[b] Statistically significant at 5% significance level.

[c] Statistically significant at 1% significance level.

[d] Number of observations = 4672

[e] F-tests for Joint Significance: IV: $F(11,4660) = 88.90$[c], OLS: $F(11,4660) = 87.31$[c]

[f] IV: Root MSE = 16.97

[g] OLS: $R^2 = 0.1709$, $\bar{R}^2 = 0.1689$, Root MSE = 16.883

Table 32: Gender-disaggregated coefficient estimates[a] of current school attendance: Sri Lanka[d]

Variable	Boys[e], [f]	Girls[e], [f]
Age of child	25.01 (20.16)	-32.52 (18.83)
(Age of child)^2	-0.957 (0.775)	1.28 (0.72)
No. of children in the household	-0.470 (0.276)	-0.952[c] (0.249)
Study time	0.023[c] (0.004)	0.032[c] (0.004)
Gender of household head (0=female, 1=male)	1.36 (1.08)	0.526 (1.07)
Age of household head	-0.035 (0.036)	-0.056 (0.033)
Education level of most educated male adult	0.885[c] (0.123)	0.386[c] (0.114)
Education level of most educated female adult	1.073[c] (0.112)	0.792[c] (0.101)
Work hours	0.898[c] (0.148)	0.382[b] (0.171)
(Work hours)^2	-0.024[c] (0.003)	-0.014[c] (0.003)

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

(d) Number of observations: (Boys) = 2403, (Girls) = 2269

(e) F-tests for Joint Significance: (Boys): $F(10,2392) = 55.63$[c], (Girls): $F(10,2258) = 41.88$[c]

(f) Root MSE: (Boys) = 17.749, (Girls) = 16.063

Table 33: Elasticity of adult education with respect to child labour hours[(a)]

	Cambodia		Panama	
	Boys	Girls	Boys	Girls
Adult male education	0.22	0.13	0.54	1.22
Adult female education	0.41	0.28	1.03	1.67

(a) See Equation (9). These elasticities are based on the gender disaggregated IV estimates and calculated at the sample means.

Table 34: 3SLS Coefficient estimates[(a)] of SAGE on selected SIMPOC data sets

Variable	Belize	Cambodia	Panama	Sri Lanka
Age of child	-10.68 (35.33)	46.39 (26.65)	18.40 (17.64)	-2.03 (13.62)
(Age of child)^2	0.411 (1.358)	-1.58 (1.02)	-0.64 (0.678)	0.098 (.524)
No. of children in the household	-0.285 (0.396)	-1.18[(c)] (0.35)	-1.70[(c)] (.17)	-0.572[(c)] (.184)
Gender of child (0=girl, 1=boy)	2.70 (1.51)	-1.94[(b)] (0.96)	0.554 (.878)	-1.712[(c)] (.525)
Age of household head	-	-.106 (0.056)	-.035 (.029)	-0.029 (.024)
Education level of most educated male adult	-	1.12[(c)] (.15)	.149[(c)] (.03)	.532[(c)] (.083)
Education level of most educated female adult	-	1.53[(c)] (.16)	.240[(c)] (.029)	.818[(c)] (0.74)
Work hours	-33.43[(c)] (7.37)	-3.76[(c)] (.55)	-2.18[(c)] (.63)	0.370[(c)] (.091)
(Work hours)^2	3.37[(c)] (0.84)	.044[(c)] (.010)	.028[(c)] (.011)	-0.014[(c)] (.002)
Domestic hours	-.009 (.082)	.416[(c)] (.127)	-	-.017[(c)] (.006)
Rural dummy	-	0.88 (1.31)	2.34[(c)] (.78)	-
Phone dummy	-	-	1.86[(b)] (.85)	-
Number of observations	1894	6318	4037	4638

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

Table 35: 3SLS coefficient estimates[(a)] of sage on daily child labour hours data in Cambodia and Sri Lanka

Variable	Cambodia	Sri Lanka	
Age of child	48.55 (26.75)	0.318 (13.82)	0.316 (13.84)
(Age of child)^2	-1.64 (1.03)	0.013 (0.53)	0.013 (0.53)
No. of children in the household	-1.20[(c)] (0.36)	-0.72[(c)] (0.19)	-0.72[(c)] (0.19)
Gender of child (0=girl, 1=boy)	-2.08[(b)] (0.97)	-2.45[(c)] (0.53)	-2.45[(c)] (0.53)
Gender of household head	3.65[(b)] (1.66)	1.14 (0.76)	1.13 (0.76)
Age of household head	-0.109 (.056)	-0.044 (0.025)	-0.041 (0.025)
Education level of most educated male adult	1.05[(c)] (0.15)	0.612[(c)] (0.084)	0.606[(c)] (0.084)
Education level of most educated female adult	1.42[(c)] (0.16)	0.893[(c)] (.075)	0.894[(c)] (0.075)
Daily work hours	-21.38[(c)] (2.86)	4.87[(c)] (0.67)	2.86[(c)] (0.41)
(Daily work hours)^2	1.43[(c)] (0.29)	-0.73[(c)] (0.07)	-0.57[(c)] (.05)
Domestic hours	0.326[(c)] (0.10)	-0.015[(c)] (0.006)	-0.014[(c)] (0.006)
Work days per week	-	-1.07[(c)] (0.25)	-
Rural dummy	0.583 (1.26)	-	-
Number of observations	6318	4672	4672

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

Table 36: Variation of school attendance rates, etc.[(a)] between occupations in Sri Lanka

Category	% age of children aged 12-14 years	School attendance rate	SAGE	Mean study time
1. Service workers, shop and market sales workers	2.39%	0.871 (.337)	87.65 (21.71)	87.24 (58.86)
2. Craft and related workers	3.48%	0.828 (0.378)	85.34 (20.08)	84.44 (61.34)
3. Sales and service workers in 'elementary occupations'	0.89%	0.395 (0.495)	62.52 (38.57)	35.70 (47.77)
4. Agricultural workers	18.94%	0.943 (0.231)	87.75 (18.57)	97.45 (64.4)
5. Non-workers	74.30%	0.963 (0.191)	88.48 (17.87)	108.97 (104.2)

(a) Figures in brackets are standard errors.

Table 37: OLS regression coefficient estimates[a] of SAGE and study time in Sri Lanka[c]

Variable	SAGE[f]	Study Time[f]
Age of child	5.55 (13.95)	155.09[d] (75.52)
(Age of child)^2	-0.18 (0.54)	-5.78[d] (2.90)
No. of children in the household	-0.73[e] (0.19)	-0.14 (1.01)
Gender of child (0=girl, 1=boy)	-2.48[e] (0.51)	-15.29[e] (2.74)
Gender of household head (0=female, 1=male)	1.47 (0.76)	10.29[e] (4.14)
Age of household head	-0.05 (0.02)	-0.21 (0.13)
Education level of most educated male adult	0.65[e] (0.08)	1.66[e] (0.46)
Education level of most educated female adult	0.98[e] (0.08)	2.50[e] (0.41)
(Work hours) * occupation[b] dummy 1	0.253 (0.171)	-1.595 (0.928)
(Work hours) * occupation[b] dummy 2	-0.013 (0.195)	-1.093 (1.057)
(Work hours) * occupation[b] dummy 3	-0.273 (0.224)	-3.019[d] (1.210)
(Work hours) * occupation[b] dummy 4	0.408[e] (0.100)	-0.664 (0.544)
(Work hours)^2 * occupation[b] dummy 1	-0.012[e] (0.003)	0.004 (0.015)
(Work hours)^2 * occupation[b] dummy 2	-0.006 (0.005)	-0.013 (0.025)
(Work hours)^2 * occupation[b] dummy 3	-0.006 (0.003)	0.021 (0.016)
(Work hours)^2 * occupation[b] dummy 4	-0.019[e] (0.003)	-0.014 (0.015)
R^2	0.1516	0.0492
$\bar{R}^2$	0.1486	0.0459

(a) Figures in brackets are standard errors.

(b) See Table C1 for the description of the 4 occupation categories.

(c) Number of observations = 4654.

(d) Statistically significant at 5% significance level.

(e) Statistically significant at 1% significance level.

(f) F tests for Joint Significance: (SAGE): F(16,4637) = 51.77[e], (Study Time): F(16,4637) = 15.0[e]

Table 38: OLS regression coefficient estimates of SAGE[a] by occupation in Sri Lanka

Variable	Service workers, shop and market salesworkers	Craft and related workers	Sales and service workers in 'elementary occupations'	Agricultural workers
Age of child	-21.24 (88.23)	58.07 (94.09)	-44.26 (261.67)	-29.58 (32.83)
(Age of child)^2	0.904 (3.38)	-2.26 (3.61)	2.12 (10.06)	1.15 (1.26)
No. of children in the household	-3.08[b] (1.41)	-2.18[b] (1.07)	-2.56 (2.87)	-0.301 (0.49)
Gender of child (0=girl, 1=boy)	-0.629 (3.54)	-2.81 (3.32)	14.73 (8.26)	-2.63[b] (1.24)
Age of household head	-0.08 (0.19)	-0.144 (0.15)	0.945[b] (0.42)	-0.066 (0.067)
Gender of household head (0=female, 1=male)	3.93 (4.87)	2.44 (5.02)	-31.70[b] (14.56)	1.74 (2.14)
Education level of most educated male adult	0.369 (0.654)	0.306 (0.499)	-7.37[c] (1.82)	0.759[c] (0.187)
Education level of most educated female adult	0.410 (0.554)	1.224[b] (0.517)	5.14[c] (1.50)	1.069[c] (0.169)
Work hours (daily)	5.225[b] (2.10)	-1.620 (2.55)	2.83 (4.08)	0.174 (1.05)
(Work hours)^2	-0.805[c] (0.187)	-0.051 (0.273)	-0.458 (0.340)	-0.095 (0.122)
R^2	0.4394	0.2163	0.7124	0.1148
$\bar{R}^2$	0.3855	0.1611	0.6059	0.1045
Number of observations	115	153	38	875

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

Table 39: Distribution of children between the four possible combinations[a] of schooling and employment

Age	Belize				Cambodia				Namibia				Panama				Philippines				Portugal				Sri Lanka			
(Boys)	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
12	.82	.16	.02	.00	.37	.54	.03	.06	.73	.11	.11	.04	.88	.07	.03	.02	.76	.17	.04	.03	.97	.02	.00	.00	.72	.25	.02	.01
13	.72	.22	.03	.03	.28	.61	.02	.09	.81	.10	.07	.02	.79	.07	.07	.07	.72	.18	.04	.06	.96	.03	.00	.00	.63	.30	.03	.04
14	.62	.18	.07	.13	.28	.57	.03	.12	.77	.10	.11	.02	.75	.07	.07	.11	.64	.19	.05	.12	.93	.04	.02	.01	.61	.30	.04	.05
(Girls)																												
12	.91	.07	.01	.01	.32	.59	.02	.07	.81	.09	.08	.02	.93	.01	.06	.00	.84	.11	.04	.01	.98	.01	.01	.00	.80	.17	.02	.01
13	.82	.11	.07	.01	.29	.59	.02	.10	.74	.09	.11	.06	.88	.02	.09	.01	.81	.11	.05	.03	.97	.02	.01	.00	.76	.18	.04	.02
14	.67	.06	.21	.06	.24	.52	.03	.21	.72	.10	.12	.06	.82	.02	.13	.03	.74	.14	.08	.05	.94	.03	.02	.01	.75	.19	.03	.03

[a] 1: "school only";
2: "school and work";
3: "neither school nor work";
4: "work only".

Table 40: Multinomial logit marginal probabilities for Belize[a]

Variable	School Only	Both School and Work	Neither School nor Work	Work Only
Age of child	-0.6983	0.8407	-0.0891	-0.0534
(Age of child)^2	0.0239	-0.0319	0.0052	0.0028
No. of children in the household	-0.0104	0.0090	0.0016	-0.0001
Gender of household head (1=male, 2=female)	0.0512	-0.0342	-0.0130	-0.0039
Gender of child (0=girl, 1=boy)	-0.0926	0.1161	-0.0300	0.0065
Years of schooling	0.0054	0.0073	-0.0099	-0.0027
Dummy for lighting	0.0736	-0.0855	0.0149	-0.0030
Dummy for water	0.0069	-0.0487	0.0381	0.0037
Dummy for TV	0.1400	-0.1126	-0.0195	-0.0079
Dummy for radio	0.0540	-0.0444	-0.0136	0.0041
Dummy for telephone	0.0816	-0.0337	-0.0253	-0.0226
Base probability	0.8416	0.1184	0.0301	0.0099

[a] These correspond to the multinomial logit parameter estimates reported in Table 2.

Table 41: Multinomial logit marginal probabilities for Cambodia[(a)]

Variable	School Only	Both School and Work	Neither School nor Work	Work Only
Age of child	-0.4075	0.7301	-0.1288	-0.1938
(Age of child)^2	0.0136	-0.0280	0.0052	0.0092
No. of children in the household	-0.0028	0.0012	-0.0006	0.0021
Gender of household head (1=male, 2=female)	-0.0334	0.0617	-0.0081	-0.0203
Age of household head	0.0004	-0.0012	0.0002	0.0006
Gender of child (0=girl, 1=boy)	0.0126	0.0102	-0.0023	-0.0206
Years of schooling	0.0146	0.0226	-0.0083	-0.0289
Education level of most educated male adult	0.0074	-0.0036	-0.0004	-0.0034
Education level of most educated female adult	0.0045	-0.0012	-0.0010	-0.0024
Domestic hours	-0.0080	0.0065	0.00008	0.0014
Rural dummy	-0.0939	0.1008	-0.0070	0.00009
Lighting dummy	0.1604	-0.1670	0.0040	0.0026
Water dummy	0.0324	-0.0381	0.0010	0.0048
TV dummy	0.0069	0.0137	-0.0029	-0.0178
Telephone dummy	0.0529	-0.0529	0.0009	-0.0008
Radio dummy	-0.0315	0.0351	-0.0018	-0.0018
Base probability	0.2910	0.6440	0.0130	0.0520

(a) These correspond to the multinomial logit parameter estimates reported in Table 7.

Table 42: Summary statistics: means of some key variables on weighted data

Variable	Belize		Cambodia		Namibia		Philippines		Sri Lanka	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Number of children aged 12-14 years	3.56	3.51	3.73	3.69	4.58	4.57	3.97	3.98	2.95	3.02
Child age	12.97	12.98	12.99	12.93	13.05	12.99	12.99	13.02	12.96	12.99
School enrolment rate	91%	88%	86%	82%	88%	94%	88%	91%	95%	96%
Hours of economic activity[(a)]	4.94	3.69	18.93	18.24	24.03	16.35	16.57	15.65	11.43	9.74
Hours of domestic child duties[(b)]	6.68	9.29	10.00	10.65	-	-	-	-	47.86	67.96
SAGE	74.57	77.09	39.32	41.57	-	-	-	-	87.80	90.27
Number of years of Schooling[(c)]	5.93	6.14	2.77	2.90	1.04[(d)]	1.11[(d)]	3.53[(d)]	3.80[(d)]	6.99	7.22
% age of children who are										
(i) In school, but don't work	73%	81%	21%	20%	76%	80%	69%	79%	66%	79%
(ii) In school and work	18%	7%	65%	63%	13%	15%	20%	13%	29%	17%
(iii) Neither in school nor in work	4%	9%	2%	2%	8%	4%	4%	6%	2%	3%
(iv) Not in school but work	5%	2%	12%	15%	4%	1%	7%	3%	3%	1%

(a) The figures are weekly hours for all countries except Belize for whom the figures are daily hours.

(b) The figures on domestic hours are weekly for all countries except Sri Lanka where the figures are expressed in "minutes per day".

(c) Not comparable between the countries

(d) The figures on the length of schooling received in Namibia, Panama and the Philippines are based on the codes in these data sets. They should not be literally interpreted as "years of schooling" and are, thus, non comparable with one another and with the other countries' figures.

Table 43: Difference between summary statistics on weighted and unweighted data

Variable	Belize		Cambodia		Namibia		Philippines		Sri Lanka	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Number of children aged 12-14 years	0.00	0.01	0.01	0.00	-0.07	-0.05	0.00	0.00	-0.08	-0.06
Child age	0.00	0.00	0.01	-0.03	0.04	-0.02	0.00	0.01	-0.01	0.00
School enrolment rate	0.2%	0.4%	-3.0%	-2.6%	5.2%	5.3%	-0.7%	-0.8%	1.1%	1.1%
Hours of economic activity[(a)]	0.09	0.07	0.87	0.09	-0.53	-4.08	-0.27	-0.05	-0.37	-0.19
Hours of domestic child duties[(b)]	0.13	-0.02	0.11	-0.06	-	-	-	-	-0.01	-0.01
SAGE	0.01	0.00	-7.11	-6.30	-	-	-	-	1.09	1.01
Number of years of Schooling[(c)]	0.00	-0.05	-0.49	-0.46	0.00[(d)]	0.02[(d)]	-0.04[(d)]	-0.03[(d)]	0.07	0.08
% age of children who are										
(i) In school, but don't work	1.1%	1.1%	-10.2%	-8.8%	2.2%	0.0%	-1.7%	-0.9%	0.8%	2.0%
(ii) In school and work	-1.0%	-0.7%	7.5%	6.1%	2.9%	5.3%	1.2%	0.5%	0.3%	-1.4%
(iii) Neither in school nor in work	0.2%	-0.3%	0.0%	-0.1%	-3.6%	-4.5%	0.0%	0.2%	-0.4%	-0.4%
(iv) Not in school but work	-0.4%	-0.3%	2.6%	2.9%	-1.6%	-0.9%	0.4%	0.3%	-0.7%	-0.3%

(a) The figures are weekly hours for all countries except Belize for whom the figures are daily hours.

(b) The figures on domestic hours are weekly for all countries except Sri Lanka where the figures are expressed in "minutes per day".

(c) Not comparable between the countries

(d) The figures on the length of schooling received in Namibia, Panama and the Philippines are based on the codes in these data sets. They should not be literally interpreted as "years of schooling" and are, thus, non comparable with one another and with the other countries' figures.

Table 44: Regression coefficient estimates[a] of current school attendance (weighted data): Namibia[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	1.318[b] (0.658)	0.205 (0.277)
(Age of child)^2	-0.052[b] (0.026)	-0.009 (0.011)
No. of children in the household	0.010[c] (0.004)	0.007[c] (0.002)
Gender of household head (0=male, 1=female)	-0.024 (0.029)	0.032[c] (0.011)
Age of household head	-0.0007 (0.001)	0.002[c] (0.0004)
Gender of child (1=girl, 0=boy)	0.077[c] (0.020)	0.053[c] (0.010)
Education level of most educated male adult	-0.005 (0.015)	0.027[c] (0.005)
Education level of most educated female adult	0.024[c] (0.008)	0.026[c] (0.005)
Rural dummy	-0.216[c] (0.074)	-0.037[c] (0.012)
Work hours	0.083[b] (0.034)	-0.004[c] (0.001)
(Work hours)^2	-0.001[c] (0.0005)	-0.0001[c] (0.00001)
	Test for H_o: Difference in coefficients is not systematic χ_1^2 = 20.03	

[a] Figures in brackets are standard errors.

[b] Statistically significant at 5% significance level.

[c] Statistically significant at 1% significance level.

[d] Number of observations = 2953

[e] F-tests for Joint Significance: IV: $F(11,2941) = 15.32$[c], OLS: $F(11,2941) = 47.59$[c]

[f] IV: Root MSE = 0.4734

[g] OLS: $R^2 = 0.1511$, $\bar{R}^2 = 0.1479$, Root MSE = 0.2675

Table 45: Regression coefficient estimates[a] of current school attendance (weighted data): Philippines[d]

Variable	IV[e], [f]	OLS[e], [g]
Age of child	-1.703 (1.424)	0.024 (0.480)
(Age of child)^2	0.067 (0.055)	-0.002 (0.018)
Seasonal dummy (1= if the child work is seasonal, 0=otherwise)	-0.112 (0.106)	0.130[c] (0.018)
Years of work	0.001 (0.014)	0.011[b] (0.005)
Gender of child (1=boy, 2=girl)	-0.043 (0.066)	0.077[c] (0.018)
Rural dummy	-0.012 (0.052)	-0.063[c] (0.018)
Work hours	-0.185[c] (0.064)	-0.021[c] (0.002)
(Work hours)^2	0.003[c] (0.001)	0.0001[c] (0.00003)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 45.22$	

[a] Figures in brackets are standard errors.

[b] Statistically significant at 5% significance level.

[c] Statistically significant at 1% significance level.

[d] Number of observations = 1710

[e] F-tests for Joint Significance: IV: F(8,1701) = 15.59[c], OLS: F(8,1701) = 118.57[c]

[f] IV: Root MSE = 0.9043

[g] OLS: $R^2 = 0.358$, $\bar{R}^2 = 0.355$, Root MSE = 0.3461

Table 46: 3SLs coefficient estimates[a] of SAGE on selected SIMPOC (weighted) data sets

Variable	Belize	Cambodia	Sri Lanka
Age of child	-14.58 (39.64)	57.97[c] (22.27)	-0.935 (13.20)
(Age of child)^2	0.558 (1.52)	-2.03[b] (0.86)	0.066 (0.508)
No. of children in the household	-0.115 (0.448)	-1.56[c] (0.29)	-0.736[c] (0.182)
Gender of child (0=girl, 1=boy)	3.62[b] (1.77)	-2.42[c] (0.81)	-2.24[c] (0.50)
Age of household head	-	-0.062 (0.048)	-0.042 (0.023)
Education level of most educated male adult	-	1.30[c] (0.127)	0.532[c] (0.081)
Education level of most educated female adult	-	1.85[c] (0.14)	0.748[c] (0.073)
Work hours	-40.54[c] (9.83)	-3.03[c] (0.58)	0.219[c] (0.092)
(Work hours)^2	-4.13[c] (1.13)	0.037[c] (0.011)	-0.012[c] (0.002)
Domestic hours	0.023 (0.091)	0.232 (0.124)	-0.013[b] (0.006)
Rural dummy	-	-0.079 (1.473)	-
Number of observations	1894	6318	4672

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

Table 47: Tobit coefficient estimates[a] of SAGE (weighted data)

Variable	Belize	Cambodia	Sri Lanka
Age of child	-0.115 (19.67)	44.88[c] (15.65)	9.51 (11.93)
(Age of child)^2	0.040 (0.756)	-1.51[b] (0.60)	-0.309 (0.457)
No. of children in the household	-0.181 (0.221)	-1.60[b] (0.206)	-0.755 (0.163)
Gender of child (0=girl, 1=boy)	4.37[c] (0.94)	-2.31[c] (0.570)	0.705 (0.820)
Age of household head	-	-0.037 (0.033)	-0.050[b] (0.021)
Education level of most educated male adult	-	1.19[c] (0.09)	0.312[c] (0.091)
Education level of most educated female adult	-	1.74[c] (0.104)	0.660[c] (0.072)
Work hours	-1.57[c] (0.14)	-0.781[c] (0.083)	-0.411[c] (0.083)
(Work hours)^2	.00007 (.001)	-0.020[c] (0.006)	-0.001[c] (0.0001)
Domestic hours	-.00 (.003)	0.148[c] (0.058)	0.007 (0.007)
Rural dummy	-	-0.967 (0.859)	-
Number of observations	1894	6318	4672

(a) Figures in brackets are standard errors.

(b) Statistically significant at 5% significance level.

(c) Statistically significant at 1% significance level.

Table 48: Summary of methodology and main results

Description	Details
A. Motivation	Attempt an answer to the question: Does a limited amount of child work in the age group 12-14 years "prejudice attendance at school"?
B. Estimation, methodology used	1. Multinomial logit estimation and calculation of marginal probabilities. 2. OLS, IV regression of child schooling and other learning variables on child labour hours and other determinants. 3. Simultaneous equation estimation of child schooling and child labour hours equations. 4. Tobit estimation to account for truncation of child labour hours at zero.
C. Data sets used	SIMPOC surveys in Belize, Cambodia, Namibia, Panama, Philippines, Portugal and Sri Lanka.
D. Principal features of data	1. Current school attendance rate varies from the low rate of Namibia to the high rates of Portugal and Sri Lanka. 2. The schooling indicators in Sri Lanka are particularly impressive considering its status as a developing country. 3. Working children in the age group 12-14 years in Sri Lanka work considerably fewer hours than in the other countries considered here. 4. Domestic chores constitute a significant share of the child's total workload. 5. Graphs show that work hours do adversely affect both school enrolment rates and the other indicators of learning.

Table 48 Summary of methodology and main results (continued)

Description	Details
E. Estimation results	1. The individual country results show that, with the exception of Namibia and Sri Lanka, child work adversely affects both school enrolment and the school outcome variables from the first hour of child labour. 2. The Sri Lankan evidence suggests an inverted U-shaped relationship between child schooling and child labour hours. 3. The principal qualitative conclusions are generally robust between single and simultaneous equations methods and to the incorporation of weights in the raw data used in the estimation. 4. The school enrolment rate is the most sensitive to the use of weights in the calculations. 5. The use of IV estimation generally worsens the adverse impact of child labour on child schooling. 6. The use of Tobit estimation to deal with the truncation of child labour hours at zero similarly worsens the adverse impact of child labour on child schooling. In case of Sri Lanka, the week support in favour of ILO Convention No. 138, Art. 7[(b)], via an inverted U-shaped relationship between child schooling and child work, disappears completely with the appearance of a strong monotonically decreasing relationship between the two in the presence of Tobit estimation.
F. Lessons learnt	Recommendations for future surveys: (i) Questions on whether work affects study should be asked more regularly and uniformally across countries. (ii) Information needed on community variables such as whether there is an active school enrolment programme in the community, travelling times to work/school, etc. (iii) Data sets should contain information on non-school education that is an important source of learning in many traditional rural communities.

Appendix B: Figures

Fig 1(a): Relation between working hours and current attendance in Belize

Fig 2(a): Relation between working hours and current attendance in Cambodia

Fig 3(a): Relation between working hours and current attendance in Namibia

Fig 4(a): Relation between working hours and current attendance in Panama

Fig 5(a): Relation between working hours and current attendance in the Philippines

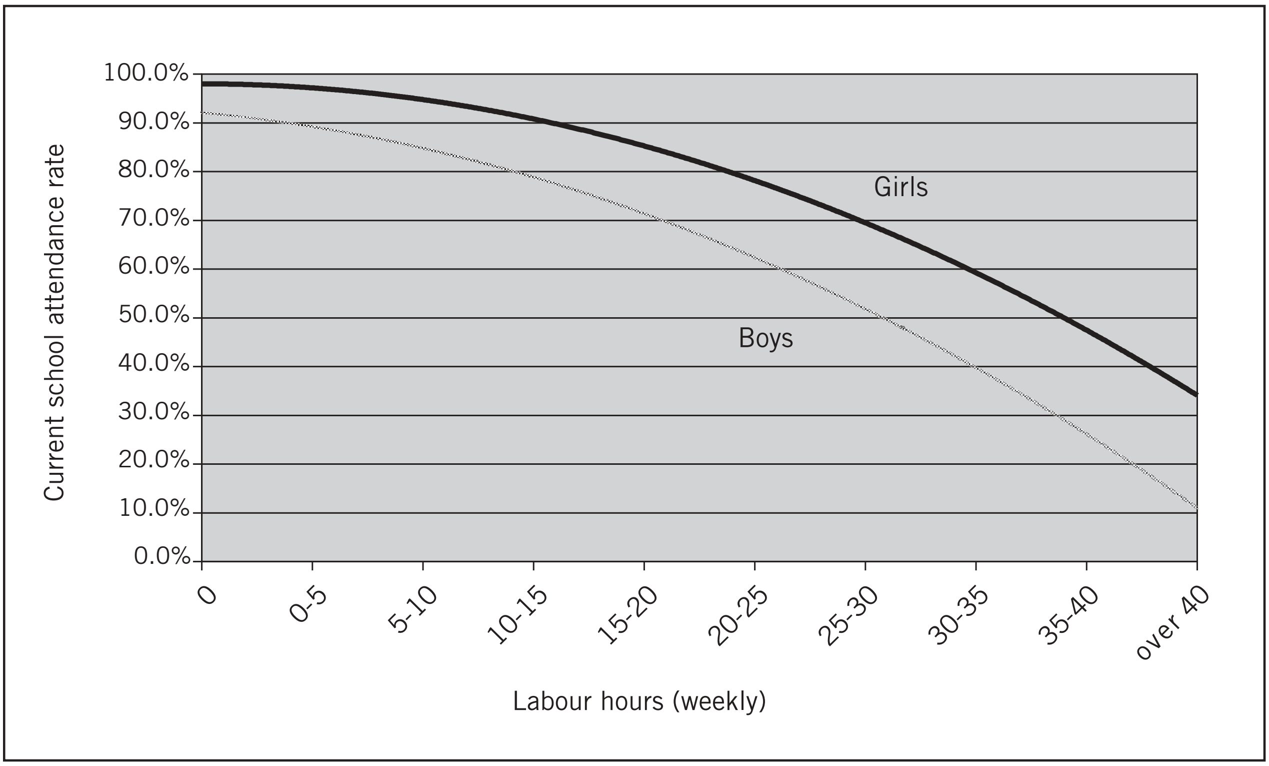


Fig 6(a): Relation between working hours and current attendance in Portugal

Fig 7(a): Relation between working hours and current attendance in Sri Lanka

Figure 1(b): Relation between working hours and SAGE in Belize

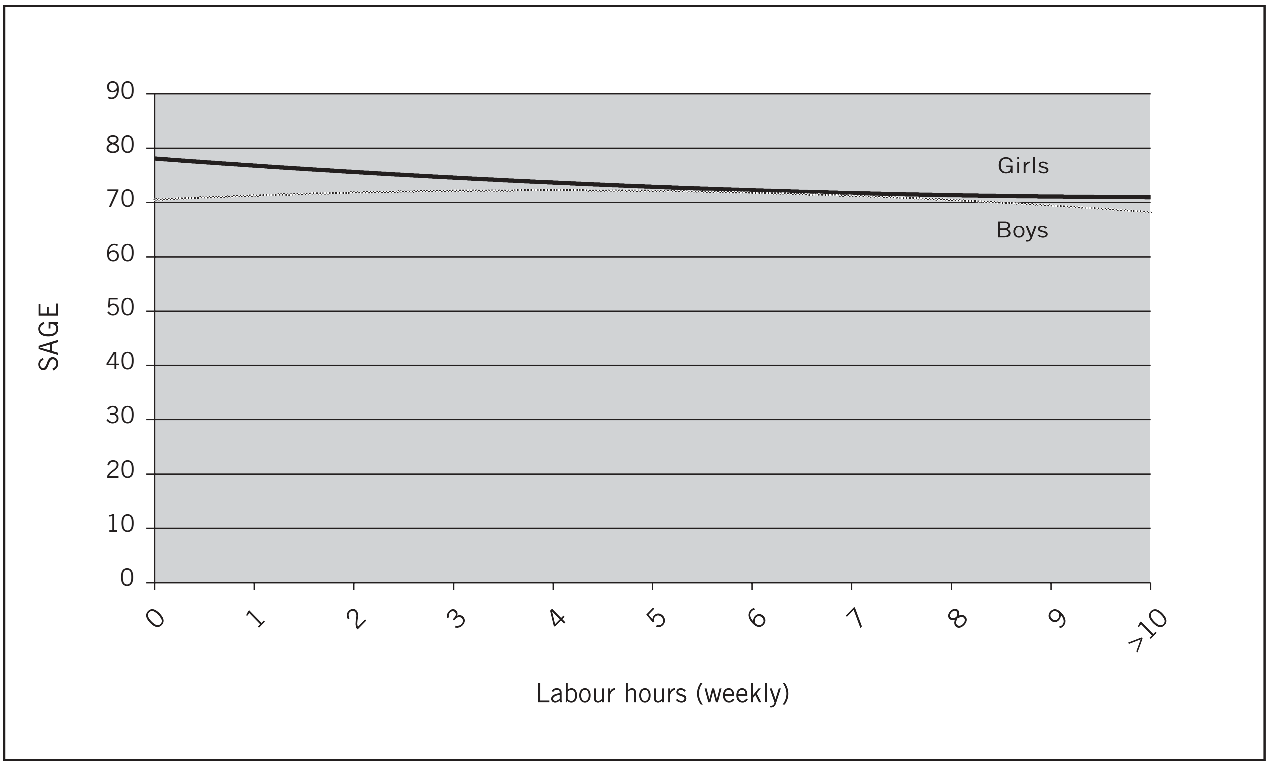


Figure 2(b): Relation between working hours and SAGE in Cambodia

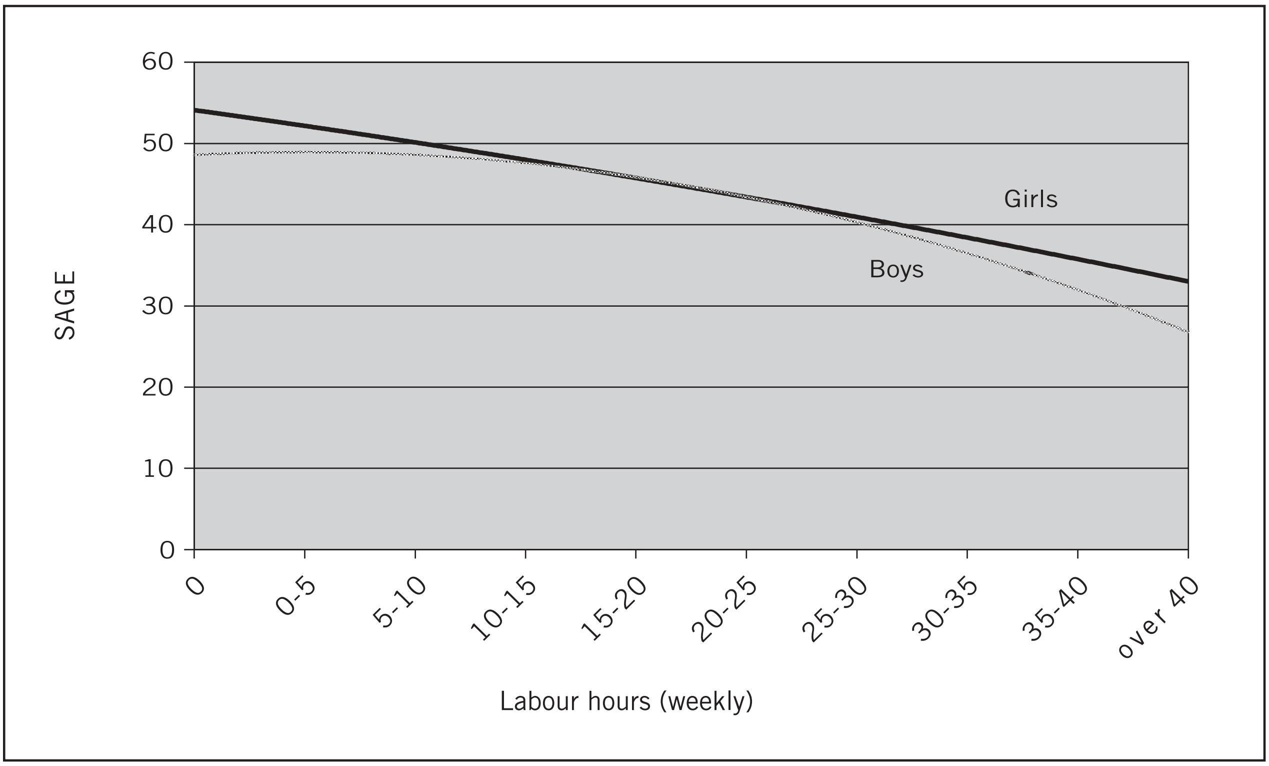


Figure 3(b): Relation between working hours and schooling in Namibia

Figure 4(b): Relation between working hours and SAGE in Panama

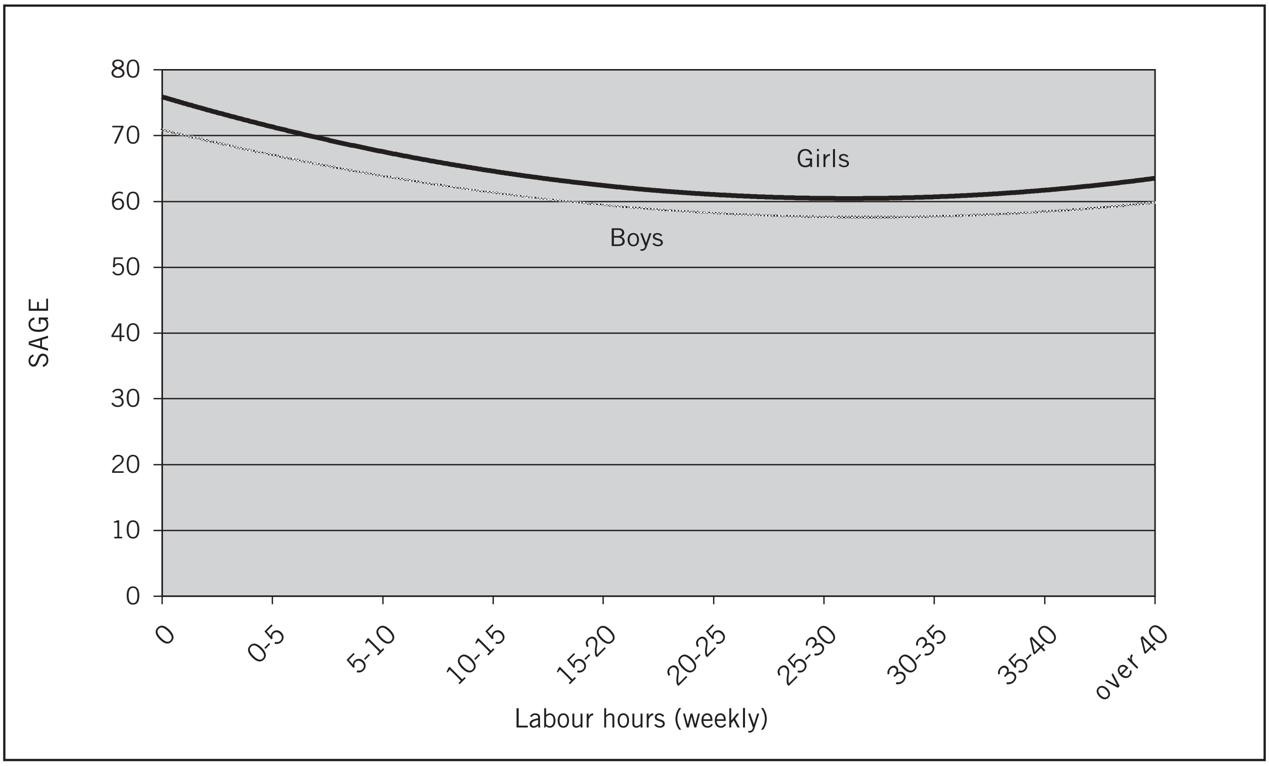


Figure 5(b): Relation between working hours and schooling in the Philippines

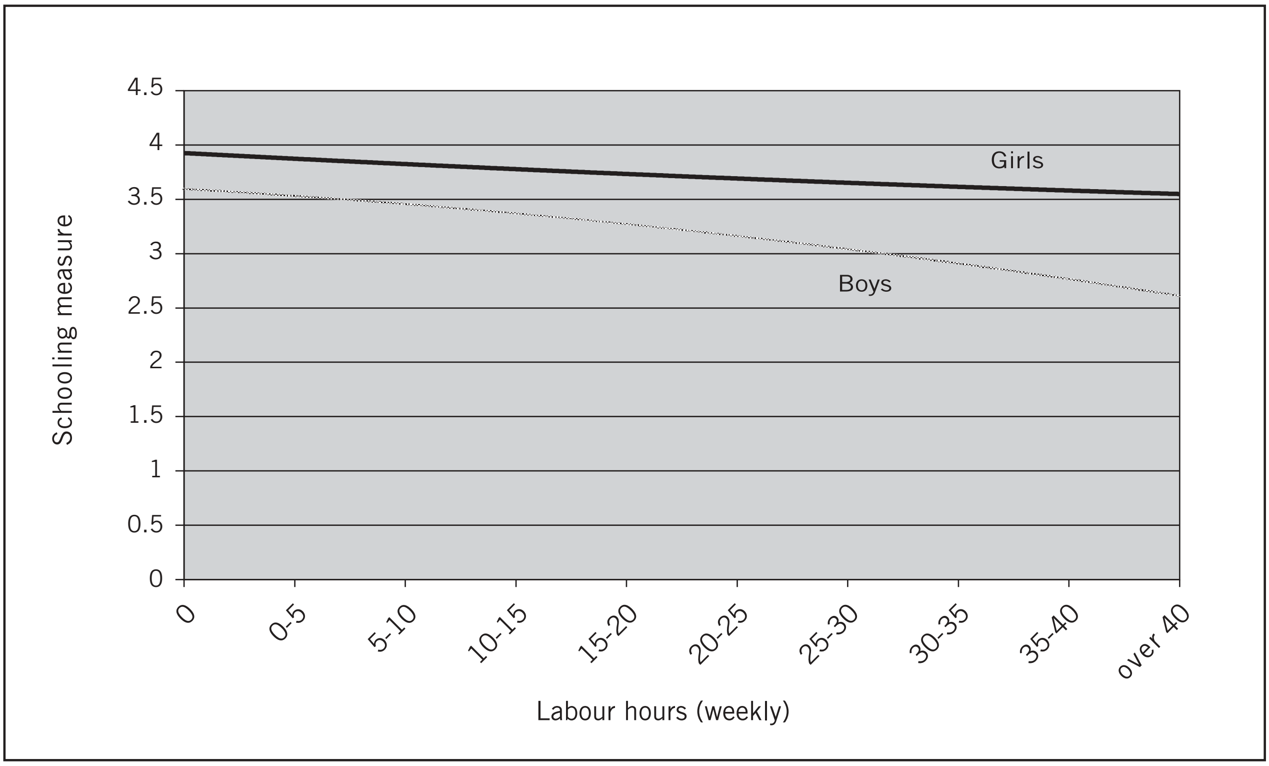


Figure 6(b): Relation between working hours and schooling in Portugal

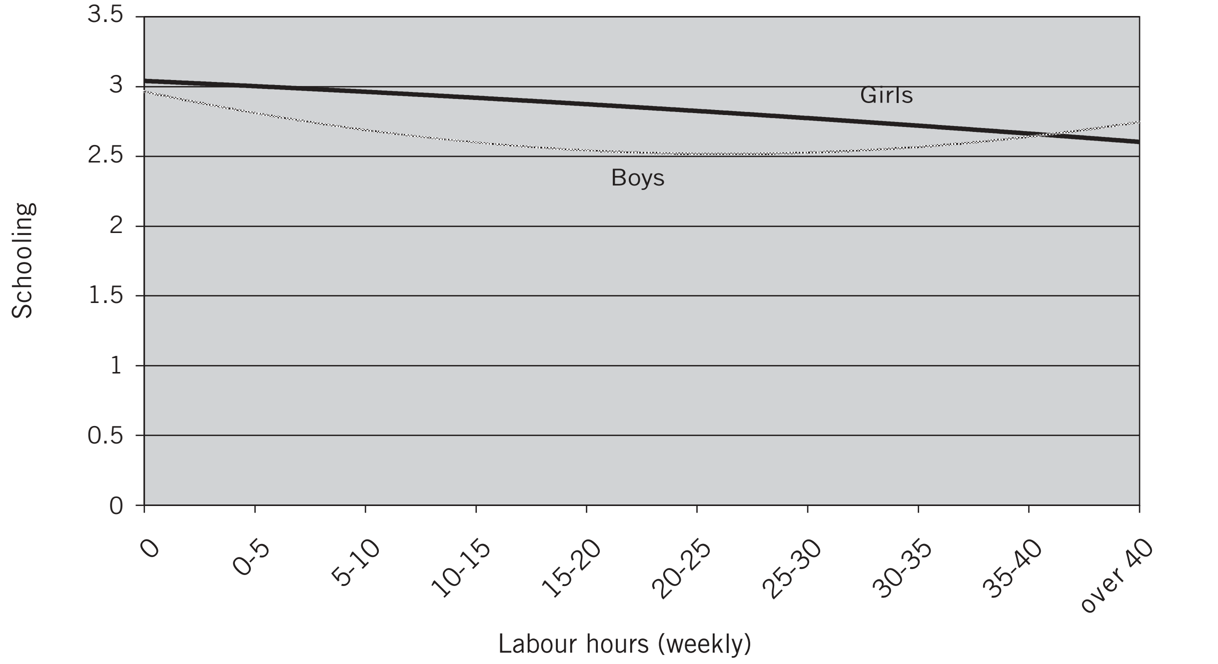


Figure 7(b): Relation between working hours and SAGE in Sri Lanka

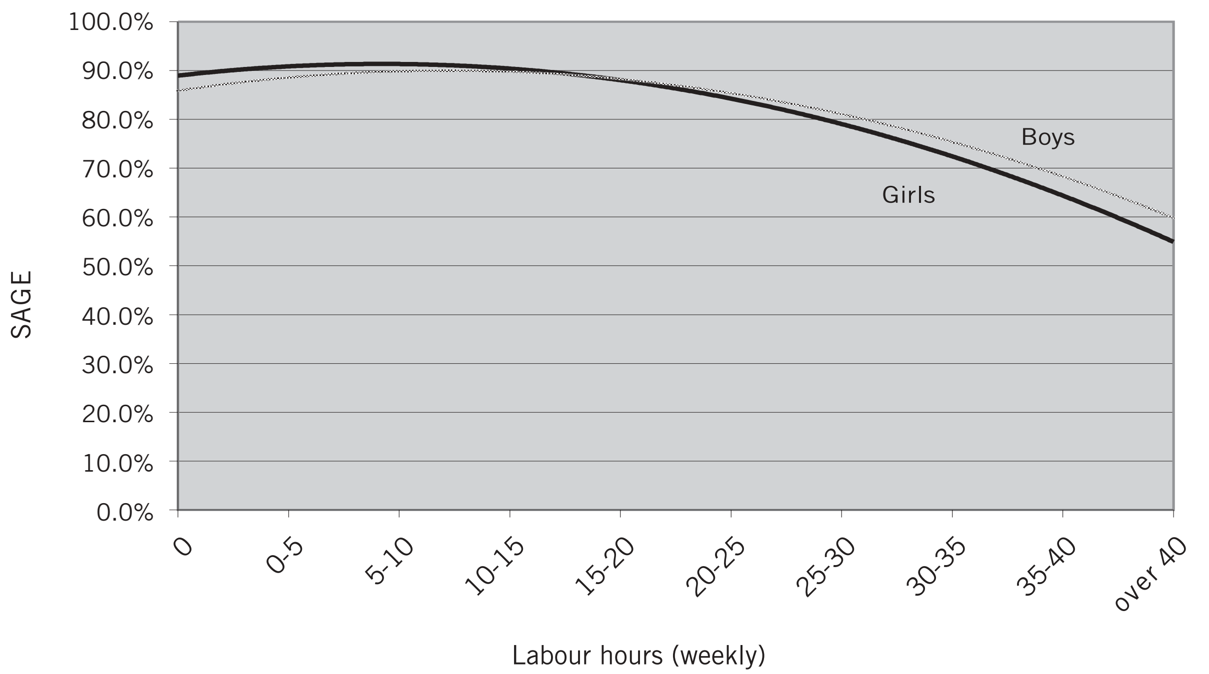


Fig 8(a): Relationship between mean study time and child ages in Sri Lanka

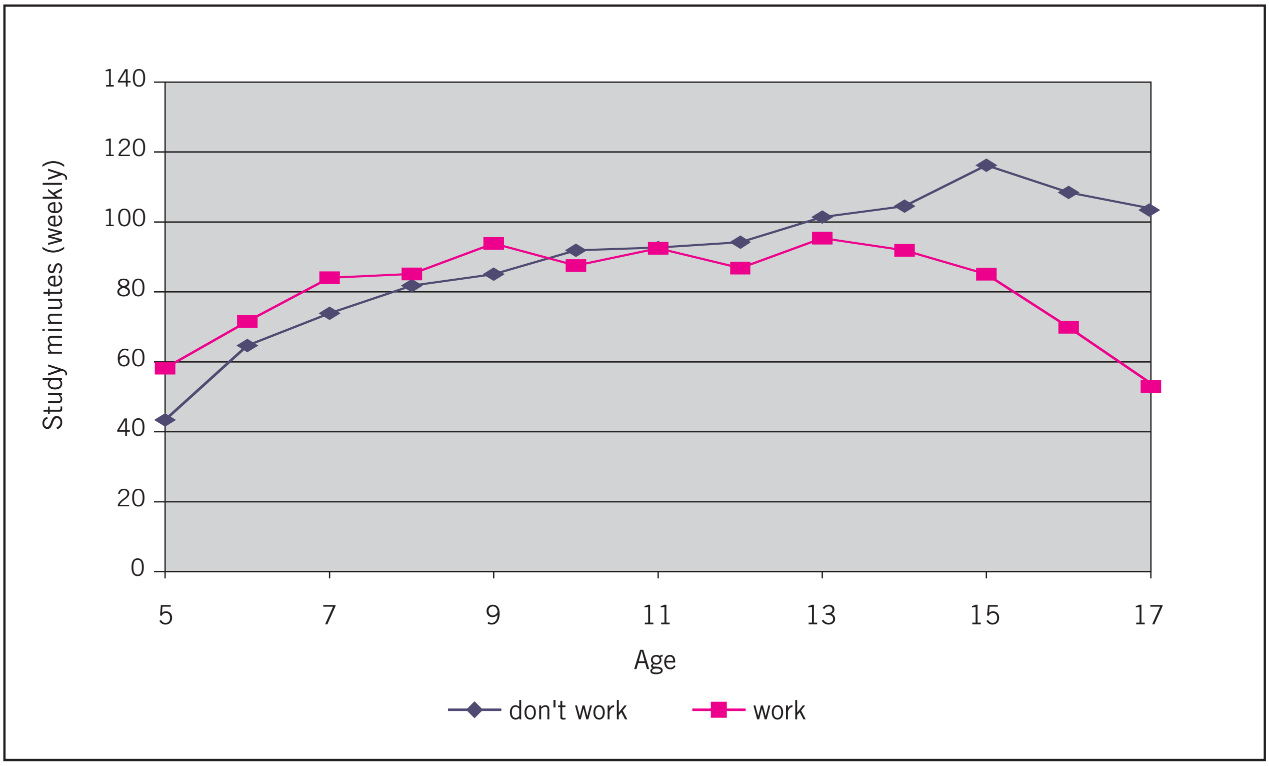


Fig 8(b): Relationship between mean study time and child age for Sri Lankan children who attend school

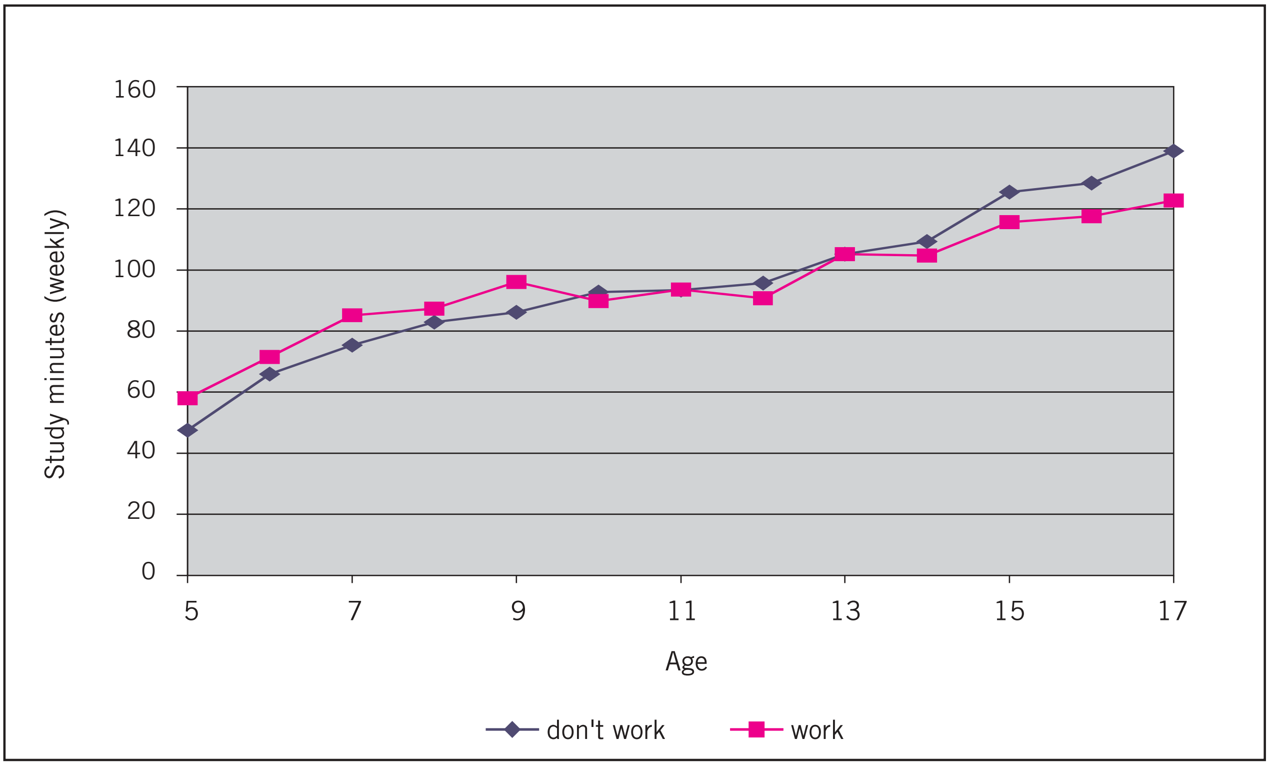
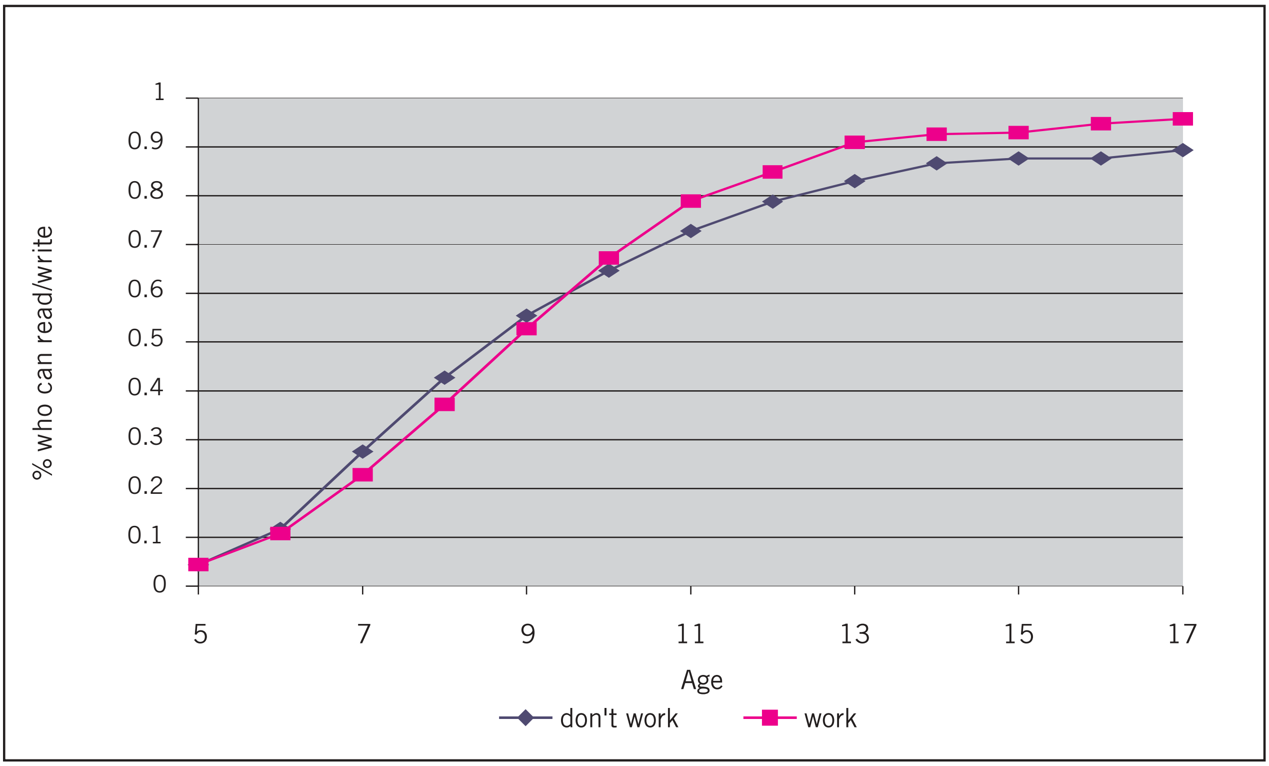


Fig 9: **Relationship between the percentage of children who can read/write and child age in Cambodia**



Appendix C

The relation between working hours and schooling in the presence of sectoral, occupational and gender disaggregation: The Philippines' evidence

With the exception of the Sri Lankan evidence presented in Section 5, the discussion in the main body of the paper has assumed away the presence of occupational shifts in the relation between school performance and the child's labour hours. In the regressions reported in the paper, we have admitted sectoral shifts between the rural and urban sectors and gender shifts between boys and girls via appropriate dummies. The most significant result here and, one that holds generally, is that girls perform better than boys on both school enrolment rates and on the years of schooling received. This is evident from the estimated regression results and, also, from the graphs depicting the relationship between the child hours and the schooling variables drawn separately for boys and girls for each of the seven SIMPOC data sets.

In this Appendix, we extend our approach by allowing for the occupation of the child to have an impact on the child's school enrolment and on her school performance. The evidence from the Philippines is presented in this Appendix. Table C1 shows the variation in the rate of current school attendance between the following four occupational groups of chid labour: (i) Fishing, (ii) Trade, (iii) Agriculture and (iv) Others. We have, also, calculated as a comparative benchmark the school attendance rate of children who do not work. Table C1 shows that the school enrolment rates vary considerably between the occupational groups from the high rate of 92.21 per cent for children employed in the Trade occupation to the low of 63.46 per cent for children employed in Fishing. Note that the former school enrolment rate is only marginally below the school enrolment rate of 93.95 per cent for the non workers. These results are reconfirmed by the logit estimation of the child's school enrolment reported in Table C2. With the trade occupation adopted as the omitted category, the significant, negative coefficient estimate of the Fishing dummy confirms that, ceteris paribus, children employed there have a lower probability of attending school than those employed in the Trade occupation. A similar result holds for children employed in the "other" occupational category vis-vis those in Trade. Of the other determinants, girls perform better than boys in school enrolment, children from female headed households are less likely to attend schools than other children, and there is no significant rural urban difference in the school enrolment rates.

Table C3 presents the OLS and IV estimates of the "years of schooling" equation in the presence of sectoral, gender and occupational dummies. While the IV results show no evidence of significant occupational effects on the length of schooling received by the child, the OLS estimates point to significantly lower schooling received by children in occupation category 3 consisting of agricultural, animal husbandry and forestry workers, fishermen and hunters. Of greater significance in the context of the present study is the result that, even in the presence of the occupational dummies, work hours impact negatively on the child's schooling years. This result is robust between the OLS and the IV. Note, also, that controlling for the endogeneity of the labour hours worsens the negative impact of child labour on schooling, consistent with the evidence reported above for the other countries.

Table C1: Variation of school attendance rates between occupations in the Philippines

Category	School attendance rate[a]
Fishing	0.635 (0.484)
Trade	0.922 (0.268)
Agriculture	0.786 (0.410)
Others	0.785 (0.412)
Non-workers	0.940 (0.238)

[a] Figures in brackets indicate standard errors.

Table C2: Logit coefficient estimates[a] of school enrolment in the Philippines

Variable	Coefficient estimate
Age of child	1.15 (4.18)
(Age of child)^2	-0.08 (0.16)
No. of children in the household	.008 (.040)
Gender of child (1=boy, 2=girl)	.396[b] (.162)
Gender of household head (1=male, 2=female)	-.728[b] (.307)
Education level of most educated male adult	.130[c] (.042)
Education level of most educated female adult	.092[b] (.044)
Years of schooling	.479[c] (0.062)
Rural dummy	.175 (.162)
Fishing dummy	-.836[b] (.359)
Agriculture dummy	-.354 (.283)
"Other" dummy	-.673 (.345)

(a) Standard errors in brackets.

(b) Statistical significance at 5% significance level.

(c) Statistical significance at 1% significance level.

Table C3: Regression coefficient estimates[a] of years of schooling in the Philippines[i]

Variable	IV[g], [i]	OLS[h], [i]
Age of child	-5.76 (8.61)	5.57[f] (1.67)
$(\text{Age of child})^2$	0.26 (0.33)	-0.19[f] (0.06)
Seasonal dummy	-1.19 (0.71)	.28[f] (.06)
Years of work	-0.05 (0.08)	0.01 (0.02)
Gender of child (1=boy, 2=girl)	-0.16 (0.34)	.32[f] (.06)
Rural dummy	-0.027 (.274)	-.113 (0.065)
Occupational category No. 1 dummy[b]	.215 (.52)	.139 (.13)
Occupational category No. 2 dummy[c]	-1.77 (1.02)	-.028 (.16)
Occupational category No. 3 dummy[d]	-.19 (.49)	-.483[f] (.11)
Work hours	-.99[e] (.43)	-.03[f] (.006)
$(\text{Work hours})^2$	.015[e] (.006)	.0002[f] (.0001)
	Test for H_o: Difference in coefficients is not systematic $\chi_1^2 = 86.27$[f]	

[a] Figures in brackets are standard errors.

[b] Occupational category 1 consists of clerical and related workers

[c] Occupational category 2 consists of service workers

[d] Occupational category 3 consists of agricultural, animal husbandry and forestry workers, fishermen and hunters.

[e] Statistically significant at 5% significance level.

[f] Statistically significant at 1% significance level.

[g] IV: Root MSE = 5.0151

[h] OLS: R2 = 0.2502, $\bar{R}^2 = 0.2453$, Root MSE = 1.2053

[i] F tests for Joint Significance: IV: F(11,1698) = 3.30[f], OLS: F(11,1698) = 51.50[f]

[j] Number of observations = 1710.

Appendix D: List of "elementary occupations" in the Sri Lankan survey

Sales and services elementary occupations

Street vendors, mobile vendors, and related workers
(Not having a permanent business place)

Street food (various food items) vendors

Street and highways salesman of lottery, newspapers, magazines, etc.

Street and highways vendors of vegetables and fruits

Street and highways betels vendors

Street and highways fish mongers

Door-to-door sales persons (including bottles and paper collectors)

Other street and highways sales persons

People engaged in self-employment in temporary stalls or similar places

Sellers in religious premises of items such as oil, flowers, incense sticks, etc.

Sellers in king coconuts/young coconuts

Sellers of vegetables, fruits, food items, etc. in fairs and temporary stalls

Sellers of ornamental fish, other beautiful animals, fancy items, clay items and toys

Sellers or related other items

Other street services

Shoe, umbrellas, bags, etc., repairers

Porters

Other services suppliers in streets and highways

Domestic helpers and related other workers

Child care takers

Kitchen workers (preparation of foods, washing plates, sauces, etc.)

Wheel chair helpers

Gardening workers (flower planting, watering, fertilizing, weeding and so on)

Launders

Other domestic work related workers