



Does school quality matter for working children?

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As part of broader efforts towards durable solutions to child labor, the International Labour Organization (ILO), the United Nations Children's Fund (UNICEF), and the World Bank initiated the interagency Understanding Children's Work (UCW) project in December 2000. The project is guided by the Oslo Agenda for Action, which laid out the priorities for the international community in the fight against child labor. Through a variety of data collection, research, and assessment activities, the UCW project is broadly directed toward improving understanding of child labor, its causes and effects, how it can be measured, and effective policies for addressing it. For further information, see the project website at www.ucw-project.org.

This paper is part of the research carried out within UCW (Understanding Children's Work), a joint ILO, World Bank and UNICEF project. The views expressed here are those of the authors' and should not be attributed to the ILO, the World Bank, UNICEF or any of these agencies' member countries.

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ABSTRACT

This paper aims to begin to fill in the gap about the possible role of school quality in affecting household decisions relative to children's work and school attendance. While from a theoretical point of view, we would expect school quality to be an important determinant of household decisions, as it influences expected return to education, there is almost no empirical evidence available on the matter.

We first review evidence based on cross country data to assess whether some clear stylized fact can be identified: cross country data show that children's work and school attendance are negatively (positively) correlated to a few of the available school indicators. Subsequently, we use micro data for Yemen (YNPS, 1999 and Yemen School Based Survey, 1999/2000) and Cambodia (CSES and EMIS, 2003/2004) to identify the effects of school quality on school attendance and children's work, and results become more definitive. Our findings suggest that school quality matters for working children: better schools do reduce participation to economic activities and increase school attendance.

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1. INTRODUCTION

1. Increasing attention is being devoted to the quality of education in both developed and developing countries. The outcome of the PISA studies² has helped focus the attention of the policy makers and researchers on what pupils are actually learning at school, making it the focus of an intense debate. School quality is assuming an increasing relevance not only in high and middle income countries, but also in low income countries. As enrolment rates increase, developing countries are facing the challenge of supplying children and society at large with “quality” education.

2. School quality is mainly measured in terms of student achievement (using various indicators) and there now exists a substantive body of literature showing that returns to education are significantly affected by the quality of the student and hence by the quality of education. As returns to education are also a proxy for labour productivity, the crucial role of education quality in the growth process is evident.

3. Significant attention has been given in the literature to the analysis of the determinants of school quality, though we are far from achieving a generalized consensus. For a recent review the reader can refer to EFA report (UNESCO, 2005).

4. Much less attention has been paid to the role of school quality in determining school attendance and involvement of children in work. The allocation of children’s time across different activities depends, among other things, on the relative returns of such activities. To the extent that school quality affects returns to education, it also influences the household decisions concerning the investment in children’s human capital.

5. The question also has strong policy relevance, as it concerns the issue of whether, in order to promote school enrolment and to reduce child labour, provision of “quality” education is essential to ensuring access to school. It is obvious that better quality education is preferable in general, if school are accessible. It is also clear that without adequate access, little benefit can be derived from improving quality. However, in several countries a decision must be made on whether, at the margin, to use additional resources for improving access or quality. Empirical evidence to support such decisions is still very scarce and this paper aims to begin filling this gap.

6. We first review evidence based on cross country panel data to assess whether some clear stylized facts can be identified. Subsequently, we use micro data for Yemen and Cambodia to identify the effects of school quality on school attendance and children’s work. These countries have witnessed a substantial expansion of primary education, but they still have some access problems, especially in rural areas and for secondary education. The countries considered therefore represent an interesting case to evaluate the relative importance of the intensive and extensive margin of school provision. Moreover, for both countries we had access to school information, allowing us to generate a relatively large number of school quality indicators.

7. Before entering the core of the paper, we need to briefly review the discussion on school quality indicators and to describe the few results available in the literature on the effects of school quality on children’s work. The next section addresses these issues.

² Programme for International Student Assessment of the OECD

2. INDICATORS OF SCHOOL QUALITY

8. Substantial efforts have been devoted by researchers to the identification of the determinants of school quality, as measured by students' achievements. Two main strands of literature have emerged: one based on the so called "production function" approach and the other more linked to a synthetic approach. While an impressive amount of evidence is available, we are far from having achieved a consensus on what are the most relevant school characteristics affecting educational outcomes. The 2005 EFA report (UNESCO, 2005) contains an excellent recent survey of the literature and we therefore do not need to review the issue in detail here.

9. The following figure, from a USDOE publication³, offers a useful framework to identify the main set of variables that can be expected to affect student achievement and we refer to this publication and to the literature cited therein for a detailed discussion of the rationale behind the use of different indicators. The more frequently used school quality indicators (pupil/teacher ratio, class size, etc.) can be easily be derived from this framework.

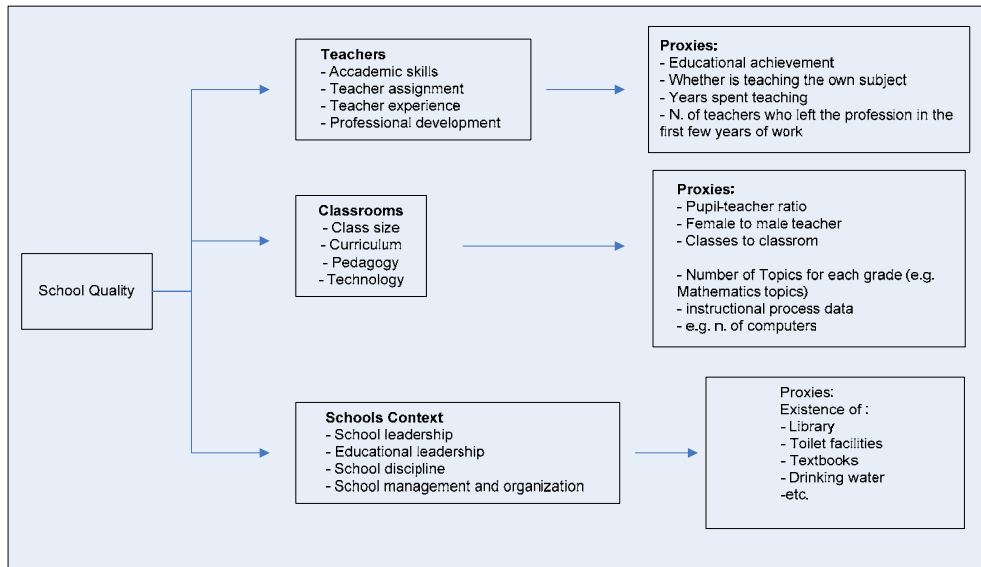
Figure 1



10. Translating the complex relationships illustrated by Fig.1 into measurable indicators is a different challenge. The next graph illustrates how the set of indicators commonly used can be mapped back to this framework. As it is easy to see, the proxy indicators used in empirical studies only partially reflect the main profiles defining school quality. In fact, the limited availability of satisfactory information on school quality, is one of the issues that future research should address.

³ U.S. Department of Education. National Center for Education Statistics. Monitoring School Quality: An Indicators Report, NCES 2001-030 by Daniel P. Mayer, John E. Mullens, and Mary T. Moore. John Ralph, Project Officer. Washington, DC: 2000.

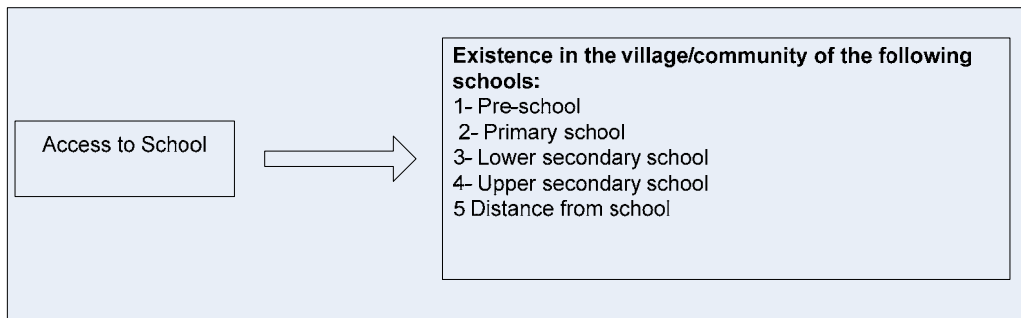
Figure 2



11. Data availability severely limits the number of indicators that can be actually employed in the estimates. This means that we will be able to test the relevance and the relative role of only a subset of the components of school quality. This also implies that our results should be interpreted with some care, as they will refer to the effects of only some aspects of school quality on children's work. The recent literature on the matter has in fact indicated that the link between components of school quality and student achievement is complex, and that measuring school "quality" in a synthetic way is a difficult task.

12. Finally, we also employ indicators of school accessibility in the country studies. While such indicators do not pose the same conceptual problems as those relative to school quality, their availability is far from common. The figure below summarises the set of indicators of school accessibility that could be expected to be relevant from a theoretical point of view.

Figure 3



3. SCHOOL QUALITY, CHILD LABOUR AND ATTENDANCE: CROSS COUNTRY EVIDENCE

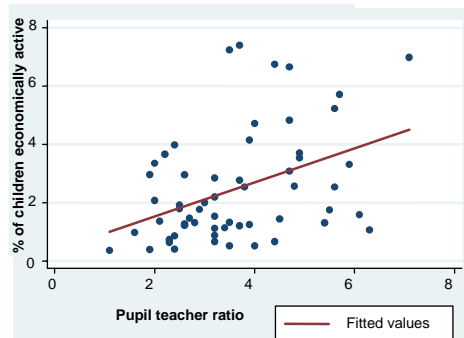
13. In this section we present evidence on the relationship between school quality and children's work using cross country panel data in order to see whether a few stylized facts can be identified.

14. Using the information on a set of indicators of school quality published by UNESCO⁴, and the data on working children elaborated by the UCW Project,⁵ we have built a database consisting of school quality indicators and children's involvement in work for about 70 developing countries. Note that children's work is defined as the participation rate in economic activities of children aged 7 to 14 years,⁶ and does not include either children engaged in unofficial work activities or children performing household chores.

15. Figure 4a shows that pupil teacher ratio is strongly and positively correlated with the percentage of working children. As the number of students per each teacher increases, the percentage of working children in each country rises. The variation around the simple regression line indicates that, not surprisingly, several other factors are at work. The relationship between pupil-teacher ratio and children's work does not seem to be significantly differentiated by gender (fig 4b-4c).

Figure 4. Pupil teacher ratio versus working children

Figure 4a - Pupil teacher ratio versus working children



Source: Pupil teacher ratio Unesco 2005 EFA; Working children: UCW calculation based on household surveys, various countries

Figure 4b - Pupil teacher ratio versus male working children

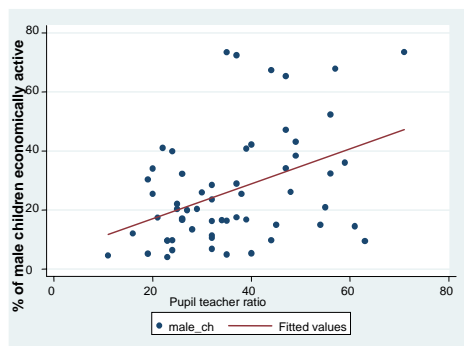
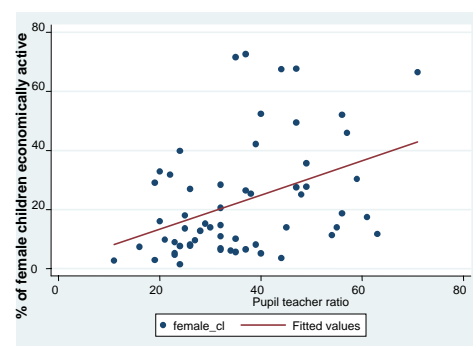


Figure 4c - Pupil teacher ratio versus female working children



⁴ EFA report ,2005

⁵ Understanding Children's Work Project (UCW). www.ucw-project.org

⁶ The age range is 10-14 for the following countries: Argentina, Burkina Faso, Cameroon; age range 12-14 for Mexico

16. The sex of the teacher has a clear association with the level of child labour. Fig. 5a-5c show a negative relationship between the presence of a female teacher and the percentage of working children. Again, there is a wide range of variability in correspondence of the lowest level of working children. The potential role of female teachers in attracting and retaining girls in school is easy to understand in countries where a large gender bias in education is present. However, it has also been shown⁷ that, beside the role of female teachers in overcoming social barriers, pupils taught by female teachers have better performance and are less likely to drop out from school than pupils taught by male teachers. The lack of substantial gender differences in the relationships between children's work and the female to male teacher ratio (Fig. 5 b -c) seems to lend support also to the latter interpretation.

Figure 5. Percentage of female teacher versus working children

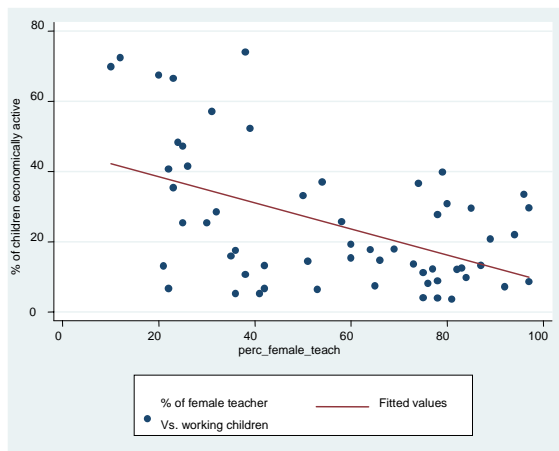


Figure 5b - Percentage of female teacher versus male working children

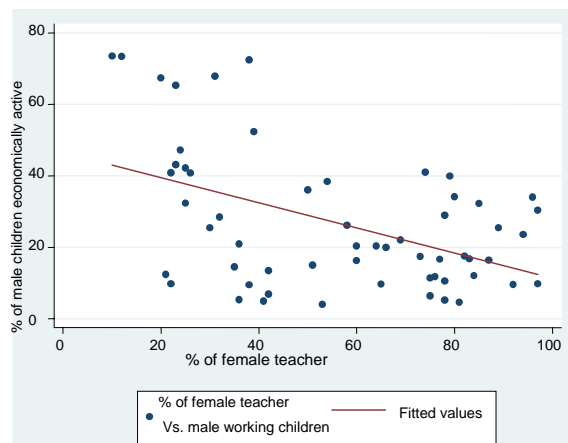
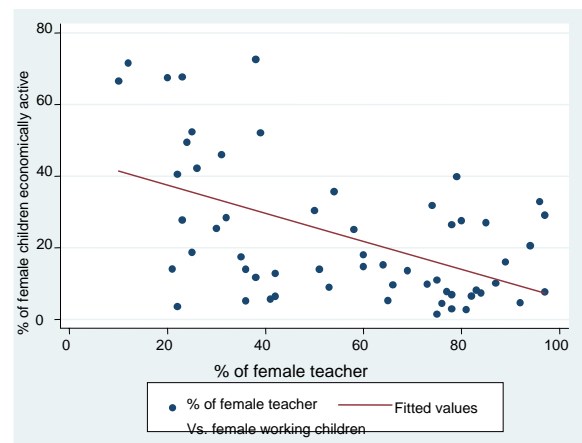


Figure 5c - Percentage of female teacher versus female working children



Source: Percentage of Female teacher, Unesco 2005 EFA; Male working children: UCW calculation based on hh survey, various countries

17. Finally, we have considered the level of expenditure per pupil in primary education as a proxy for the amount of public investment in the human capital of primary school aged children. The expenditure on primary education is a key factor

⁷ Postlethwaite T. N. 2004. *What do International Assessment Studies tell us about the Quality of School Systems?* Background paper for EFA Global Monitoring Report 2005.

for increasing the enrolment rate, as it denotes the priority that a country devotes to that specific level of education in the formulation of the national policy. The following figures show the relationship between school attendance, child economic activity and the public current expenditure on primary education per pupil, respectively.

18. The figures show a strong positive correlation between expenditures per pupil and school attendance and a clear, but less marked, negative correlation between child economic activity and the level of expenditure. Improving the quality of the schools could help to reduce child labour and to bring children to school or to prevent them from dropping out of school.

Figure 6. Public expenditure on primary education per pupil vs. net enrolment ratio in primary education

Figure 6 a - Male enrolment

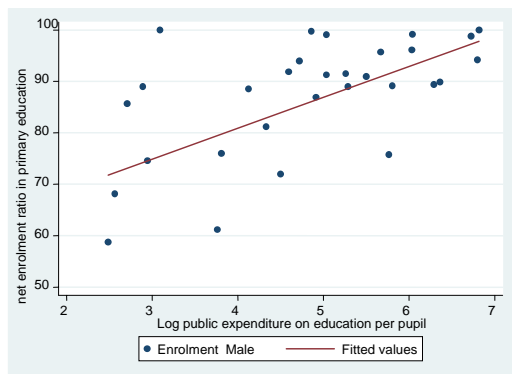
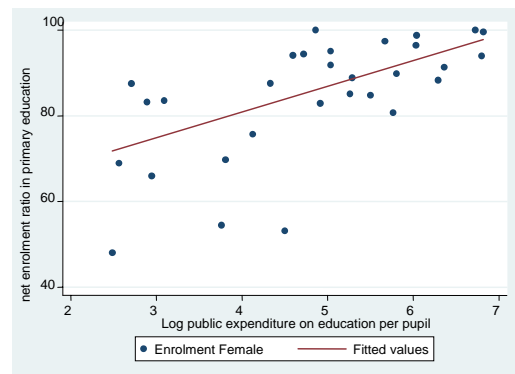


Figure 6 b - Female enrolment



Source: Public current expenditure on primary education per pupil (unit cost), Unesco 2005 EFA; net enrolment ratio in primary education, Unesco 2005 EFA

Figure 7. Public expenditure on primary education per pupil vs. working children

Figure 7b - Male working children

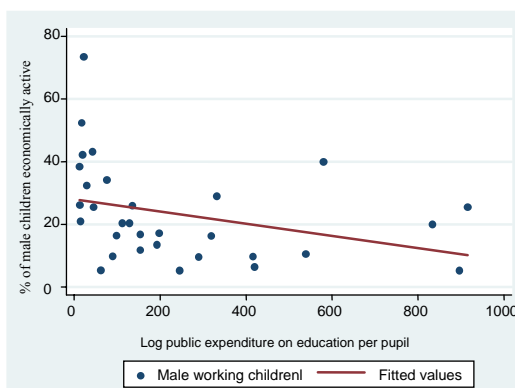
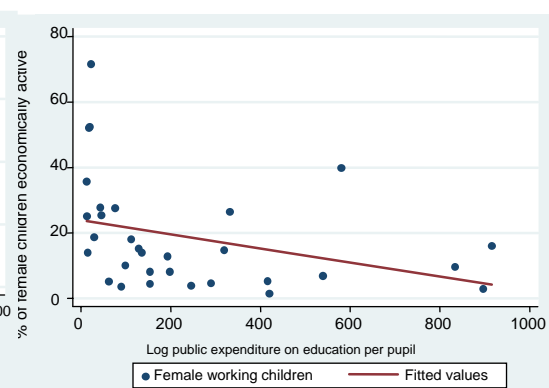


Figure 7c - Female working children



Source: Public current expenditure on primary education per pupil (unit cost), Unesco 2005 EFA; Working children: UCW calculation based on hh survey, various countries;

19. In conclusion, if we look at cross country data we find evidence of a negative relationship between school quality and child labour. Such evidence must, however,

be considered with care as several factors might be at play in influencing both children's work and school quality.

4. CROSS COUNTRY PANEL ESTIMATES

20. Simple correlations shown in the previous section, while suggestive, do not offer firm evidence. We used cross country panel data sets to assess whether it was possible to establish a more solid relationship between school quality and children's work.

21. Unfortunately, limitations in data availability across countries and time did not allow us to use the same set of indicators discussed above.

22. The panel dataset we used includes information on child labour, education, indicators of school quality, trade policy and GDP. The data were collected from various sources for a set of developing countries, and cover the period from 1960 to 1990 in 4 waves at 10 year intervals. The panel data constructed from Barro-Lee⁸ to measure educational quality across countries constitutes the main source of school quality indicators. The additional data on national accounts indicators were collected from the paper of Barro-Lee⁹ "Data set for a panel of 138 countries". It includes data divided into the following broad categories: national accounts of income; education; population/ fertility; government expenditures; PPP deflators; political variables; trade policy and others. Finally, data on child labour were collected from the World Bank Development Indicators, 2004.

23. The participation rate of children aged 10 to 14 was regressed on a set of school quality indicators and other controls. In particular, we have used in the estimates the following indicators of school quality: the pupil teacher ratio at primary and secondary school, the average real salary of primary school teachers, the ratio of real salary of primary school teacher to real per capita GDP, the repetition rate at primary and secondary school, and the educational expenditure per pupil at primary and secondary school. The other controls included the log of GDP, various measures of the degree of openness of the economy and regional dummies.

24. The results of the panel estimates, independently of the specific technique used, are however very imprecise and unstable. The significance of coefficients depends heavily on the combination of variables used and most of the school quality indicators are not significant. This fact can be due to the quality of the data or reflect the actual nature of the phenomena. The data on school quality indicators cover an uneven number of countries and time periods, so that the sample often changes substantially with the specification used. Moreover, as discussed in the previous section, defining school quality is complex and it might be too ambitious to try to identify, through the limited set of indicators available, the relationship object of our attention.

25. From the cross country analysis carried out we can conclude that there is some evidence of a negative correlation between school quality and involvement of children in work. Such correlation does not, however, withstand the test of more robust estimates. This result can be due either to the unavailability of data suitable for

⁸ Lee, Jong-Wha and Robert J. Barro. "Schooling Quality In A Cross-Section Of Countries," *Economica*, 2001, v68(271,Nov), 465-488

⁹ Barro, R., e J.W.Lee (1994), "Data set for a panel of 138 countries", Washington DC, The World Bank

a cross country – cross time estimates or to the fact that the school quality does not matter much in shaping household decisions regarding child labour.

26. In order to analyze the matter further we now revert to estimates based on country cross sectional data. The results obtained by such an approach are also limited in their relevance by the quality of the data available, as will be discussed in more detail below. They should allow us, however, to draw some more clear-cut conclusions.

5. SCHOOL QUALITY AND CHILD WORK: EVIDENCE FROM CAMBODIA AND YEMEN

27. The availability of school quality data at country level and, especially, the possibility to merge such information with household surveys containing information on children's work and its likely determinants, is very limited. Yemen and Cambodia, as we will discuss in more detail, are among the few countries for which such a possibility exists. Moreover, as the relationship between school quality and children's work is likely to also depend on institutional and cultural factors that are difficult to disentangle within a single country study, focusing on more than one country will help to assess the validity of the results obtained. Even if the data sets available are very rich, however, they are far from optimal as they are not experimental in nature and do not permit dealing fully with the problem of non random assignment.

28. Beyond the possible biases due to non random allocation of school quality across communities, we need to briefly discuss the possible interpretations of our results.

29. As mentioned in the introduction, we do not directly observe school quality (Q), rather we observe a vectors of indicators (X). We can interpret these indicators as inputs to the production of school quality, $Q = f(X)$ or as a subset of a multidimensional quality $X \in Q$. Information on X is then used to make inference on the effects of school quality on work and schooling decisions (W), $W = g(Q) = g(f(X)) = h(X)$. Hence, in interpreting our results we must be careful, as we testing jointly that X is an input (dimension) to (of) Q and that Q affects household decisions. In other words, we cannot identify (unless we are ready to support heroic assumptions) g' and f' separately. We are only able to identify $h' = g' f'$. This implies that if for some subset x of X , $h' = 0$ we will not be able to assess whether this is due to the fact that $g' = 0$, i.e., that Q does not affect household decisions, or that $f' = 0$, i.e., that x does not affect Q . If we are ready to assume that $g'_x = g'$ for all x in X , then if for some x we observe $h' = 0$ and for some x' we have $h' \neq 0$, it follows that $f'_{x'} = 0$ while $f'_{x'} \neq 0$. On the other hand, if we observe $h' > 0$, this implies that both g' and f' are positive

30. Before presenting the estimates of the effect of various school quality indicators on the joint household decision of sending children to work or to school modelled using a bivariate probit, we describe the data employed, review the children's work situation and present the school quality indicators used.

6. DATA AND DESCRIPTIVE STATISTICS

6.1 Cambodia

31. The information on working children, school attendance, school quality and other variables was collected through the Cambodia Socio Economic Survey (CSES) 2003-

2004 and the EMIS (Education Management Information System) 2003-2004. The data on working children and school attendance were drawn from the Cambodia Socio Economic Survey (CSES) carried out from November 2003 to January 2004 by the National Institute of Statistics. The CSES is a national representative survey conducted on a sample of 15,000 households in 867 villages, designed to collect information about the living standard of the population, the extent of poverty and basic indicators to identify determinants and design policy for reducing poverty. In particular, the survey focuses on six main areas: household consumption; household production and cash income; education and access to schooling; health and access to medical care; housing and amenities; family and social relation. The survey collects information on working children starting from the age of 10 years.

32. The indicators of school quality are drawn from the survey EMIS (Education Management Information System) carried out during the school year 2003-2004. The survey focuses on pre-school, primary and secondary education and includes information on student, teacher, buildings and school facilities. It also includes information on the participation of the community to the school activities.

33. The information is collected from the "Education Management Information System" (EMIS) Center of the Department of Labor (DoP) of Ministry of Education, Youth and Sport (MoEYS). The EMIS center uses the Annual School Census Forms (ASCF) to collect the data. The forms are distributed to all the schools on an annual basis through the provincial and district education services. The school principals are responsibility for filling the forms and the district and provincial offices for collecting, checking and returning the forms to DoP.

34. The regression analysis is carried out using a dataset constructed by merging the information collected at the commune level from the EMIS 2003-2004 with the information collected through the CSES 2003-2004 at the individual level.

6.2 Yemen

35. Information on working children, school attendance, school quality and other variables was collected through two different surveys, the Yemen National Poverty Survey (YNPS 1999) and the Yemen School Based Survey (1999-2000).

36. The child labour descriptive evidence is based on YNPS 1999. The survey involves a stratified sample of 54,000 households and is designed primarily to provide information on access to services and other aspects of the living standards at the district level. It collected also detailed information of other broad areas: health and access to health center; family planning, breastfeeding and child nutrition; housing and consumer durables; and access to community services. Information on education and working activities for all the household members are collected, starting from the age six with regard to education and from the age five with regard to the working activities.

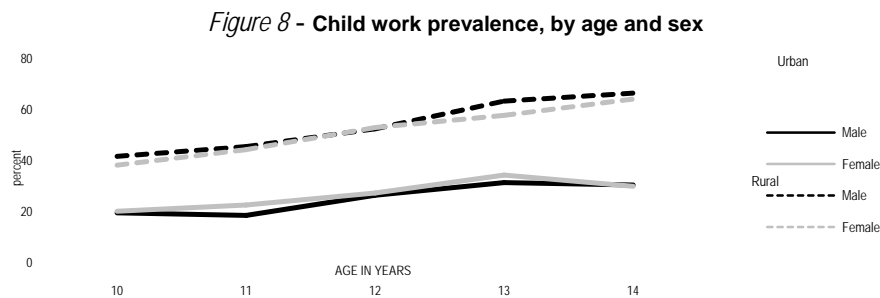
37. The indicators on school quality are drawn from the Yemen School Based survey (1999-2000). The school based survey was carried out by General Department of Statistics and Planning, Ministry of Education, Sana'a in 2000 (Second Round) and refers to the schooling year 1999/2000. The survey collected a variety of information for each school level at the governorate level as well as at the district level. Information collected included the number of basic school buildings, the number of basic/secondary school buildings, the number of male and female students enrolled for each type of school, the number of male and female teachers for each type of school, and the number of classrooms and classes.

38. The final dataset used for the analysis is constructed merging the information collected at the individual level through the YNPS (1999) with the information collected at the school level through the Yemen School Based Survey. While the indicators on school quality are drawn from the school based survey, the indicators of school availability are drawn from the YNPS survey. The detailed information collected from the latter on the access to school and school proximity, allowed us to better measure the effect of school quality on children's activities.

7. CHILDREN'S WORK AND SCHOOL ATTENDANCE IN CAMBODIA

39. According to the Cambodia Socio Economic Survey (CSES) 2003-2004, 47 percent of children aged 10-14 are attending school full time, while about 45 percent combine work and school.

40. The involvement in economic activity of Cambodian children remains one of the highest in East and South-East Asia region. A total of 49 percent, 885,000 in absolute term, declared to be involved in work activities, with only a negligible difference by sex. The place of residence plays an important role in determining the probability of only attending school or combining work and school. Twenty four percent of children



Source: UCW calculations based on *Cambodia CSES, 2003-04*.

combining work and school reside in urban areas, while the percentage rises to about 45 percent when considering rural areas. It is not surprising to note that children's total involvement in schooling is about 90 percent. In fact, the 96 percent of the villages declare to have a primary school (see table 1).

41. Children living in cities and towns are considerably less likely than their rural counterparts to engage in economic activity. The percentage of work involvement increase with the age of the child. As pointed out before, this reflects both the higher opportunity costs of school in terms of earnings forgone as a child gets older and of the more limited schooling opportunities at the higher grades. The percentage of male and female working children in rural area is already high, around 40%, at the age of ten and rise sharply to 65 percent at the age of 14 (fig.8)

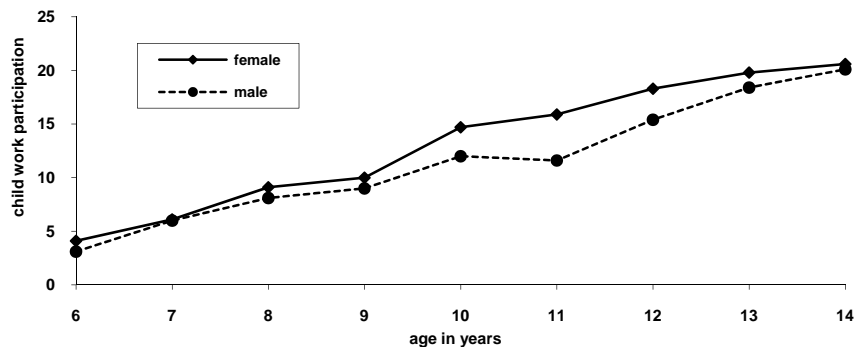
8. CHILD WORK AND SCHOOL ATTENDANCE IN YEMEN

42. Twelve percent of children in the age range 6 - 14 years are involved in some forms of economic activity in Yemen. Table 2 shows that economic activity rates vary little by sex in either rural or urban areas, but vary considerably by place of residence for both sexes. In absolute terms, 615,000 children residing in rural areas are involved in economic activity, accounting for the 15% of the children in the selected age group, against 2.8 percent in urban areas. However, the actual gender gap in work involvement is probably greater, as girls are almost twice as likely as boys to be reported as involved in 'no activities' (49% versus 21%), a category which also likely captures unreported work or involvement in household chores.

43. Only 55% of children are attending school. The table highlight also a sensitive variation by place of residence and by gender. But while in urban areas the difference in school attendance is little, in rural area there is a large gender-based disparity. In fact, only 35% of female children are attending school against 65% of male children.

44. Children's involvement in work increases with age (Figure 9). This is a likely reflection both of the higher opportunity costs of school in terms of earnings forgone as a child gets older and of the more limited schooling opportunities at the higher grades.

Figure 9 - Child work prevalence, by age and sex



Source: UCW calculations based on *Yemen Poverty Monitoring Survey*, 1999.

45. While less than five percent of six and seven year-olds are economically active, over 20% of children are working by the age of 14. But the absolute number of very young Yemeni children engaged in work is nonetheless significant. Some 120,000 children aged 6-8 years, and some 344,000 children aged 6-11 years, are economically active. These very young working children are the most vulnerable to workplace abuses, and most at risk of work-related ill-health or injury.

9. SCHOOL QUALITY INDICATORS EMPLOYED IN THE ESTIMATES.

46. Figures 10-11 present the indicators available for the two countries and employed in the estimates. The indicators are presented according to the classification discussed in section 2. Unfortunately, such indicators are not easily comparable across the two

countries, so we will not be able to assess comparatively how they affect household decisions concerning child schooling and work. As we will discuss in more detail below, only a small subset of the indicators appears to be significant in the regression analysis.

Figure 10

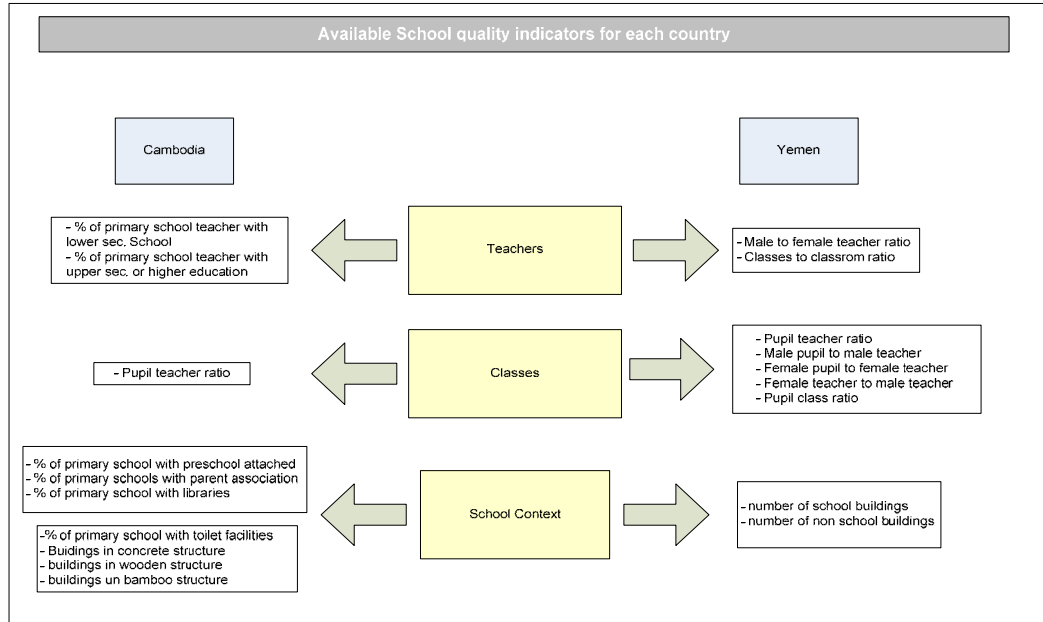
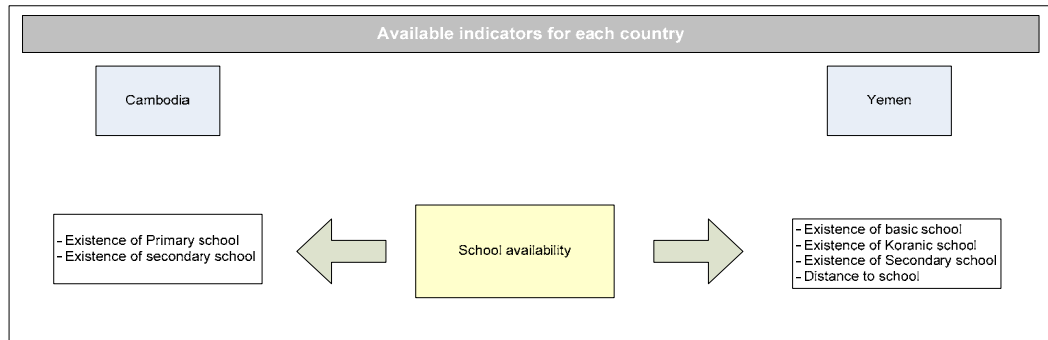


Figure 11



10. SCHOOL QUALITY AND HUMAN CAPITAL INVESTMENT: RESULTS OF THE ESTIMATES

47. The theoretical model underlying the estimates assumes that household decisions concerning children's school attendance and work are made on the basis of the resource constraints and of the relative benefits and costs of education and work faced by the household. The model is well known¹⁰ and does not need to be described here

¹⁰ See for example Cigno and Rosati (2005) and the literature quoted therein.

in detail. Within the limitation of the data sets available, we have used as controls to proxy for resource availability and relative prices household income or expenditure, household structure, parent's education, area of residence, ethnicity, access to water, age and sex of the child. We have, of course, introduced in the estimates the indicators of school availability and quality described above. A child is defined as working if she or he participates in economic activities for at least one hour in the reference period.

48. The bivariate probit model of school attendance and work has been estimated for children aged 10 to 14 years both in Yemen and in Cambodia. Given the large differences across gender and area of residence, the estimates have also been carried out separately for male and female and for urban/rural residence. Tables 3 and 4 contain the summary statistics of the variables employed in the estimates for Cambodia and Yemen, respectively.

49. In Cambodia, primary schools are widely distributed across the communes and can be relatively easily reached from almost the totality of children of primary school age. Lower secondary schools, by contrast, are accessible only for the 54 percent of the child population aged 10-14 (see table 3). The distribution of the lower secondary schools on average does not show significant difference with regard to the urban/rural residence. The number of pupils per teacher in primary school is high, around 60 students for every teacher. The pupil-teacher ratio shows an average of 42 pupils per teacher in the urban area, rising to 64 in rural areas.

50. The percentage of primary schools with parent associations and with libraries are both valid proxies of the "school context" dimension of school quality. While the percentage of primary schools with parent association is about 85 percent, with small differences between urban and rural area, only 38 percent of primary schools contain a library. Moreover, schools based in the urban areas seem to provide the students with better equipment compared with those in the rural areas. In fact, 53 percent of the urban primary school declared to have a library compared with only 34 per cent of those in rural areas.

51. In Yemen, basic schools are available to about 85 per cent of the child population aged 6-14. The access to the basic school remains higher in the urban areas (91%) than in rural areas (78%) (see table 4). School availability decreases as the school level increases. In fact, secondary schools are available for the 48 per cent of the child population aged 6-14. We observe only a negligible change in this percentage (about 1%) if we consider the access to secondary school for children of secondary school age. Accessing secondary school seems to be much more difficult in rural areas. Only 36 per cent of the child population in the rural areas have access to secondary school, compared with 84 per cent of their urban counterparts.

52. Let us now turn to discuss the results of the estimates. The control variables at the individual, household and community level all have the expected signs. As the role of these variables has already been described in other studies, we will not discuss them here¹¹.

53. Only a few indicators of school quality turned out to be significant. We have experimented with several combinations, functional forms, etc. In some cases we had obvious problems of collinearity, but in most of the cases the indicators did not turn out to be significant or to be associated with robust or stable estimates. As mentioned above, when a school quality indicator is not significant we are not able to assess

¹¹ *Children's Work in Cambodia: a challenge for Growth and Poverty reduction*, UCW Country report, www.ucw-project.org; *Understanding Children's work in Yemen*, UCW Country report, www.ucw-project.org

whether this is due to the fact that the indicator is not relevant for quality, or that quality is not relevant to household decisions.

54. In the case of Cambodia, we present three sets of estimates following some preliminary testing. The first and the third group of estimates, in addition to pupil to teacher ratio, include a set of other indicators. As just mentioned, collinearity and other reasons do not allow to obtain reliable estimates that include all the available proxies for school quality. The first set of estimates include the availability of a library at the school, the second the “quality” of teachers (as proxied by their education and experience) and the third the characteristics of the school buildings.

55. A lower pupil to teacher ratio reduces the involvement of children in economic activity, independently of whether they were attending school or not, and increases the number of children attending school only. The effects on “idle” children are negligible. The aggregate results, shown in Table 5, masks large differences by sex and area of residence. In particular, the effects of the pupil to teachers ratio appear to be larger for male children and in rural areas (see Table 6 and 9).

56. The presence of a school library tends to reduce the number of children working only or “idle”, and to increase school attendance. This effect is especially relevant for girls, while there does not appear to be any relevant difference between urban and rural areas. The “quality “ of teachers also appears to be relevant. The higher the share of teachers with large experience, the lower is the probability that a child is working or “idle” and the higher is school attendance. Teacher education increases the number of children working while attending school and increases the probability that children attend school only. There is some evidence that the characteristics of the school building also matter, but the evidence is in this case less conclusive.

57. Note, finally, that indicators of school quality seem to be associated with larger effects when access is not relevant. For example, the pupil to teacher ratio becomes relatively more important in urban areas, where access to lower secondary education does not constitute a problem.

58. In Yemen, the male to female teacher ratio significantly affects the allocation of children’s time. In particular, an increase in the number of female teachers tends to increase the number of children attending school, reducing the number of children working and neither working nor studying. The increase in school attendance is, however, mainly due to the increase in children going to school only. While the female to male teacher ratio is significant both for boys and girls, the effect is much larger for girls. The main difference between urban and rural areas lies in the fact that in urban areas an increase in the relative number of female teachers generates an increase in the number of children attending school only, while in the rural areas we observe an increase in both the number of children attending school only and working and attending school. In both areas, the increase in attendance is coupled with a reduction in the number of “idle” children and of children working only.

59. A reduction in the classes to classroom ratio generates an increase in the number of children attending school, both working and not. The increase in attendance is due mainly to a reduction in the number of idle children. The effects are very similar for boys and girls and across areas of residence.

60. Given the metric of the indicators of school quality, it is not easy to interpret the marginal effects in terms of quantitative impact. To better assess such an impact, we have performed a series of simulations of the effects of changes in school quality indicators on children’s activities (See tables 17-23).

61. In the case of Cambodia (tables 17-20), the impact of availability of a school library seems to be negligible: raising the percentage of schools with a library to the

national median (in those communities below the median) increases school attendance, as measured by national average, by just one third of a percentage point.

62. On the other hand, the pupil teacher ratio seems to have a larger impact on household decisions. A decrease in the pupil teacher ratio increases the probability that children attend school only and reduces the probability that they work while attending school. Reducing the average class size by one third increases the probability that children attend school only by 1.4 percentage points and reduces the probability that a child attends school and work by the same amount. The impact rises to 2.5 percentage points if the pupil teacher ratio is reduced by half. To better evaluate the relevance of the impact of this variable, consider that making a secondary school available in all communities appears to reduce children's work and to increase school attendance by 1.5 and 2.2 percentage points, respectively, for the age groups 10-15 and 10-17. These figures must of course be considered with care and not, in any way, as a comparison of the two sets of different programs: they indicate, however, that the effects of school quality are not so "small" with respect to those arising from improved access to school.

63. The conclusion is different in the case of Yemen, where substantial increases in school quality, as proxied by the female to male teacher ratio, and in the number of classes to classrooms does not produce any sizeable effect (see Tables 22-24). However, the small impact at national level masks a non negligible impact in the Governorates, where school quality is low. For example, raising the female to male teachers ratio to the national median increases school attendance, in the Governorates below the median, by almost two percentage points. An increase that is associated with a reduction in the number of children working only and, especially, of the children (particularly girls), neither working nor attending school.

11. NON RANDOM ALLOCATION OF SCHOOL QUALITY

The nature of data available does not allow us to design the estimates on a quasi-experimental basis. This leaves open the questions of possible biases due to the presence of unobservables (or unobserved) relevant for household decisions and correlated with the treatment (school quality in our case). In particular, household with strong preferences for education could tend to live in communities where education is more accessible and/or of better quality and this would tend to bias upward the estimates. Similarly, communities whose members have strong preference for education might act to obtain better schooling facilities.

As mentioned, the data do not allow us to tackle these issues directly.

To assess the extent of the problem, we have proceeded in three ways: first, we have tested the probability that a household's migration to a community is dependent on the school characteristics of the receiving community; second, we have treated school quality as endogenous, using instrumental variable estimates; and third we have carried out a sensitivity analysis.

Given the availability of information, we were only able to perform these tests for Cambodia. We also limited the instrumental variable analysis to the pupil teacher ratio, both for methodological reasons and because this is the most relevant variable.

Table 24 reports the results of the regression of the share of households that migrated to a community on a set of characteristics of the receiving community, including access to school and indicators of school quality.

While the share of migrated households is linked to a few community characteristics of the receiving community, like access to basic services and its average income, none of the school quality variables is significantly different from zero. This leads us to believe that, at least in the case of Cambodia, the possible bias due to the migration of households to communities with better schools is not likely to be large.

As mentioned above, we have also to check the robustness of the estimates by treating the pupil teacher ratio as endogenous. As instruments, we have used the pupil- teacher ratio observed in the previous wave of the survey and a set of community characteristics like the status of the health services, access to basic services, etc. The non linear estimates we employ do not allow the use of fitted values in the equation. We have hence followed the methodology employed in Aldermann et al. (2006), and added to the repressors set the residuals from the auxiliary equation. The results do not show any substantial change in the estimate discussed in the paper. Finally, to check the robustness of our results we have carried out a sensitivity analysis on the impact of the pupil teacher ratio.

The method for sensitivity analysis proposed by Rosenbaum and Rubin (1983) is extended here to the case of continuous treatment variable. In particular this method allow us to assess the sensitivity of the estimated causal effects with respect to assumptions about an unobserved binary covariate that is associated with both the treatment and the outcome.

Suppose that treatment assignment is not unconfounded given a set of observable variables X , i.e.,

$$Y(t) \text{ not } \perp T|X \text{ for all } t \in \tau.$$

but unconfoundedness holds given X and an unobserved binary covariate U , that is

$$Y(t) \perp T|X,U \text{ for all } t \in \tau.$$

We can then judge the sensitivity of conclusions to certain plausible variations in assumptions about the association of U with T , $Y(t)$, and X .

Since $Y(t)$ and T are conditionally independent given X and U , we can write the joint distribution of $(Y(t), T, X, U)$ as

$$\Pr(Y(t), T, X, U) = \Pr(Y(t)| X, U) \Pr(T| X, U) \Pr(U| X) \Pr(X)$$

where, in our analysis, we assume that

$$\Pr(U = 0|X) = \Pr(U = 0) = \pi$$

$$T|X,U \sim N(\gamma Xi + \alpha U, \sigma^2)$$

$$\Pr(Y(t) = j| X, U) = \exp(\beta_j X + \tau_j T + \delta_{ij} U) (1 + \sum_i \exp(\beta_i X + \tau_i T + \delta_{ii} U))^{-1}$$

j =(working only:wo, studying only: so, working and studying: ws, neither working nor studying: no)

π represents the proportion of individuals with $U=0$ in the population, and the distribution of U is assumed to be independent of X . This should render the sensitivity analysis more stringent, since, U were associated with X controlling for X should capture the at least some of the effects of unobservables.

The sensitivity parameter α captures the effect of U on the level of the treatment receipt, while δ_{it} are the effects of U on the outcome.

Given plausible but arbitrary values to the parameters π , α and δ , we estimated the parameters γ , β and τ by maximum likelihood. The parameter τ captures the causal effect (in the logit scale) of a marginal increase of T on Y , given the parametric assumptions. For computational reasons we have utilized here a multinomial logit. Nothing of substance would change if we were to use a bivariate probit.

Table 25 shows the results of the sensitivity analysis for pupil teacher ratio for different values of the sensitivity parameters. The first column of the table report the estimates obtained assuming unconfoundedness to hold.

The results indicates that the estimates of τ *do not change significantly under* a range of plausible assumptions about the correlation between the unobserved variable on the one hand and the treatment and outcomes on the other.

This gives support to the causal interpretation of the impact of school quality on children's activities.

12. CONCLUSIONS

64. Increasing attention is being paid in both developing and developed countries to the role that school quality plays in determining school achievements, labour market outcomes and growth. Much less attention has been devoted to the possible role of school quality in affecting household decisions relative to children's work and school attendance. While from a theoretical point of view, we would expect school quality to be an important determinant of household decisions, as it influences expected return to education, there is almost no empirical evidence available on the matter.

65. The present paper aimed to begin to fill this gap both by looking at cross country stylized facts and by analyzing household behaviour in Cambodia and Yemen.

66. The empirical definition of school quality is far from straightforward. We have briefly reviewed the main indicators used in the literature and the rationale for their inclusion in the analysis. Of course, only a subset of the potentially relevant indicators was available for our analysis and the scope of the results is, obviously, limited by the incompleteness of the available information.

67. Cross country data show that children's work and school attendance are negatively (positively) correlated to a few of the available school quality indicators. However, when we move beyond correlation and use a panel data sets the evidence we obtain is rather weak. This can be due also to measurement problems, and to the lack of relevant indicators across countries and time.

68. Results become more definite when we move to the analysis based on household survey data for Yemen and, especially, Cambodia.

69. In Yemen, the male to female teacher ratio does significantly affect the allocation of children's time. In particular, an increase in the number of female teachers tends to increase the number of children attending school, reducing the number of children working and neither working nor studying. The increase in school

attendance is, however, mainly due to the increase in children going to school only. While the female to male teacher ratio is significant both for boys and girls, the effects is much larger for girls. A reduction in the classes to classroom ratio generates an increase in the number of children attending school, both working and not. The increase in attendance is due mainly to a reduction in the number of idle children. The effects are very similar for both boys and girls and across areas of residence.

70. In Cambodia, a lower pupil to teacher ratio reduces the involvement of children in economic activity, independently of whether they were attending school or not, and increases the number of children attending school only. The aggregate results mask large differences by sex and area of residence. In particular, the effects of the pupil to teacher ratio appear to be larger for male children and in rural areas

71. The presence of a school library tends to reduce the number of children working only or “idle”, and to increase school attendance. This effect is especially relevant for girls, while there does not appear to be any relevant difference between urban and rural areas.

72. The “quality “ of teachers appears also to be relevant. The higher the share of teachers with substantial experience, the lower is the probability that a child is working or “idle” and the higher is school attendance. Teacher education increases the number of children working while attending school, and increases the probability that children attend school only.

73. While the available data do not allow to explicitly control for the potential non random allocation of school quality, the few tests we performed for Cambodia seem to indicate that the estimates presented are robust.

74. The effects of school quality on children’s work and school attendance not only appears significant but also of non negligible magnitude, especially in the case of Cambodia. The size of these effects does not appear, moreover, to be small with respect to those generated by an increase in school availability. These conclusion should not be interpreted as a measure of the relative efficacy of the two programs (as a much more detailed analysis including costing etc. would be necessary), but as an indication of the relevance of school quality.

75. The initial answer to the question posed in the title of the paper seems, then, to be positive. School quality matters for working children: better schools do reduce participation to economic activities and increase school attendance.

76. Much work, however, remains to be done to transform such an initial answer in a well established conclusion. First of all, more evidence must be gathered on the effects of different school quality indicators on children’s work and on the different forms of work. Experimental or quasi-experimental data might become available, even if techniques based on sensitivity analysis are useful to assess the possible biases due to non exogenous allocation of treatment. Moreover, the relationship between inputs to school quality, school quality and child work needs to be analyzed more in depth. As mentioned in the paper, we are unable at this stage to disentangle the effects of a set of inputs on school quality from those of school quality on children’s work. In other words, we can only very weakly assess whether is school quality that is (not) relevant to household decision or whether it is the particular input considered that does (not) affect school quality. The answer to this question is, of course, essential for policy design. Finally, more effort would need to be devoted to comparing the effects of improved access to education with respect to improved quality, even if the task is made difficult by the lack of data and, especially, by methodological issues.

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ANNEXES

Table 1 - Child activity status (10-14), by sex and residence

Type of Activity	Residence	Male		Female		Total ⁽²⁾	
		%	No. ⁽¹⁾	%	No. ⁽¹⁾	%	No. ⁽¹⁾
Economically active only	Urban	3.0	4.2	4.2	5.5	3.6	9.7
	Rural	6.6	51.8	8.2	61.7	7.4	113.6
	Total	6.1	56.0	7.6	67.3	6.8	123.3
School only	Urban	72.2	98.6	68.1	90.7	70.2	189.3
	Rural	42.5	333.6	43.9	331.8	43.2	665.4
	Total	46.9	432.2	47.5	422.6	47.2	854.7
Combining school and economic activity	Urban	22.5	30.8	23.0	30.7	22.8	61.5
	Rural	47.2	370.0	43.6	330.0	45.4	700.0
	Total	43.5	400.8	40.5	360.7	42.1	761.5
Neither in school nor in economic activity ⁽³⁾	Urban	2.3	3.1	4.7	6.3	3.5	9.4
	Rural	3.7	29.0	4.3	32.8	4.0	61.9
	Total	3.5	32.1	4.4	39.2	3.9	71.3
Total work ⁽⁴⁾	Urban	25.6	34.9	27.2	36.2	26.4	71.2
	Rural	53.8	421.9	51.8	391.7	52.8	813.6
	Total	49.6	456.8	48.1	427.9	48.9	884.7
Total study ⁽⁵⁾	Urban	94.7	129.4	91.1	121.4	92.9	250.8
	Rural	89.7	703.6	87.5	661.8	88.6	1365.4
	Total	90.4	833.0	88.0	783.2	89.3	1616.2

Notes: (1) Numbers expressed in thousands; (2) Totals may not add up due to rounding; (3) 'No activities' refers to children who neither attend school nor work; (4) 'Total work' refers to children that work only and children that work and study; (5) 'Total study' refers to children that study only and children that work and study

Source: UCW calculations based on *Cambodia Socio Economic Survey (CSES), 2003-2004*

Table 2 - Child activity status (6-14), by sex and residence

Type of Activity	Residence	Male		Female		Total ⁽²⁾	
		%	No. ⁽¹⁾	%	No. ⁽¹⁾	%	No. ⁽¹⁾
Economically active only	Urban	1.5	9.6	1.1	7.0	1.3	16.6
	Rural	6.1	131.3	13.9	277.8	9.9	409.1
	Total	5.0	140.8	10.8	284.8	7.9	425.6
School only	Urban	78.6	512.8	73.8	465.2	76.3	978.0
	Rural	57.7	1,236.4	27.3	546.1	43	1,782.5
	Total	62.6	1,749.3	38.4	1,011.3	50.9	2,760.5
Combining school and economic activity	Urban	2.5	16.0	0.6	3.8	1.5	19.8
	Rural	7.4	159.2	2.4	47.7	5.0	206.9
	Total	6.3	175.2	2.0	51.5	4.2	226.6
Neither in school nor in economic activity ⁽³⁾	Urban	17.5	113.9	24.5	154.2	20.9	268.1
	Rural	28.7	614.2	56.4	1,128.9	42.1	1,743.1
	Total	26.1	728.1	48.8	1,283.1	37.1	2,011.2
Total work ⁽⁴⁾	Urban	3.9	25.5	1.7	10.8	2.8	36.4
	Rural	13.6	290.5	16.3	325.5	14.9	615.9
	Total	11.3	316.0	12.8	336.3	12.1	652.3
Total study ⁽⁵⁾	Urban	81.1	528.8	74.4	469.0	77.8	997.8
	Rural	65.2	1,395.6	29.7	593.7	48.0	1,989.4
	Total	68.9	1,924.4	40.4	1,062.8	55.1	2,987.2

Notes: (1) Numbers expressed in thousands; (2) Totals may not add up due to rounding; (3) 'No activities' refers to children

who neither attend school nor work; (4) 'Total work' refers to children that work only and children that work and study;

(5) 'Total study' refers to children that study only and children that work and study.

Source: UCW calculations based on *Yemen Poverty Monitoring Survey*, 1999

Table 3 – Cambodia - Descriptive statistics of the variable employed in the estimates

Variable	Total		Urban		Rural	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Employ	0.506	0.500	0.295	0.456	0.555	0.497
Attend	0.867	0.340	0.910	0.287	0.856	0.351
age	12.465	1.691	12.542	1.705	12.447	1.687
age2	158.23		160.19		157.77	
	6	42.242	7	42.682	9	42.128
female	0.490	0.500	0.486	0.500	0.491	0.500
n. siblings in the household	0.385	0.621	0.327	0.569	0.399	0.632
n. adults in the household	2.010	0.685	2.119	0.838	1.984	0.642
Household size	6.251	1.888	6.201	1.883	6.263	1.889
ethnicity*	0.963	0.189	0.958	0.200	0.964	0.187
Public water network*	0.099	0.299	0.366	0.482	0.037	0.189
Migration of hh head*	0.508	0.500	0.724	0.447	0.457	0.498
Level of education of hh. head	2.193	0.459	2.437	0.627	2.136	0.388
Father not live in the household*	0.197	0.398	0.208	0.406	0.195	0.396
Mother not live in the household *	0.090	0.286	0.097	0.296	0.088	0.284
Log of hh expenditure	13.514	0.941	14.034	1.066	13.393	0.866
rural area*	0.811	0.392	0.000	0.000	1.000	0.000
Pupil teacher ratio	59.968	29.396	42.530	20.109	64.033	29.731
% of primary school with parent association	0.844	0.263	0.788	0.335	0.857	0.242
% of primary school with libraries	0.375	0.360	0.528	0.403	0.340	0.339
lower secondary school in the commune*	0.537	0.499	0.514	0.500	0.542	0.498
School buildings in concrete structure	8.476	6.064	9.331	7.743	8.277	5.583
School buildings in wooden structure	3.639	4.067	3.585	4.386	3.652	3.989
School buildings in bamboo structure	0.302	1.283	0.129	0.631	0.342	1.389
School buildings without good floor	3.519	3.268	3.436	3.328	3.538	3.254
School buildings without good roof	2.001	2.158	2.117	2.432	1.976	2.092
School buildings under repair	0.590	1.298	0.347	0.895	0.644	1.366
School buildings under construction	0.442	0.815	0.466	0.919	0.436	0.790
%teacher with 5-15 years of experience	0.312	0.154	0.412	0.132	0.289	0.150
% teacher with more than 15 years of experience	0.400	0.175	0.354	0.183	0.410	0.172
% teacher with lower sec. education	0.676	0.213	0.600	0.229	0.694	0.205
% teacher with higher education	0.224	0.159	0.272	0.173	0.213	0.153

Obs.: Total 12084; Urban 2220; Rural 9864

Table 4 - Yemen - Descriptive statistics of the variable employed in the estimates

Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
	Total		Urban		Rural	
Employ	0.1098	0.3127	0.0372	0.1893	0.1385	0.3454
School enrolment	0.5597	0.4964	0.7443	0.4362	0.4868	0.4998
Age	9.8293	2.5635	9.9981	2.5611	9.7626	2.5613
Age square	103.1854	51.2419	106.5215	51.4705	101.8689	51.0919
Female	0.4843	0.4998	0.4908	0.4999	0.4817	0.4997
Household size	9.9078	4.3127	9.8859	4.2310	9.9164	4.3445
n of siblings	1.5661	1.4804	1.4693	1.3791	1.6043	1.5168
public water network	0.3731	0.4836	0.7199	0.4491	0.2362	0.4248
log of household expenditure	10.4462	0.3663	10.6040	0.3041	10.3839	0.3700
urban area	0.2830	0.4504	1.0000	0.0000	0.0000	0.0000
basic school	0.8524	0.3547	0.9302	0.2549	0.8217	0.3827
koranic school	0.2915	0.4544	0.7016	0.4576	0.1296	0.3359
secondary school	0.4772	0.4995	0.8676	0.3390	0.3231	0.4677
time to school	33.5767	16.2500	24.1377	10.3334	37.3247	16.6461
male to female teacher ratio	17.3755	23.4632	10.6082	18.2021	20.1023	24.7581
classes to classroom ratio	1.6934	0.5040	1.6975	0.4341	1.6919	0.5285

Obs.: Total 91359; Urban 26358; Rural 65001

Table 5: Cambodia. Marginal effect after bivariate probit analysis School quality and child labour, whole sample

variable	Economic activity only		School only		Combining Economic activity and school		Neither in economic activity nor in school	
	dy/dx	z	dy/dx	z	dy/dx	z	dy/dx	z
age	-0.0384	-2.78	-0.0448	-0.94	0.1061	2.23	-0.0229	-3.26
age2	0.0024	4.42	-0.0011	-0.57	-0.0025	-1.33	0.0012	4.32
female*	0.0167	6.66	0.0094	0.99	-0.0355	-3.80	0.0095	7.05
n. siblings in the household	0.0065	3.07	-0.0262	-3.10	0.0178	2.13	0.0019	1.78
n. adults in the household	-0.0073	-3.22	0.0071	0.81	0.0037	0.42	-0.0034	-3.01
Household size	0.0024	3.09	0.0002	0.06	-0.0039	-1.27	0.0013	3.28
ethnicity*	-0.0062	-0.83	-0.0457	-1.71	0.0591	2.26	-0.0072	-1.54
Public water network*	-0.0167	-4.63	0.1603	8.32	-0.1418	-7.50	-0.0018	-0.66
Migration of hh head*	-0.0020	-0.80	0.0637	6.53	-0.0645	-6.67	0.0028	2.24
Level of education of hh. head	-0.0168	-4.76	0.0615	5.11	-0.0395	-3.29	-0.0052	-2.93
Father not live in the household*	0.0195	4.23	-0.0287	-1.97	0.0007	0.05	0.0084	3.59
Mother not live in the household *	0.0033	0.74	0.0460	2.46	-0.0545	-2.98	0.0052	1.92
Log of hh expenditure	-0.0079	-4.94	0.0007	0.13	0.0113	1.94	-0.0041	-5.11
rural area*	0.0078	2.52	-0.1798	-13.32	0.1794	13.67	-0.0075	-2.98
School quality indicators								
Pupil teacher ratio	0.0001	2.46	-0.0008	-4.31	0.0007	3.72	0.00001	0.42
% of primary school with libraries	-0.0131	-3.48	0.0231	1.61	-0.0046	-0.32	-0.0055	-2.92
School availability								
lower secondary school in the commune*	-0.0045	-1.80	0.0227	2.35	-0.0173	-1.81	-0.0010	-0.80

Source: authors calculations based on Cambodia (CSES 03-04, EMIS 03-04)

Table 6: Cambodia Marginal effect after bivariate probit analysis, School quality and child labour: Male children.

Variable	Economic activity only		School only		Combining Economic activity and school		Neither in economic activity nor in school	
	dy/dx	z	dy/dx	z	dy/dx	z	dy/dx	z
Age	-0.0255	-1.49	-0.0227	-0.34	0.0618	0.92	-0.0136	-1.65
age2	0.0017	2.52	-0.0020	-0.73	-0.0005	-0.18	0.0008	2.31
n. siblings in the household	0.0038	1.50	-0.0283	-2.36	0.0238	2.00	0.0007	0.54
n. adults in the household	-0.0056	-2.05	0.0117	0.95	-0.0039	-0.32	-0.0023	-1.73
Household size	0.0032	3.41	-0.0053	-1.19	0.0007	0.15	0.0014	2.99
ethnicity*	-0.0120	-1.18	-0.0653	-1.78	0.0893	2.48	-0.0120	-1.69
Public water network*	-0.0140	-3.07	0.1546	5.51	-0.1382	-4.98	-0.0024	-0.74
Migration of hh head*	-0.0049	-1.62	0.0682	4.96	-0.0639	-4.67	0.0006	0.39
Level of education of hh. head	-0.0139	-3.13	0.0745	4.41	-0.0569	-3.36	-0.0036	-1.71
Father not live in the household*	0.0146	2.58	-0.0188	-0.91	-0.0022	-0.11	0.0064	2.29
Mother not live in the household *	-0.0003	-0.06	0.0395	1.48	-0.0408	-1.55	0.0017	0.59
Log of hh expenditure	-0.0071	-3.55	0.0123	1.49	-0.0023	-0.28	-0.0030	-3.08
rural area*	0.0087	2.39	-0.1999	-10.64	0.1956	10.61	-0.0044	-1.55
School quality indicators								
Pupil teacher ratio	0.0001	2.00	-0.0008	-2.92	0.0007	2.47	0.00001	0.73
% of primary school with libraries	-0.0053	-1.17	0.0237	1.16	-0.0168	-0.83	-0.0016	-0.74
School availability								
lower secondary school in the commune*	-0.0068	-2.21	0.0372	2.72	-0.0287	-2.11	-0.0017	-1.18

Source: authors calculations based on Cambodia (CSES 03-04, EMIS 03-04)

Table 7 : Cambodia Marginal effect after bivariate probit analysis, School quality and child labour: Female children

Variable	Economic activity only		School only		Combining Economic activity and school		Neither in economic activity nor in school	
	dy/dx	z	dy/dx	z	dy/dx	z	dy/dx	z
Age	-0.0550	-2.46	-0.0644	-0.95	0.1560	2.32	-0.0366	-3.03
age2	0.0033	3.73	-0.0003	-0.11	-0.0049	-1.81	0.0019	3.86
n. siblings in the household	0.0097	2.75	-0.0235	-1.97	0.0102	0.86	0.0036	1.95
n. adults in the household	-0.0089	-2.36	0.0020	0.16	0.0118	0.96	-0.0049	-2.46
Household size	0.0012	0.89	0.0057	1.30	-0.0080	-1.84	0.0011	1.65
ethnicity*	-0.0004	-0.04	-0.0212	-0.54	0.0237	0.62	-0.0021	-0.33
Public water network*	-0.0215	-3.82	0.1685	6.36	-0.1451	-5.62	-0.0019	-0.42
Migration of hh head*	0.0018	0.44	0.0577	4.17	-0.0653	-4.78	0.0058	2.67
Level of education of hh. head	-0.0200	-3.53	0.0482	2.81	-0.0208	-1.22	-0.0074	-2.48
Father not live in the household*	0.0253	3.37	-0.0382	-1.86	0.0021	0.10	0.0108	2.74
Mother not live in the household *	0.0065	0.87	0.0519	1.99	-0.0681	-2.69	0.0097	1.94
Log of hh expenditure	-0.0087	-3.38	-0.0096	-1.18	0.0241	2.98	-0.0058	-4.20
rural area*	0.0069	1.30	-0.1587	-8.15	0.1626	8.68	-0.0109	-2.50
School quality indicators								
Pupil teacher ratio	0.0001	1.48	-0.0008	-3.10	0.0007	2.75	0.00001	-0.13
% of primary school with libraries	-0.0217	-3.52	0.0236	1.15	0.0085	0.42	-0.0104	-3.17
School availability								
lower secondary school in the commune*	-0.0013	-0.33	0.0084	0.62	-0.0070	-0.52	-0.0001	-0.03

Source: authors calculations based on Cambodia (CSES 03-04, EMIS 03-04)

Table 8 : Cambodia Marginal effect after bivariate probit analysis , School quality and child labour: Urban area

variable	Economic activity only		School only		Combining Economic activity and school		Neither in economic activity nor in school	
	dy/dx	z	dy/dx	z	dy/dx	z	dy/dx	z
age	-0.0058	-0.35	-0.0573	-0.57	0.0729	0.75	-0.0097	-0.59
age2	0.0006	0.92	0.0003	0.08	-0.0016	-0.42	0.0007	1.03
female*	0.0115	3.30	-0.0280	-1.41	0.0058	0.30	0.0107	3.14
n. siblings in the household	0.0059	2.14	-0.0393	-2.14	0.0295	1.66	0.0039	1.51
n. adults in the household	-0.0035	-1.48	0.0205	1.30	-0.0145	-0.95	-0.0025	-1.10
Household size	0.0023	2.34	-0.0117	-1.74	0.0076	1.17	0.0018	1.87
ethnicity*	-0.0344	-1.91	0.2404	4.04	-0.1990	-3.40	-0.0070	-0.82
Public water network*	-0.0061	-1.67	0.0947	3.95	-0.0877	-3.77	-0.0010	-0.26
Migration of hh head*	-0.0049	-1.24	0.0641	2.63	-0.0583	-2.46	-0.0010	-0.29
Level of education of hh. head	-0.0091	-2.65	0.0804	4.11	-0.0666	-3.51	-0.0048	-1.47
Father not living in the household*	0.0197	2.78	-0.0818	-2.73	0.0482	1.69	0.0139	2.21
Mother not living in the household *	0.0014	0.29	0.0669	1.99	-0.0761	-2.40	0.0077	1.14
Log of hh expenditure	-0.0051	-2.71	-0.0272	-2.59	0.0394	3.87	-0.0071	-3.66
School quality indicators								
Pupil teacher ratio	0.00001	0.04	-0.0028	-4.59	0.0030	4.99	-0.0002	-1.75
% of primary school with libraries	-0.0067	-1.53	0.0910	3.07	-0.0826	-2.87	-0.0016	-0.39
School availability								
lower secondary school in the commune*	-0.0003	-0.11	-0.0249	-1.20	0.0272	1.35	-0.0019	-0.63

Source: authors calculations based on Cambodia (CSES 03-04, EMIS 03-04)

Table 9 : Cambodia Marginal effect after bivariate probit analysis, School quality and child labour: Rural area

variable	Economic activity only		School only		Combining Economic activity and school		Neither in economic activity nor in school	
	dy/dx	z	dy/dx	z	dy/dx	z	dy/dx	z
age	-0.0488	-2.81	-0.0392	-0.76	0.1119	2.15	-0.0239	-3.20
age2	0.0030	4.34	-0.0014	-0.67	-0.0028	-1.35	0.0012	4.15
female*	0.0178	5.73	0.0199	1.95	-0.0469	-4.59	0.0092	6.42
n. siblings in the household	0.0067	2.54	-0.0214	-2.36	0.0130	1.43	0.0017	1.51
n. adults in the household	-0.0087	-2.93	0.0036	0.36	0.0088	0.88	-0.0036	-2.86
Household size	0.0023	2.33	0.0030	0.88	-0.0065	-1.92	0.0012	2.85
ethnicity*	0.0044	0.56	-0.1305	-4.32	0.1332	4.51	-0.0071	-1.28
Public water network*	-0.0190	-3.20	0.1555	5.26	-0.1343	-4.60	-0.0022	-0.54
Migration of hh head*	-0.0010	-0.33	0.0622	6.00	-0.0645	-6.23	0.0033	2.52
Level of education of hh. head	-0.0181	-3.81	0.0461	3.27	-0.0227	-1.59	-0.0052	-2.59
Father not live in the household*	0.0184	3.29	-0.0136	-0.84	-0.0123	-0.76	0.0074	2.99
Mother not live in the household *	0.0025	0.45	0.0397	1.92	-0.0461	-2.26	0.0039	1.40
Log of hh expenditure	-0.0083	-4.07	0.0106	1.62	0.0007	0.11	-0.0030	-3.52
School quality indicators								
Pupil teacher ratio	0.0001	2.41	-0.0006	-3.04	0.0004	2.27	0.00001	0.94
% of primary school with libraries	-0.0155	-3.22	-0.0014	-0.09	0.0238	1.50	-0.0069	-3.35
School availability								
lower secondary school in the commune*	-0.0053	-1.71	0.0229	2.18	-0.0166	-1.58	-0.0010	-0.74

Source: authors calculations based on Cambodia (CSES 03-04, EMIS 03-04)

Table 10: Cambodia Marginal effect after bivariate probit analysis, School quality and child labour: Teacher's experience, whole sample

variable	Economic activity only		School only		Combining Economic activity and school		Neither in economic activity nor in school	
	dy/dx	z	dy/dx	z	dy/dx	z	dy/dx	z
Age	-0.039	-2.8	-0.044	-0.92	0.106	2.22	-0.023	-3.27
Age2	0.002	4.43	-0.001	-0.59	-0.003	-1.33	0.001	4.33
female*	0.017	6.68	0.010	1.01	-0.036	-3.84	0.009	7.06
n. siblings in the household	0.006	2.98	-0.027	-3.13	0.018	2.18	0.002	1.67
n. adults in the household	-0.008	-3.26	0.009	0.98	0.002	0.27	-0.003	-2.97
Household size	0.003	3.28	-0.001	-0.17	-0.003	-1.10	0.001	3.36
ethnicity*	-0.005	-0.68	-0.048	-1.78	0.059	2.26	-0.007	-1.43
Public water network*	-0.017	-4.43	0.140	7.01	-0.120	-6.14	-0.003	-1.01
Migration of hh head*	-0.003	-1.01	0.058	5.86	-0.057	-5.87	0.002	1.72
Level of education of hh. head	-0.018	-5.12	0.069	5.70	-0.045	-3.73	-0.005	-3.06
Father not live in the household*	0.020	4.27	-0.031	-2.15	0.003	0.21	0.008	3.55
Mother not live in the household *	0.003	0.71	0.043	2.28	-0.051	-2.77	0.005	1.82
Log of hh expenditure	-0.009	-5.31	0.000	-0.04	0.013	2.30	-0.004	-5.52
rural area*	0.011	3.67	-0.177	-12.59	0.170	12.39	-0.004	-1.91
School quality indicators								
%teacher with 5-15 years of experience	-0.009	-0.99	0.173	4.83	-0.170	-4.79	0.006	1.31
% teacher with more than 15 years of experience	-0.024	-2.82	0.054	1.61	-0.021	-0.62	-0.009	-2.21
% teacher with lower sec. education	0.003	0.32	0.025	0.63	-0.031	-0.80	0.003	0.65
% teacher with higher education	-0.004	-0.38	0.240	5.40	-0.248	-5.63	0.012	2.20
School availability								
lower secondary school in the commune*	-0.007	-2.79	0.026	2.70	-0.017	-1.77	-0.002	-1.68

Source: authors calculations based on Cambodia (CSES 03-04, EMIS 03-04)

Table 11: Cambodia Marginal effect after bivariate probit analysis, School quality and child labour: School buildings, whole sample

variable	Economic activity only		School only		Combining Economic activity and school		Neither in economic activity nor in school	
	dy/dx	z	dy/dx	z	dy/dx	z	dy/dx	z
Age	-0.0396	-2.85	-0.0486	-1.02	0.1114	2.34	-0.0232	-3.36
Age2	0.0025	4.48	-0.0009	-0.49	-0.0027	-1.44	0.0012	4.41
female*	0.0167	6.65	0.0103	1.09	-0.0364	-3.88	0.0093	7.05
n. siblings in the household	0.0064	3.01	-0.0269	-3.18	0.0187	2.24	0.0017	1.68
n. adults in the household	-0.0075	-3.26	0.0079	0.90	0.0029	0.34	-0.0034	-3.01
Household size	0.0025	3.17	0.0000	0.01	-0.0038	-1.24	0.0013	3.33
ethnicity*	-0.0072	-0.95	-0.0538	-2.00	0.0697	2.66	-0.0086	-1.74
Public water network*	-0.0182	-5.28	0.1713	8.97	-0.1508	-8.04	-0.0024	-0.91
Migration of hh head*	-0.0031	-1.23	0.0629	6.40	-0.0619	-6.36	0.0021	1.73
Level of education of hh. head	-0.0175	-4.92	0.0652	5.41	-0.0426	-3.53	-0.0052	-2.99
Father not live in the household*	0.0190	4.13	-0.0286	-1.96	0.0016	0.11	0.0080	3.48
Mother not live in the household *	0.0035	0.77	0.0452	2.42	-0.0539	-2.94	0.0051	1.92
Log of hh expenditure	-0.0079	-4.93	0.0007	0.12	0.0112	1.94	-0.0040	-5.08
rural area*	0.0072	2.25	-0.1785	-13.05	0.1791	13.48	-0.0078	-3.08
School quality indicators								
School buildings in concrete structure	-0.0007	-2.67	0.0002	0.22	0.0009	0.86	-0.0004	-2.72
School buildings in wooden structure	-0.0002	-0.62	0.0036	2.30	-0.0035	-2.21	0.0001	0.43
School buildings in bamboo structure	0.0005	0.44	0.0094	1.97	-0.0107	-2.27	0.0008	1.49
School buildings without good floor	0.0015	2.32	-0.0017	-0.67	-0.0004	-0.18	0.0007	2.14
School buildings without good roof	0.0006	0.73	0.0039	1.21	-0.0050	-1.57	0.0005	1.36
School buildings under repair	-0.0002	-0.16	0.0036	0.75	-0.0035	-0.74	0.0001	0.19
School buildings under construction	-0.0027	-1.69	0.0076	1.24	-0.0039	-0.65	-0.0010	-1.22
Pupil teacher ratio	0.0001	3.09	-0.0009	-4.87	0.0008	4.08	0.00002	0.81

School availability

lower secondary school in the commune*	-0.0032	-1.06	0.0083	0.71	-0.0040	-0.35	-0.0011	-0.78
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Source: authors calculations based on Cambodia (CSES 03-04, EMIS 03-04)

Table 12: Yemen Marginal effect after bivariate probit analysis, School quality and child labour: whole sample.

<i>Variables</i>	Economic activity only		School only		Combining Economic activity and school		Neither in Economic activity non in school	
	<i>dy/dx</i>	<i>z</i>	<i>dy/dx</i>	<i>z</i>	<i>dy/dx</i>	<i>z</i>	<i>dy/dx</i>	<i>z</i>
female*	0.0448	15.0	-0.4145	-45.7	-0.0238	-13.0	0.3935	44.9
Age	-0.0173	-8.4	0.4962	76.7	0.0572	38.1	-0.5362	-85.2
age2	0.0012	12.3	-0.0230	-71.6	-0.0023	-32.8	0.0240	77.2
hhsiz	0.0024	9.6	-0.0277	-34.5	-0.0021	-12.2	0.0273	35.1
public water network*	-0.0115	-6.4	0.0730	11.7	0.0011	0.9	-0.0626	-10.5
n of siblings	0.0023	3.7	0.0085	4.2	0.0030	7.4	-0.0138	-7.1
log of household expenditure	-0.0472	-17.1	0.4302	46.5	0.0243	13.1	-0.4072	-45.6
urban area*	-0.0394	-25.8	0.0775	13.1	-0.0212	-20.5	-0.0169	-2.9
interaction terms								
female - water network*	-0.0227	-11.6	0.1228	16.0	-0.0030	-1.8	-0.0971	-13.2
female-basic school*	0.0101	3.2	-0.0300	-2.7	0.0036	1.7	0.0163	1.5
female - koranic school	-0.0253	-12.2	0.1456	17.0	-0.0029	-1.5	-0.1174	-14.4
female-secondary school	-0.0172	-8.0	0.0953	11.5	-0.0010	-0.6	-0.0770	-9.7
female- n. of siblings	0.0003	0.4	-0.0055	-2.3	-0.0006	-1.2	0.0058	2.5
School availability								
basic school*	-0.0169	-6.2	0.0706	9.0	-0.0019	-1.3	-0.0518	-6.8
koranic school*	0.0062	2.7	-0.0458	-6.3	-0.0017	-1.2	0.0413	5.9
secondary school	-0.0001	0.0	0.0054	0.9	0.0007	0.6	-0.0060	-1.0
time to school	0.0004	11.6	-0.0027	-20.2	-0.00004	-1.7	0.0023	17.9
school quality indicators								
male to female teacher ratio	0.0001	2.6	-0.0008	-9.5	-0.0001	-3.8	0.0008	9.8
classes to classroom ratio	0.0006	0.4	-0.0130	-2.4	-0.0014	-1.5	0.0138	2.7

Note: dummies of governorates omitted

Source: authors calculations based on Yemen (NPS and School based survey, 1999)

Table 13: Yemen Marginal effect after a bivariate probit analysis, School quality and child labour: Male children

variable	Economic activity only		School only		Combining Economic activity and school		Neither in Economic activity non in school	
	dy/dx	z	dy/dx	z	dy/dx	z	dy/dx	z
age	-0.0363	-16.7	0.4356	55.6	0.0636	23.1	-0.4629	-64.4
age2	0.0019	18.0	-0.0196	-50.5	-0.0024	-17.9	0.0201	56.4
hhsz	0.0028	11.2	-0.0242	-24.8	-0.0021	-6.2	0.0235	26.5
public water network*	-0.0161	-12.4	0.0962	17.6	-0.0031	-1.6	-0.0770	-15.6
n of siblings	0.0006	1.2	0.0115	5.9	0.0047	7.3	-0.0168	-9.5
log of household expenditure	-0.0466	-16.6	0.3560	32.0	0.0183	5.0	-0.3277	-32.4
Urban area*	-0.0169	-10.4	0.0063	0.8	-0.0288	-14.2	0.0394	5.5
School availability								
basic school*	-0.0129	-6.4	0.0592	8.2	-0.0050	-2.2	-0.0413	-6.3
koranic school*	-0.0016	-1.0	0.0049	0.7	-0.0016	-0.8	-0.0017	-0.3
secondary school	-0.0027	-2.0	0.0206	3.6	0.0011	0.6	-0.0190	-3.7
time to school	0.0003	8.4	-0.0020	-12.6	0.0000	0.3	0.0017	11.6
School quality indicators								
male to female teacher ratio	0.0000	0.8	-0.0004	-3.8	-0.0001	-2.4	0.0005	4.8
classes to classroom ratio	-0.0008	-0.6	-0.0148	-2.3	-0.0062	-3.2	0.0218	3.8

Note: dummies of governorates omitted

Source: authors calculations based on Yemen (NPS and School based survey, 1999)

Table 14: Yemen Marginal effect after a bivariate probit analysis, School quality and child labour: Female children

<i>variable</i>	Economic activity only		School only		Combining Economic activity and school		Neither in Economic activity non in school	
	<i>dy/dx</i>	<i>z</i>	<i>dy/dx</i>	<i>z</i>	<i>dy/dx</i>	<i>z</i>	<i>dy/dx</i>	<i>z</i>
Age	0.0144	4.1	0.4356	47.6	0.0377	24.2	-0.4876	-52.7
age2	-0.0001	-0.5	-0.0210	-46.3	-0.0016	-22.7	0.0227	49.6
hhsiz	0.0014	3.3	-0.0268	-23.8	-0.0016	-10.5	0.0269	23.6
Public water network*	-0.0291	-12.6	0.1625	25.7	0.0018	2.2	-0.1352	-21.3
n of siblings	0.0038	4.5	-0.0032	-1.4	0.0010	3.8	-0.0016	-0.7
log of household expenditure	-0.0373	-7.8	0.4438	34.0	0.0212	12.9	-0.4277	-32.6
Urban area*	-0.0620	-23.8	0.1378	16.6	-0.0123	-13.6	-0.0635	-7.7
School availability								
basic school*	-0.0058	-2.0	0.0417	5.0	0.0013	1.5	-0.0372	-4.4
koranic school*	-0.0162	-6.0	0.0536	7.3	-0.0016	-1.8	-0.0358	-4.9
secondary school	-0.0170	-7.1	0.0815	12.6	0.0006	0.8	-0.0652	-10.1
time to school	0.0005	8.0	-0.0034	-17.0	-0.0001	-3.8	0.0029	14.8
School quality indicators								
male to female teacher ratio	0.0001	2.8	-0.0012	-10.0	-0.0001	-3.8	0.0011	9.4
classes to classroom ratio	0.0051	2.0	-0.0165	-2.1	0.0004	0.5	0.0110	1.4

Note: dummies of governorates omitted

Source: authors calculations based on Yemen (NPS and School based survey, 1999)

Table 15: Yemen Marginal effect after a bivariate probit analysis, School quality and child labour: Urban area

variable	Economic activity only		School only		Combining Economic activity and school		Neither in Economic activity non in school	
	dy/dx	z	dy/dx	z	dy/dx	z	dy/dx	z
Female*	0.0071	2.1	-0.1821	-7.4	-0.0037	-1.1	0.1788	7.6
Age	-0.0116	-7.2	0.4761	50.5	0.0186	10.8	-0.4830	-52.7
age2	0.0006	8.1	-0.0218	-46.6	-0.0007	-9.0	0.0219	48.3
Household size	0.0018	9.8	-0.0266	-22.6	0.0004	2.0	0.0244	21.5
public water network*	-0.0095	-6.2	0.1122	11.4	-0.0026	-2.0	-0.1001	-10.5
n of siblings	0.0002	0.6	0.0047	1.5	0.0006	1.4	-0.0056	-1.8
log of household expenditure	-0.0304	-12.4	0.4595	29.9	-0.0056	-2.4	-0.4235	-28.5
Interaction term								
Female_water network*	-0.0070	-5.0	0.0577	5.3	-0.0049	-3.2	-0.0458	-4.3
Female_basic school*	-0.0059	-1.4	-0.0088	-0.3	-0.0078	-1.7	0.0225	0.8
Female_koranic school*	-0.0067	-4.5	0.0776	6.8	-0.0032	-1.9	-0.0676	-6.1
Female_secondary school*	0.0022	0.7	0.0110	0.5	0.0035	0.9	-0.0167	-0.8
Female_siblings	0.0005	1.0	-0.0052	-1.4	0.0003	0.5	0.0044	1.2
School availability								
basic school*	-0.0020	-0.7	0.0151	0.7	-0.0013	-0.4	-0.0119	-0.6
koranic school*	-0.0003	-0.2	-0.0182	-2.0	-0.0017	-1.3	0.0201	2.3
secondary school	0.0015	0.8	0.0000	0.0	0.0017	0.9	-0.0032	-0.2
time to school	0.0002	4.1	-0.0014	-5.2	0.0001	2.3	0.0012	4.5
School quality indicators								
male to female teacher ratio	0.00001	1.2	-0.0009	-5.2	0.0000	-0.9	0.0008	5.3
classes to classroom ratio	0.0029	2.2	0.0019	0.2	0.0037	2.6	-0.0085	-0.9

Note: dummies of governorates omitted

Source: authors calculations based on Yemen (NPS and School based survey, 1999)

Table 16: Yemen Marginal effect after a bivariate probit analysis, School quality and child labour: Rural area

variable	Economic activity only		School only		Combining Economic activity and school		Neither in Economic activity non in school	
	dy/dx	z	dy/dx	z	dy/dx	z	dy/dx	z
Female*	0.0654	14.5	-0.4187	-44.1	-0.0366	-15.6	0.3899	41.2
Age	-0.0137	-4.2	0.4408	58.5	0.0731	38.0	-0.5002	-66.7
age2	0.0013	8.2	-0.0205	-54.9	-0.0030	-32.9	0.0222	59.9
Household size	0.0023	5.7	-0.0255	-26.9	-0.0033	-14.7	0.0264	28.2
public water network*	-0.0146	-4.8	0.0819	10.6	0.0057	3.0	-0.0731	-9.7
n of siblings	0.0036	3.6	0.0089	3.9	0.0039	7.5	-0.0164	-7.3
log of household expenditure	-0.0513	-11.7	0.3777	36.0	0.0376	15.7	-0.3640	-35.2
Interaction term								
Female_waterr*	-0.0222	-5.9	0.0787	7.6	-0.0012	-0.5	-0.0553	-5.5
Female_basic school*	0.0123	2.5	-0.0111	-0.9	0.0057	2.2	-0.0070	-0.6
Female_koranic school*	-0.0167	-3.5	0.0637	4.8	0.0001	0.1	-0.0471	-3.7
Female_secondary school*	-0.0163	-4.5	0.0592	6.1	-0.0001	0.0	-0.0428	-4.6
Female_siblings	-0.0005	-0.4	-0.0030	-1.1	-0.0009	-1.3	0.0043	1.6
School availability								
basic school*	-0.0258	-6.4	0.0726	9.1	-0.0013	-0.7	-0.0455	-5.7
koranic school*	-0.0005	-0.1	0.0063	0.7	0.0009	0.4	-0.0067	-0.7
secondary school	-0.0091	-3.1	0.0358	5.1	0.0008	0.5	-0.0276	-4.0
time to school	0.0007	11.2	-0.0029	-19.5	-0.0001	-3.5	0.0024	16.0
School quality indicators								
male to female teacher ratio	0.0001	2.1	-0.0008	-8.4	-0.0001	-4.3	0.0008	8.5
classes to classroom ratio	-0.0016	-0.7	-0.0123	-2.1	-0.0033	-2.7	0.0171	3.0

Note: dummies of governorates omitted

Source: authors calculations based on Yemen (NPS and School based survey, 1999)

Table 17 - Cambodia. Simulated effect of Pupil teacher ratio on children's activity

	Decreasing Pupil teacher ratio by 30%	Decreasing Pupil teacher ratio by 40%	Decreasing Pupil teacher ratio by 50%
	% change		% change
Attending school only	1.4	1.9	2.4
Attending school and working	-1.1	-1.5	-1.9
Economically active only	-0.3	-0.4	-0.6
Neither working nor studying	0.0	0.0	0.0

Source: authors calculations based on Cambodia (CSES 03-04, EMIS 03-04)

Table 18 - Cambodia. Simulated effect of Percentage of School with library on children's activity

	% of school without library at the median
	% change
Attending school only	0.2
Attending school and working	0.1
Economically active only	-0.2
Neither working nor studying	-0.1

Source: authors calculations based on Cambodia (CSES 03-04, EMIS 03-04)

Table 19 - Cambodia. Simulated effect of Pupil teacher ratio on children's activity

	Pupil teacher ratio at the national median	Pupil teacher ratio at the national median for the subgroup of communities above the median
	% change	
Attending school only	1.0	2.0
Attending school and working	-0.8	-1.5
Economically active only	-0.3	-0.5
Neither working nor studying	0.0	0.0

Source: authors calculations based on Cambodia (CSES 03-04, EMIS 03-04)

Table 20 - Cambodia. Simulated effect of availability of Lower secondary school on children's activity

	Lower secondary school in each commune Age group 10-15	Lower secondary school in each commune Age group 10-17
	% change	
Attending school only	1.3	2.2
Attending school and working	-1.0	-1.2
Economically active only	-0.4	-1.0
Neither working nor studying	0.0	0.0

Source: authors calculations based on Cambodia (CSES 03-04, EMIS 03-04)

Table 21 - Yemen. Simulated effect of Male to Female teacher ratio on children's activity

	Male to Female teacher ratio at the median	Male to Female teacher ratio =2	Male to female teacher ratio at the national level for the vulnerable governorate
	% change	% change	% change
Attending school only	0.5	0.7	1.8
Attending school and working	0.0	0.0	0.3
Economically active only	-0.2	-0.3	-0.6
Neither working nor studying	-0.3	-0.4	-1.5

Source: authors calculations based on Yemen (NPS and School based survey, 1999)

Table 22 - Yemen. Simulated effect of Classes to Classroom ratio on children's activity

	Classes to Classroom ratio at the median
	% change
Attending school only	0.1
Attending school and working	0.0
Economically active only	0.0
Neither working nor studying	-0.1

Source: authors calculations based on Yemen (NPS and School based survey, 1999)

Table 23 - Yemen. Simulated effect of school availability on children's activity

	Basic school	Basic school and secondary school	8
	% change	% change	8
Attending school only	0.6	2.5	8
Attending school and working	0.0	0.0	8
Economically active only	-0.2	-0.8	8
Neither working nor studying	-0.4	-1.7	8

Source: authors calculations based on Yemen (NPS and School based survey, 1999) 8

Table 24 - OLS estimates at community level

	Number of obs = 667 F(25, 641) = 10.83 R-squared = 0.2969 Prob > F = 0.0000		
	Coef.	Std. Err.	t
Family moved			
Status health services 1	-0.0471	0.0510	-0.92
Status health services 2	-0.0401	0.0515	-0.78
Water access	0.0008	0.0007	1.15
Electricity access	0.0024	0.0007	3.66
Public phone in the village	-0.0042	0.0277	-0.15
Agricultural land	0.0000	0.0000	1.53
Distance to the bus stop	0.0011	0.0003	3.20
Motorable road	0.0078	0.0400	0.19
Pre school in the commune	0.0137	0.0280	0.49
Lower secondary school in the commune	-0.0130	0.0290	-0.45
Upper secondary school in the commune	0.0611	0.0390	1.57
Pupil teacher ratio	0.0004	0.0005	0.78
School parent association	-0.0662	0.0534	-1.24
School library	0.0386	0.0388	1.00
School buildings in concrete structure	-0.0048	0.0030	-1.62
School buildings in wooden structure	-0.0110	0.0040	-2.72
School buildings in bamboo structure	0.0219	0.0135	1.62
School buildings without good floor	0.0033	0.0061	0.53
School buildings without good roof	0.0109	0.0081	1.34
School buildings under repair	-0.0068	0.0118	-0.58
School buildings under construction	-0.0182	0.0158	-1.15
Ln expenditure	0.1486	0.0275	5.39
%teacher with 5-15 years of experience	0.1112	0.0943	1.18
% teacher with more than 15 years of experience	-0.0781	0.0885	-0.88
% teacher with lower sec. education	0.1048	0.0958	1.09
% teacher with higher education	0.1631	0.1152	1.42
_cons	-1.62187	0.375341	-4.32

Note: Staus Health services: 1- health services improved; 2- health services stayed the same; comparison group: health services deteriorated

Table 25. Sensitivity analysis for "Pupil teacher ratio" for different values of the sensitivity parameters

	$\alpha=0$ $\delta_{iW}=0$ $\delta_{iWS}=0$ $\delta_{iNO}=0$	$p=0.1, \alpha=0.1$ $\delta_{iW}=-0.1$ $\delta_{iWS}=0.1$ $\delta_{iNO}=0.1$	$p=0.5, \alpha=0.5$ $\delta_{iW}=0.1$ $\delta_{iWS}=0.1$ $\delta_{iNO}=0.1$	$p=0.1, \alpha=0.1$ $\delta_{iW}=-0.5$ $\delta_{iWS}=0.5$ $\delta_{iNO}=0.5$	$p=0.5, \alpha=0.5$ $\delta_{iW}=-0.5$ $\delta_{iWS}=0.5$ $\delta_{iNO}=0.5$
Working only	0.00495	0.00510	0.00516	0.00507	0.00457
	(0.00122)	(0.00121)	(0.00122)	(0.00122)	(0.00122)
Working and studying	0.00411	0.00398	0.00405	0.00402	0.00395
	(0.00078)	(0.00078)	(0.00078)	(0.00078)	(0.00079)
Neither working nor studying	0.00342	0.00349	0.00331	0.00347	0.00303
	(0.00172)	(0.00173)	(0.00173)	(0.00173)	(0.00173)

Note: base category "Study only"; absolute value of s.d. in parenthesis

Source: authors calculations based on Cambodia (CSES 03-04, EMIS 03-04)