

NiCE Working Paper 08-114

December 2008

**Household and context determinants of child labor
in 156 districts of 11 developing countries**

Ellen Webbink

Jeroen Smits

Eelke de Jong

Nijmegen Center for Economics (NiCE)

Institute for Management Research

Radboud University Nijmegen

P.O. Box 9108, 6500 HK Nijmegen, The Netherlands

<http://www.ru.nl/nice/workingpapers>

Abstract

We study household and context determinants of child labor for 150,000 children in 11 developing countries, with child labor rates ranging from 2 to over 20 percent. Multilevel analysis showed socio-economic factors to be still major determinants of child labor, with less child labor in households with more resources and in districts and countries that are more developed. Demographic factors are also important. First-born children and children with more siblings work more. This is also true if a parent is missing. Living in an extended family reduces child labor among girls. Effects of household-level factors depend on characteristics of the context, with stronger child-labor reducing effects under more favorable circumstances. Policy measures should focus on the weakest groups and on strengthening the position of women.

Ellen Webbink, e-mail: e.webbink@fm.ru.nl

Jeroen Smits, e-mail: j.smits@fm.ru.nl

Eelke De Jong, e-mail: e.dejong@fm.ru.nl

Introduction

Given the broad agreement that child labor should be eradicated and that it is in the interest of both the children and the country as a whole that all children go to school (Sen 1999; Barro 1999; Case 2001; World Bank 2002), governments and donor organizations during the last decades have done major efforts to reduce child labor throughout the developing world. However, in spite of these efforts, still over 200 million children are estimated to be working as child laborers worldwide. (ILO 2006). To improve this situation, it is of fundamental importance to gain a better understanding of the factors that influence the decisions of parents (or other caretakers) regarding the engagement in paid employment of their children. Policies directed at reducing child labor can only be effective if they are based on a thorough understanding of the forces by which young children are pushed or pulled into the labor market.

Most research on child labor focuses on predictors at one level, either the family level (e.g. Basu, Das and Dutta 2007; Buchman 2000; Patrinos and Psacharopoulos 1997) or the national level (e.g. Kis-Katos and Schultze 2006; Fan 2004; Levy 1985). However, the determinants of child labor are not restricted to one level. The outcomes of parental decisions regarding child labor depend not only on characteristics of those parents and their households, but just as well on the presence of job opportunities for children at the local labor market and on the characteristics of the available educational facilities. Hence, for gaining encompassing understanding of the roots of child labor, the relevant factors at the different levels should be considered simultaneously. Recently, this has been more and more recognized by researchers in school enrollment and child labor studies (Manacorda and Rosati 2007; Bashieri and Falkingham 2006; Kris-Katos and Schultze 2006; Smits, 2007; Huisman and Smits 2009). The current paper intends to add to this understanding by analyzing the effects of (family) background characteristics and characteristics of the context in which the family lives on engagement in child labor of children in eleven developing countries.

Using theoretical ideas from different disciplines, an encompassing theoretical framework is built which includes explanatory factors at the household, district and national level. The hypotheses derived from this framework are tested on a unique

database, containing information on over 150,000 children aged 8-13 and their families, in eleven developing countries from different regions of the developing world. Of these children we know whether or not they are engaged in paid labor and we have information on the socio-economic and demographic characteristics of their family background. This household-level information is combined with information about the district and the country in which the children live. As we can distinguish 156 districts in the eleven countries, there is ample explanatory power at the district level that can be used to test hypotheses on context effects. The context information includes indicators of level of development, degree of urbanization, the position of women and the quality of the available educational facilities.

To find out which factors at which level of aggregation are most important in explaining variation in child labor, we apply multi-level logistic regression models that make it possible to estimate effects of factors at household, district and national level simultaneously. To address within this framework of large-scale quantitative analysis the fact that each situation is unique -- and hence that the effects of the various factors might differ depending on the circumstances --, besides direct effects of the explanatory factors also interactions between household-level factors and characteristics of the context are studied. The information thus obtained might be helpful in developing tailor-made policy interventions aimed at reducing child labor.

In the next section, our theoretical model will be discussed and we formulate hypotheses on the way in which the household and context characteristics may affect child labor. Thereafter the data and methods are discussed. In the results section we first present bivariate associations between the explanatory variables and child labor, followed by the results of our multilevel logistic regression models. We end the paper with a concluding section in which the major findings and their implications are discussed.

Theories and hypotheses

Figure 1 presents the central model of the paper. It includes factors at both the household and the context level. Central in the model is the outcome of the (parental) decision regarding child labor: a child is or is not engaged in paid employment. Decisions regarding child labor are in three ways influenced by characteristics of the context in which the household lives: (1) directly (e.g. if there is no work for children in the local context, children will not work), (2) indirectly (e.g. if legislation against child labor is better enforced, there will be less opportunities for child labor in the local context) and (3) via interactions with household-level factors (e.g. effects of household wealth on child labor may depend on the costs of schooling in the local context). Hypotheses are formulated on individual/household factors, on context factors and on interactions between context and household factors. For reasons of simplicity, Figure 1 contains only the relevant factors, without specifying the nature of the relationships. These are illustrated in the theoretical review below.

Figure 1 about here

To understand the decision process taking place at the household level, often a human capital approach is used (Becker 1964; Edmonds 2008). Parents are assumed to weigh-off the current benefits from child labor against the current costs and the perceived future returns of schooling (Basu and Van 1998). This decision is influenced by the situation of the household and characteristics of the context in which the household lives. Especially in developing countries, where pension schemes are absent, parents may profit on the long run from the economic returns to children's education, assuming that there is bilateral altruism (Cigno and Rosati 2005).

As the decision making process takes place within the household, child labor theory has to account for the collective identity of the process. Traditional Beckerian models, however, treat the parents or household as one decision maker. Recent models do more justice to the collective identity of the family by considering more than one decision maker, so that parents and other (extended) family members are able to bargain about

their different interests (Cigno and Rosati 2005). The decision regarding child labor or schooling is supposed to be made for each child separately, but the outcome of this process is influenced by characteristics of other children in the household and what was decided for them. Parents may, for example, send weaker or cleverer children to school and keep stronger or less talented children at home to work on the land or in the household.

Since time is limited, decisions regarding child labor or schooling are time-allocation decisions, taken simultaneously with decisions about time spend on leisure, sleep, and travel (Contreras 2007; Edmonds 2008). Basically the decision-making process may lead to one of the following four possible outcomes:

- Send child to work, the income is needed in the present, the expected future returns to education do not outweigh the present costs
- Send child to school in the present, the returns to education outweigh the present costs
- Send child to school and to work: a child goes to school but also works after school hours or during certain periods (peak/ harvest periods), or is not enrolled in school full time.
- Send child neither to school nor to work, the child is not generating income by paid work in the present, but the returns to education do not outweigh the costs (and the child can help at home).

The fourth option, neither school nor working, is sometimes called idleness (Bocolod, Marigee and Ranjan 2008; Maitra, Panda and Sarangi 2006; Biggeri et al. 2003). Opting for idleness can be a sensible strategy from a risk aversion perspective (Maitra, Panda and Sarangi 2006). When children are enrolled in school and parents have made costs (like school fees in the beginning of the year) the children cannot easily help in times of sudden demand for (child) labor. In this situation the school fees can be considered as sunk costs. Therefore, some parents keep their children at home.

Figure 1 shows that at the household level, characteristics of the children themselves, of their parents and of the household are expected to influence the outcome of the decision making process. These factors may affect (the perception of) either the costs of schooling or the economic contribution of child labor in the present, or both.

Socio-economic factors

Since poverty is often mentioned as the major cause of child labor, income or wealth obviously influences the extent to which parents can afford schooling. If there is enough income for the household, there is no need to generate income from child labor. Since the parents may base their decisions on the perceived returns to child labor versus education or idleness, the educational status of the parents themselves might play a role too. If the parents received some education, they know the value of schooling and what the returns are and hence may be more motivated to send their own children to school and let them work less (Das and Mukherjee 2007). Parents who have reached a certain educational level can be expected to want their children to reach at least the same level (Breen and Goldthorpe 1997). We therefore expect higher levels of education of the parents to lead to less labor engagement of their children

We expect to find an effect of the education of both parents. But for girls probably the education of the mother is more important. Mothers who have succeeded in completing a certain level of education have experienced the value of education and know that it is within the reach of girls to complete that level. Therefore, we expect them to use the bargaining power and insights derived from their higher education to make sure that their daughters get educated too (Emerson and Souza 2007). Hence, girls with a higher educated mother will probably work less (Basu, Das and Dutta 2007). However, there is also empirical evidence from rural India, that the effect of the education of the mother on child labor is similar for boys and girls, while the effect of education of the father is stronger for boys (Kurosaki et al. 2006)

In developing countries, where many children grow up to do a similar job as their parents, we expect that there is a strong relationship between parent's and children's occupation. For some professions, like agricultural work and basic industries, this means that parents might believe that training by doing has more value than education (Bass 2004; Smits and Gunduz-Hosgor, 2006). We therefore expect that children with a father working in agriculture or trade will work more than other children. This effect will be probably more pronounced for boys, as they may be prepared for taking over the family business. Girls will be more trained in doing the household chores and to be a good

housewife as they are often expected to marry into the family of their husband (Bass 2004). If so, this implies that there are no direct returns for the parents and sending them to school might be considered a waste of money (Smits and Gunduz-Hosgor 2006; Huisman and Smits, 2009).

There is also empirical evidence that children of working mothers work more (Francavillia and Gianelli 2007). For girls, this effect is sometimes larger than for boys (Bhalotra 2003). This might be due to the fact that girls often “go along” with their mothers and that mothers often are engaged in home- based work.

Demographic factors

Besides socio-economic factors, also demographic characteristics of the household may influence the way in which the available resources are distributed among family members. An important recourse-dilution factor is the number of brothers and sisters. The likelihood that children go to school instead of working might decrease with every additional sibling, because there are more mouths to feed and higher schooling costs. On the other hand, more brothers and sisters means more helping hands, which allows for a division of the households chores and other work among the children. This may lead to more time for school or leisure for every child (Patrinos and Psacharopoulos 1997), or to schooling for some and child labor for others, as recourses tend to be unequally distributed in households with more siblings (Buchman 2000). Because work is often sex-specific (Morduch 2000), it is important to look also at gender differences in these sibling effects.

Applying the resource-dilution argument again, children might profit from other adults in the family when they live in an extended family. More adults in a household means more people for generating income and more helping hands to divide the household tasks (Huisman and Smits, 2009; Swaminathan 1998). Hence, we expect that children living in an extended family work less. When the father or mother is missing from a household, children consequently are expected to work more. With fewer adults in a household, the extra income might be much needed. With respect to birth order, it has been argued that first-born children need to work to pay for the education of the other children (e.g. Patrinos and Psacharopoulos 1995; Emerson and Souza 2008; Chesnokova

and Vaithianathan 2008). First-born children therefore are expected to work more than their younger brothers and sisters.

Parents may favor their own kin because the blood band ensures that they benefit from the future returns. There is some evidence that biological children work less than non- biological children (Bhalothra and Heady 2000). Others (Nkamleu and Kielland 2006) have expanded this idea by making the distinction between working outside the home and working in the family business. Inheritance laws in favor of biological children increase the value of work experience at a farm or household's business relative to schooling. This leads to the alternative prediction that foster children will be more engaged in paid work to generate extra income, but will work less in the family business, since this work leads to work experience valuable for inheriting the businesses.

Context factors

Decisions regarding child labor are not taken in a vacuum. Parents may take the demand for child labor at the local labor market and the quality of the available educational facilities into account. Also cultural factors, in particular gender role attitudes, may be important.

The demand for labor at the local labor market is difficult to measure. Therefore, we look at the general demand for labor, reflected by the district's level of development. In more developed (or urbanized) districts, the level of mechanization is generally higher. Assuming that mechanization replaces cheap unskilled labor, the demand for child labor might be lower in these areas. However, it has also been argued (Nkamleu and Kielland 2006) that more community wealth might lead to more labor opportunities, hence a higher child labor demand. Regarding the effect of urbanization, it could be argued that in rural areas, more efficiency may lead to more harvest, hence more work. On the other hand, there is also consensus on the idea that machines can lighten or replace agricultural work such as cotton picking, leading to a decrease of the demand for child laborers (Levy 1985). Hence the effects of development and urbanization on child labor are ambiguous.

Since schooling and working decisions are trade-off outcomes, it is important to include also an indicator of the local educational facilities in the model. It has been theorized and shown that the availability of schools plays a role in school enrollment and

employment of children (Huisman and Smits 2009; Baschieri and Falkingham 2007; Ersado 2005). In our analyses, we test the hypothesis that children are driven into child labor by the absence of good schooling facilities.

As a cultural characteristic, the position of women in the local context might be important. Empowerment of women is believed to improve their children's well-being and health. At the household level, more empowered women may use their influence to improve the health and schooling of their children (Mukherjee and Das 2008; Hobcraft 1993). Huisman and Smits (2009) showed that if the proportion of women compared to men in the district is lower – an indicator of women's position based on Sen's (1992) "missing women" thesis -- school enrollment of girls is significantly reduced. Similarly, we expect that in districts with a better position of women, parents will invest more in their children's future and hence both boys and girls may be less engaged in child labor.

Situation-specific knowledge

The reasons why children are engaged in paid employment may be different in different contexts. Policy measures for improving problem situations, therefore, require knowledge that is as specific as possible. In this paper, this specificity is achieved by studying how the effects of household-level factors differ among different contexts. In this way, the relative uniqueness of a problem situation is addressed by considering it as a unique combination of more general factors (i.e. the factors discussed in the preceding sections). The assumption underlying this approach is that all these factors may play a role in any problem situation, but that the extent of their importance may differ among situations and is related in predictable ways to characteristics of the context (compare Smits 2007; Huisman and Smits 2009).

Regarding the way in which effects of the household level factors may depend on characteristics of the context not much theory exists. However, it seems likely that under more difficult circumstances, parents with more resources will have more possibilities to prevent child labor than parents with fewer resources. For example, there are indications that under less favorable circumstances parents with more resources or motivation are better able to get their children into school (Filmer and Pritchett 1999; Handa 2002; Mugisha 2006). We therefore expect that in less developed districts, in districts with low

quality educational facilities and – with respect to paid labor of girls – in districts with a weaker position of women, the (child-labor reducing) effects of socio-economic resources of the parents are stronger.

Data and Methods

The data are derived from the Demographic and Health Surveys (DHS). These are large representative household surveys held since the 1980s in many developing countries. We use recent surveys for eleven countries; India, Bolivia, Dominican Republic, Colombia, Nicaragua, Uganda, Tanzania, Mali, Chad, Congo-Brazzaville and Malawi. These countries were chosen because the DHS data for them included information on the labor market participation of young children. Within these countries we distinguish 156 sub-national districts. The total number of children aged 8-13 available for our analyses is 167,383 of which 84,934 boys and 82,449 girls.

Besides household-level data, we also use context information at the district and national level. The district-level information is in part derived by aggregating from the household surveys. Because the samples are large, we could create district-level indicators by taking the district's average of characteristics of households and individuals (compare Huisman and Smits 2009). Information on educational facilities at the district-level was derived from other sources (statistical offices, Ministries of Education, websites, reports).

Methods

The effect of family background characteristics on the participation in child labor is studied using multilevel logistic regression analysis. Dependent variable in this analysis is a dummy variable indicating whether (1) or not (0) the child performed any economic activity in the week before the survey. We restrict our analyses to children aged 8-13. The upper limit was chosen because the ILO- conventions on child labor permit light work for 14 and 15 year-olds in developing countries. To test whether the effects of the explanatory variables differed between boys and girls we computed interactions between all variables and sex. If an interaction was significant, separate coefficients for boys and

girls were estimated. If the interaction was not significant, a coefficient for children in general is presented. In this way both the effects of the explanatory variables and the gender differences can be presented in a clear and concise way.

Variables

Independent variables at the household level are socio-economic characteristics (parental education, father's occupation, mother's employment, household wealth) and demographic characteristics (age, number of brothers and sisters, birth order, biological versus non-biological children, extended versus nuclear family and age at first birth of the mother).

Father's occupation is measured with three categories: (1) farm, (2) lower nonfarm (sales, service and manual occupations), (3) upper nonfarm (professional, managerial, technical and clerical occupations). Employment of the mother is a dummy indicating whether (1) or not (0) the mother is employed. Education of father is measured with three categories: (1) none, (2) at least some primary, (3) at least some secondary. Given the low educational levels of the mothers in these countries, their education was measured with a dummy indicating whether (1) or not (0) the mother had completed primary education.

Age of the child is measured in years. The numbers of sisters and brothers are measured with three categories (1) none, (2) one or two, and (3) three or more. For birth order also a three-category variable is used: (1) oldest child, (2) second to fourth child, (3) fifth or later child. Presence of the parents is measured with two dummies indicating whether (1) or not (0) the mother or father is missing from the household. Extended family is measured with a dummy indicating whether (1) or not (0) there are grandparents and/or other close relatives living in the household. Age at first birth of the mother was measured by a dummy variable indicating whether (1) or not (0) the mother got her first child below age 18.

Because income is lacking in most of the surveys, household wealth is used as an alternative. Household wealth is measured by an index constructed on the basis of household assets (such as radios, cars, telephones), the possession of land, and housing characteristics (such as floor material, roofing, toilet facilities, source of drinking water). Using a method developed by Filmer & Pritchett (1999), all households within a country

are ranked on the basis of their assets and divided into wealth index quintiles. Our wealth variable has three categories, (1) lowest 20%, (2) 20-80%, (3) upper 20%.

Urbanization is measured with a dummy variable indicating whether (1) or not (0) the child lives in a rural area. District level of development is measured by an index constructed on the basis of six variables aggregated from our household datasets: the percentages of households in the district owning a fridge, car, telephone, or television, and the percentages of households with electricity or running water. As indicator of school quality, we use the number of teachers per 1000 pupils in the district. This variable was constructed by dividing the number of teachers in primary education by the number of children aged 0-19 in the district. For Chad, Nicaragua and Dominican Republic, information at the country level was used because no information on number of teachers at the district level was available. Level of development at the country level was measured by national GDP per capita derived from the World Development Indicators (World Bank 2007).

Results

Figure 2 shows the percentages of boys and girls engaged in child labor in the countries. There are major differences between the countries and continents. Overall, in Latin America and India, the incidence of child labor is lower than in Africa. Only in Nicaragua, the percentage of boys engaged in child labor is with 17 percent comparable to some African countries. Children in Uganda are most engaged in child labor, with over 40 percent of children working. Children in Colombia are least involved, with 3 percent of boys and only 1 percent of girls reporting to work for pay. In Africa, there are striking differences between the countries, with percentage ranging from 10 (Malawi) to 47 (Uganda). In India, the incidence of child labor is with 6 percent for girls and 8 percent for boys relatively low compared to the other countries, but it still implies that millions of Indian children work for pay. The absolute difference between boys and girls is largest in Mali, with 15 percent of girls and 32 percent of boys engaged in paid work. The relative difference is largest in Nicaragua, with four times more boys than girls working.

Figure 2, 3 and 4 about here

Figure 3 shows the differences between urban and rural areas. In eight countries the incidence of child labor is substantially higher in the rural areas. Exceptions are Dominican Republic, Congo Brazzaville and India, where the differences are negligible. In these countries the demand for child labor might not be highest in agriculture but in other sectors.

The relationship between wealth and child labor also varies much among the countries (Figure 4). In Latin America, the largest differences (about 10 percent) between the poorest and upper wealth quintiles are found in Peru and Nicaragua. In Bolivia and Colombia only the lowest quintile differs from the other categories, indicating that the households in the middle quintiles have become wealthy enough to withdraw their children from the labor market (Basu 1998).

This is not the case in Africa, where in all countries a very substantial percentage of the children from the upper wealth quintile is economically active. In Congo-Brazzaville, there is even a completely reversed pattern with (somewhat) more child labor in the upper wealth quintile. In Chad and Uganda child labor is highest in the middle wealth group. These findings seem to indicate that in these very poor African countries, the money brought in by working children is badly needed to pull households out of extreme poverty and help them to build up at least some wealth. In India, there are only small differences between the upper quintile and the rest. Hence, wealth does not seem to play a role of importance there.

Bivariate analyses

The bivariate results of the multilevel logistic regression analyses can be found in Table 1. Coefficients that significantly (at $p=0.05$ level) differ between boys and girls are presented separately. Hence coefficients presented in the middle column under 'All' have about the same value for boys and girls.

Table 1 about here

Whether children are engaged in child labor is strongly related to socio-economic characteristics of their parents. Both boys and girls work significantly less when the father has a nonfarm occupation compared to children with a father engaged in farming. This is in line with expectations. If the mother is gainfully employed, both boys and girls work more. This indicates that in these countries mothers tend to work out of economic necessity and that in the households with working mothers any additional income is welcome.

Education of the father influences the engagement in child labor in a nonlinear way. Children of fathers with (some) primary education work more and children with fathers with at least some secondary education work less than children of fathers with no education. The effect of mother's education is as expected. When the mother received at least some primary education, both boys and girls work significantly less. The effects of household wealth are less strong than expected. Only in households in the upper wealth quintiles children work significantly less. Hence, as already could be seen in Figure 4, in these poor countries only the wealthiest groups escape the need for additional income from child labor.

With regard to the demographic factors, Table 1 shows that -- as found in most child labor studies -- boys are significantly more engaged in child labor than girls. Both boys and girls work more when they get older, but this effect is stronger for boys. Absence of the parents only has an effect when it concerns absence of the mother. When the mother is missing, children work more. Living in an extended family is associated with a higher level of child labor for girls but not for boys. Children who are fifth or later child are less likely to work. This is in line with the idea that later born children may profit of the earnings brought in by their earlier-born siblings. Regarding the number of siblings we see that girls with one or two sisters tend to be more engaged in child labor than boys with one or two sisters; however for neither of them the effect is significant. Having three or more brothers increases the likelihood of being employed for all children, but in particular for boys. When the mother had her first child under eighteen, boys tend to work slightly more.

Regarding the context in which the household lives, we see that child labor levels are higher in rural areas. Also children living in districts with a lower level of development or in countries with lower GDP per capita tend to work more. This is in line with the idea that modernization improves the situation of children and refutes the presumption that modernization would lead to a higher demand for cheap labor. Our indicators of the quality of the available educational facilities and of the position of women in the district show no significant effects.

Multivariate analyses

The coefficients of the bivariate analyses are important, because they show how child labor varies among households and districts with different characteristics. They thus represent the observable reality in the countries under study. However, because these characteristics may be related to each other (e.g. higher educated mothers tend to be married with higher educated fathers; traditional women tend to live in the countryside; being the fifth child means having at least four siblings), the bivariate figures give no insight into the relative importance of the various characteristics in explaining child labor, and hence learn us little about the underlying processes. To gain more insight into these underlying processes, we now turn to the multivariate results.

Table 2 presents coefficients of two multivariate models. Model 1 contains only coefficients of the main effects. Model 2 is similar to Model 1, but contains also all significant interaction effects. To keep the tables readable, the interaction coefficients are presented separately in Table 3. As in the bivariate analysis, separate coefficients for boys and girls are presented if the gender difference was statistically significant.

Comparison of Models 1 and 2 makes clear that addition of the interaction effects to the model has not very much influence on the coefficients of the explanatory variables. Only for employment and education of the mother and for living in a rural area the significance of the coefficients changes (from insignificant to significant).

Socio-economic background of the parents influences the working status of children in several ways. Having a working mother is most strongly related to employment of girls. This effect is positive, thus supporting earlier findings (e.g. Francavillia and Gianelli 2007) indicating that girls with working mothers tend to work more. As this

effect is controlled for household wealth, we cannot say that financial reasons are responsible for this effect. Maybe these girls work more because they go along with their mothers into the fields or factories. It is also possible that employment of the mother is a sign of demand for cheap female labor at the local labor market. Occupation of the father is only associated with less child labor if the father works in an upper nonfarm occupation.

Children of fathers with at least some secondary education work less than children of fathers with no education. The effect of having a father with at least some primary education found in the bivariate analysis is not present any more in the multivariate models. Education of the mother has no significant effect any more in Model 1, but regains its significance when in Model 2 the interaction effects are included. In line with expectations, we find that children living in wealthier families work significantly less than children in less wealthier families. This effect is in Table 2 also significant for the middle wealth category.

Table 2 about here

With respect to demographic variables, we see that boys are more engaged in child labor than girls and that older children work more than younger children. The age effect is stronger for boys than for girls, suggesting that the gender difference increases with age. When the father is missing from the household, girls are more engaged in child labor. When the mother is missing, both boys and girls tend to work more. One would think that when the father is missing, boys have to take over the father role, but apparently single mothers tend to put economic responsibilities more on the shoulders of their daughters than of their sons. In the multivariate models, living in an extended family reduces the likelihood that girls are engaged in child labor. Hence the positive effect found in the bivariate analysis was probably due to the fact that extended families tend to be more traditional, rural and disadvantaged in other respects. No evidence is found for the idea that parents favor their own children over foster children. Biological children do not work less than non-biological children.

There is no difference between boys and girls with respect to the effect of birth order. Firstborn children work more than their later born siblings, indicating that these working children generate income to pay for their sibling's education. Children with more brothers and sisters have to work more (although the effect of the number of sisters is only significant for children with one or two sisters). This supports the resource-dilution argument. Whether the mother had her first child under the age of eighteen does not significantly influence the engagement in child labor of her children. This might mean that cultural factors have a smaller influence on child labor than, for example, on educational participation, which tends to be reduced for children of teenage mothers (Huisman and Smits 2009).

Children in rural areas work more, although this effect is only significant in Model 2. Both the district level of development and national GDP per capita have significant negative effects, indicating that child labor is concentrated in less developed districts and countries. The number of teachers per 1000 pupils has no significant effect on child labor. Neither has our indicator of the position of women. Hence for explaining variation in child labor economic factors seem to be more important than the availability of good educational facilities or culture.

Interaction effects

In our theoretical section, we hypothesized that under less favorable circumstances socio-economic characteristics would be more important. To test this hypothesis, we computed interaction effects between relevant context factors (urbanization, district level of development, school quality and position of women in the district and national GDP per capita) and the household-level variables. Given the large number of potential interaction effects, only the significant interactions are included in our model. As none of the interaction effects differed significantly between boys and girls, only general coefficients are presented.

Table 3 about here

Table 3 shows that in rural areas the advantages derived from having a mother with some education, of belonging to the upper wealth quintile, of living in an extended family, of having better educational facilities or a stronger position of women are all reduced compared to the situation in urban areas. At the same time we see that in the countries with higher GDP per capita the child labor reducing effect of father's education is stronger. These findings are not in line with our expectation that under more difficult circumstances resources make more of a difference. In contrast, we see that especially for women a relatively favorable context is needed to let their children profit of their resources. Table 3 shows that their absence from the household is more problematic in districts with higher levels of development or better educational facilities. Also their education makes more of a difference if the educational facilities are better or the position of women is stronger in the district. Education of the husband, in contrast, makes less of a difference if the position of women is stronger in the district. Hence improvements in the position of women are associated with greater importance of their resources compared to their husband's.

With increasing level of development of the district, the positive effect of having an employed mother on child labor becomes stronger and this effect becomes also significant for boys. This suggests that in the more modern regions within these poor countries the demand for cheap (female or children's) labor is higher. The negative interaction coefficient of district level of development with the wealth index middle quintile indicates that the advantages of living in a relatively developed district are reaped more by the middle groups than by the poorest households.

The already low chances of 5th and later born children to be engaged in child labor are even more reduced in districts with better educational facilities and in countries with higher GDP per capita. Also competition with brothers that may drive children into the labor market is lower if the educational facilities are better.

Conclusions

We studied effects of household and context variables on the likelihood of being engaged in child labor for over 150,000 children living in 11 developing countries. At the household-level, both socio-economic and family structure characteristics were included in the analysis. The context in which the household lived was indicated by its urbanization, level of development, quality of the available educational facilities and the position of women. Besides direct effects of the context factors, also interactions between these factors and the household variables were analyzed. In this way more profound insights were obtained into the role of these household level factors under different circumstances.

In line with expectations, we found socio-economic characteristics of the family background to make a large difference for children's employment. Children work less if their parents have a higher educational level, if their father has an upper nonfarm occupation and if the household is wealthier. The effect of wealth is substantial. Children belonging to the lowest wealth quintile have 62 percent higher odds of being employed than children from the upper wealth quintile. The effect of employment of the mother is positive and stronger for girls than for boys. Hence children and especially daughters of working mothers tend to work more. This finding is in line with earlier research (Bhalotra 2003; Francavillia and Gianelli 2007). Possible explanations are that girls tend to go along with their working mothers or that employment of mother's is a sign of demand for cheap (female or children's) labor at the local labor market.

Besides socio-economic factors, characteristics of the family structure—reflecting in part competition within the family—are associated with child labor. Children work more if they have more siblings and especially if they have more brothers. Hence the higher economic need of families with many children seems to push children into the labor market. The presence of more adults in the household reduces the need for child labor. Child labor is increased in families where one of the parents is missing and reduced in extended families. The presence of adults is especially important for girls. They profit most from living in an extended family and are more strongly affected when the father is missing. This last finding suggests that single mothers put economic responsibilities more

on the shoulders of their daughters than of their sons. Our expectation that non-biological children would be more involved in child labor was not confirmed by our data. This result does not refute the idea of Nkamleu and Kielland (2006) that both types of children are involved in different forms of child labor; non-biological children more outside the home and biological children more in the family business (which they may inherit).

The effects of the context factors urbanization, district level of development, and national GDP per capita were in line with expectations. We found less child labor in the more developed districts and countries and in the urban areas. Hence the idea that more community wealth leads to more child labor because it creates new job opportunities (Nkamleu and Kielland 2006) has to be rejected. Of the other context factors -- quality of the local educational facilities and the position of women -- no significant direct effects were found. That does, however, not mean that they are not important. Our interaction analysis revealed a substantial number of significant interactions between the context factors (including school quality and position of women) and household-level variables. Hence the way in which household-level factors affect children's employment is different for households living in different contexts.

Our central hypothesis regarding these interactions was that under more difficult circumstances the importance of socio-economic resources would be higher. This idea was largely disproved by our data. In urban areas and in more developed districts, the negative effect of household wealth on child labor was stronger than in rural and less developed areas. The child labor reducing effect of father's education was stronger in more highly developed countries and that of education of the mother in urban areas, in districts with better educational facilities and in districts with a better position of women. Also absence of the mother was more problematic in districts with higher levels of development and better educational facilities. These findings all seem to point in the same direction: *resources make more of a difference in a more favorable context*. This finding is very important, because it implies that the weakest groups in society, the ones with very few resources, not automatically benefit from an improvement in the circumstances under which they live (as is sometimes supposed).

Hence we can conclude that economic development is accompanied by both a reduction of child labor and an increase of the difference in child labor between the haves and the have-nots. Our major message to policy makers is thus that when regions and countries develop child labor might decrease at the upper and middle level of society but not at the lowest level and that for eradicating child labor completely specific support measures targeted at the weakest groups are required. Those support measures should not only focus on financial relieve, but also on strengthening the position of women. The findings of this and earlier studies (e.g. Smits and Gunduz-Hosgor 2006; Huisman and Smits 2009) make clear that under more favorable circumstances mothers can make better use of their (educational) resources on behalf of their children.

References

- Barro, Robert J. 1999. 'Determinants of Democracy.' *Journal of Political Economy* 107 (6): 158-183.
- Bass, Loretta, E. 2004. *Child labor in Sub-Saharan Africa*. Boulder: Lynne Rienner Publishers.
- Baschieri, Angela and Jane Falkingham. 2006. "Staying in School: Assessing the Role of Access, Availability and Opportunity Cost." S3RI Applications & Policy Working Papers.
- Basu, Kaushik, and Pham Hoang Van. 1998. "The Economics of Child Labor." *The American Economic Review* 88 (3): 412-426.
- Basu, Kaushik. 1999. "Child Labor: Cause, Consequence, and Cure, with remarks on International Labor Standards." *Journal of Economic Literature* 37(3): 1083-1119.
- Basu, Kaushik, and Zafiris Tzannatos. 2003. "The Global Child Labor Problem: What Do We Know and What Can We Do?" *World Bank Economic Review* 17 (2): 147-173.
- Basu, Kaushik, Sanghamitra Das, and Bhaskar Dutta. 2007. "Child labor and Household Wealth: Theory and Empirical Evidence of an Inverted U." IZA Discussion Paper No. 2736.
- Becker, Gary.S. 1964 (1993, 3rd ed.). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. Chicago: University of Chicago Press.
- Biggeri, Mario, Lorenzo Guarcello, Scott Lyon, and Furio C Rosati. 2003. "The Puzzle of "Idle" Children: Neither in School nor Performing Economic Activity: Evidence from Six Countries." Understanding Children's Work Project Working Paper Series.
- Bhalotra, Sonia, and Christopher Heady. 2000. "Child Farm Labor: Theory and Evidence." STICERD - Development Economics Papers 24.
- Bhalotra, Sonia, and Christopher Heady. 2003. "Child farm Labor: The Wealth Paradox." *The World Bank Economic Review* 17 (2): 197-222.
- Bhalotra, Sonia. 2003. "Child Labour in Asia and Africa." Background Research Paper for the EFA Monitoring Report.
- Bocolod, Marigee, P., and Priya Ranjan. 2008. "Why Children Work, Attend School, or

- Stay Idle: The roles of Ability and Household Wealth.” *Economic Development and Culture change* 56 (4): 791–828,
- Breen, Richard, and John H. Goldthorpe. 1997. “Explaining Educational Differentials: Towards a Formal Rational Action Theory.” *Rationality and Society* 9 (3), 275-305.
- Buchmann, Claudia. 2000. “Family structure, parental perceptions, and child labor in Kenya: What factors determine who is enrolled in school?” *Social Forces* 78 (4): 1349–1378.
- Case, Anne. 2001. “The primacy of education”. Princeton: WWS Working Paper 203.
- Chesnokova, Tatyana and Rhema Vaithianathan. 2008. Lucky Last? Intra- Sibling Allocation of Child Labor. *The B.E. Journal of Economic Analysis & Policy* 8 (1) article 20.
- Cigno, Alessandro and Furio Rosati. 2005. *The Economics of Child Labor*. Oxford: University Press.
- Colclough, Ch., Rose, P. & Tembon, M. (2000). Gender Inequalities in Primary Schooling; The Roles of Poverty and Adverse Cultural Practice. *International Journal of Educational Development*, 20, 5-27.
- Das, Saswati, and Diganta Mukherjee. 2007. “Role of Women in Schooling and Child Labour Decision: the Case of Urban Boys in India.” *Social Indicators Research* 82 (3): 463-486.
- Edmonds, Eric.V. 2008. “Child Labor.” In *Handbook of Development Economics Volume 4* Edited by T. Paul Schultz and John Strauss. Amsterdam: Elsevier.
- Emerson, Patrick. M. and André. P. Souza. 2007. “Child Labor, School Attendance, and Intrahousehold Gender Bias in Brazil.” *The World Bank Economic Review* 21 (2): 301–316.
- Emerson, Patrick. M., and André. P. Souza. 2008. Birth order, Child Labor and School Attendance in Brazil. *World Development* 36 (9): 1647-1664.
- Ersado, Lire. (2005). “Child Labor and Schooling Decisions in Urban and Rural Areas: Comparative Evidence from Nepal, Peru and Zimbabwe.” *World Development* 33 (3), 455-480.
- Fan, C. Simon. 2004. Relative Wage, Child Labor, and Human Capital. *Oxford Economic*

- Papers* 56 (4): 687-700.
- Francavilla, Francesca, and Gianna C. Gianelli. 2007. "The Relationship between Child Labour and Mother's work: The Case of India". IZA Discussion Paper Series, No. 3099.
- Filmer, Deon and Lant Pritchett. 1999. "The Effect of Household Wealth on Educational Attainment: Evidence from 35 Countries." *Population and Development Review* 25 (1): 85-120.
- Handa, Sudhanshu .2002. Raising Primary School Enrolment in Developing Countries; The Relative Importance of Supply and Demand. *Journal of Development Economics*, 69, 103-128.
- Hobcraft, John. 1993. "Women's Education, Child Welfare and Child Survival: a Review of the Evidence". *Health Transition Review* 3 (2): 9-173.
- Huisman, Janine, and Jeroen Smits. 2009. "Effects of household and district-level factors on primary school enrollment in 30 developing countries." *World Development*, 37 (1) 179-193.
- International Labour Office. 2006. *The End of Child Labour: Within Reach*. Global Report under the Follow-up to the ILO Declaration on Fundamental Principles and Rights at Work. Geneva: ILO/IPEC.
- International Labour Office. 2002. *Eliminating the Worst Forms of Child Labour: A Practical Guide to ILO Convention No. 182*, Handbook for Parliamentarians No. 3-2002, Geneva: ILO and Inter-Parliamentary Union.
- Jensen, P. & Nielsen, H.S. (1997). Child Labour or School Attendance? Evidence from Zambia. *Journal of Population Economics*, 10, 4, 407-424.
- Kondolys, F. & Manacorda, M. (2006). School Proximity and Child labor. Evidence from Rural Tanzania. Working Paper for the UCW access and Quality workshop.
- Kis-Katos, K Krisztina. & Schulze, Günther.G. (2006). Where Child Labor Supply Finds its Demand, University of Freiburg, Institute for Economic Research, Working Paper.
- Kurosaki, Takashi., Ito, Seiro., Fuwa, Fuwa. Kubo, K Kensuke. & Sawada, Yasuyuki. (2006) Child Labor and School Enrollment in Rural India: Whose Education Matters? *The Developing Economies*, 44, 4, 440-464.
- Levison, Deborah. and Karine. S. Moe (1998), "Household Work as a Deterrent to

- Schooling: An Analysis of Adolescent Girls in Peru”, *Journal of Developing Areas*, 32(3), 339-356.
- Levy, Victor. 1985. “Cropping Pattern, Mechanization, Child Labor, And Fertility Behavior in a Farming Economy: Rural Egypt. “ *Economic Development and Cultural Change* 33 (4): 777-791.
- Maitra, Pushkar, Bibhudutta Panda and Sudipta Sarangi. 2006. “Idle Child: The Household’s Buffer.” Working Paper.
- Manacorda, Marco, and Furio C. Rosati. 2007. “Local Labor Demand and Child Labor.” Conference Paper for IZA Conference.
- Marx, Karl. 1867. *Das Kapital: Kritik der Politischen Oekonomie, 3d ed. translated by S. Moore and E. Aveling (1983)*. New York: International Publishers.
- Morduch, Jonathan. 2000. Sibling Rivalry in Africa. *American Economic Review*, 90, 2, 405-409.
- Mugisha, Frederick. 2006. School Enrollment among Urban Non-slum, Slum and Rural Children in Kenya: Is the Urban Advantage Eroding? *International Journal of Educational Development* 26(5), 471-482.
- Mukherjee, Dilip. & Das, Sanghamitra. 2008. “Role of Parental Education in Schooling and Child Labour Decision: Urban India in the Last Decade.” *Social Indicators Research* 89 (2): 305-322.
- Nkamleu, Guy B., and Anne Kielland. 2006. “Modeling Farmer’s Decisions on Child Labor and Schooling in the Cocoa Sector: A Multinomial Logit Analysis in Côte d’Ivoire.” *Agricultural Economics* 35 (3): 319-333.
- Patrinos, Harry, A., and George Psacharopoulos. 1997. “Family size, Schooling and Child Labor in Peru- An Empirical Analysis.” *Journal of Population Economics* 10 (4): 387-405.
- Purkayastha, D. 1998. Child Labor, Human Capital, and the Role of Parental Power in Poor Households. *Journal of Economic Development*, 23, 2, 43-55.
- Ray, Ranjan. 2000. “Child Labor, Child Schooling, and their Interaction with Adult Labor: Empirical Evidence for Peru and Pakistan.” *The World Bank Economic Review* 14 (2): 347-367.
- Ray, Ranjan. 2002. “The Determinants of Child Labour and Child Schooling in Ghana.”

- Journal of African Economies* 11 (4): 561-590.
- Rosati, Furio C. and Mariacristina Rossi. 2003. "Children's Working Hours and School Enrollment: Evidence from Pakistan and Nicaragua." *The World Bank Economic Review* 17 (2): 283-295.
- Sen, Amartya. 1992. "Missing Women." *British Medical Journal*, 304 (6827): 586-587.
- . 1999. *Development as freedom*. Oxford: Oxford University Press.
- Smits, Jeroen. 2007. Family Background and Context Effects on Educational Participation in Five Arab Countries. *Nijmegen Center for Economics (NiCE)*. Working Paper 07-106.
- Smits, Jeroen., and Ayşe Gündüz-Hoşgör. 2006. "Effects of Family Background Characteristics on Educational Participation in Turkey." *International Journal of Educational Development* 26, (5): 545-560.
- Swaminathan, Madhura. 1998. "Economic Growth and the Persistence of Child Labor: Evidence from an Indian City." *World Development* 26 (8): 1513-1528.
- World Bank. 2002. "Poverty Reduction Strategy paper." Education Chapter. Geneva: World Bank.
- _____. 2007. World Development Indicators: www.worldbank.org.

Figure 1: Household-level and context determinants of child labor

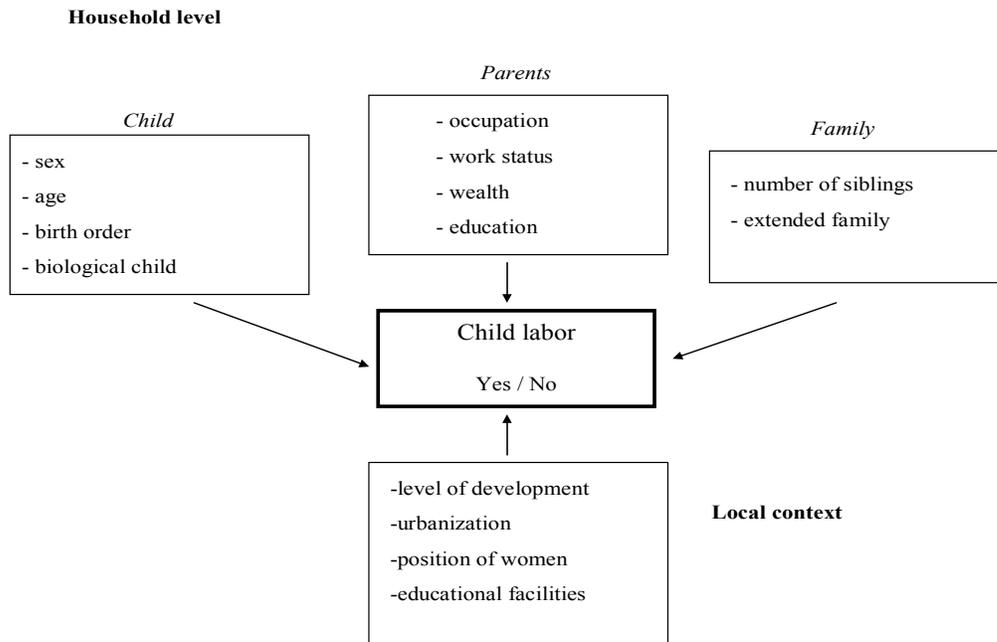


Figure 2. Percentages of boys and girls aged 8-13 engaged in child labor by country

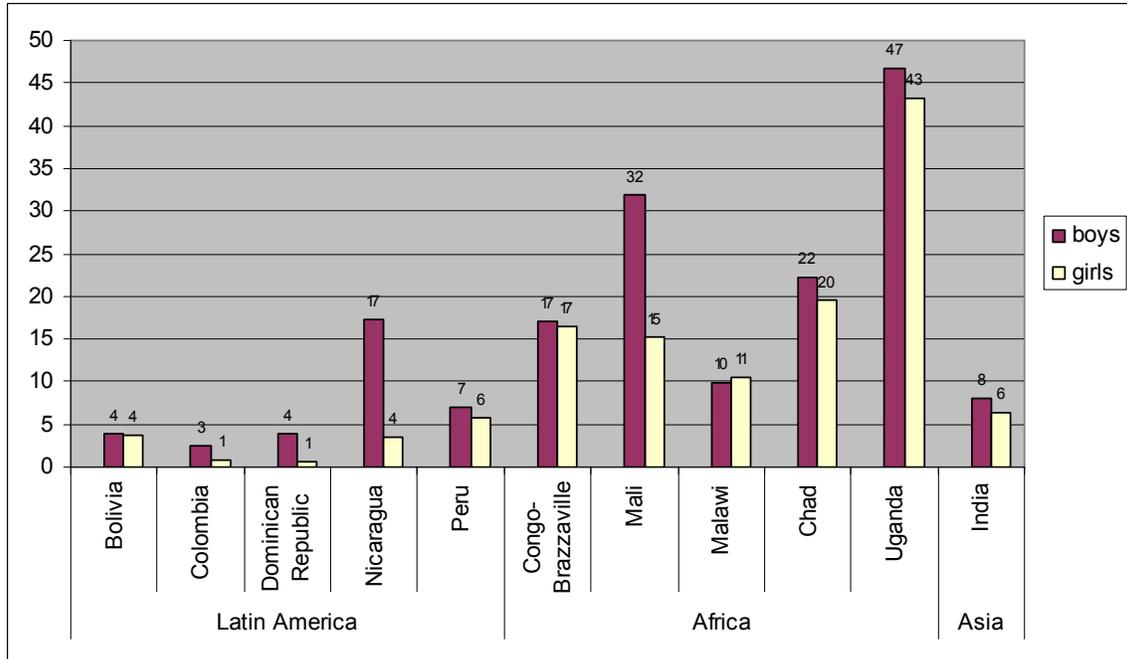


Figure 3. Percentages of children aged 8-13 engaged in child labor by urbanization and country

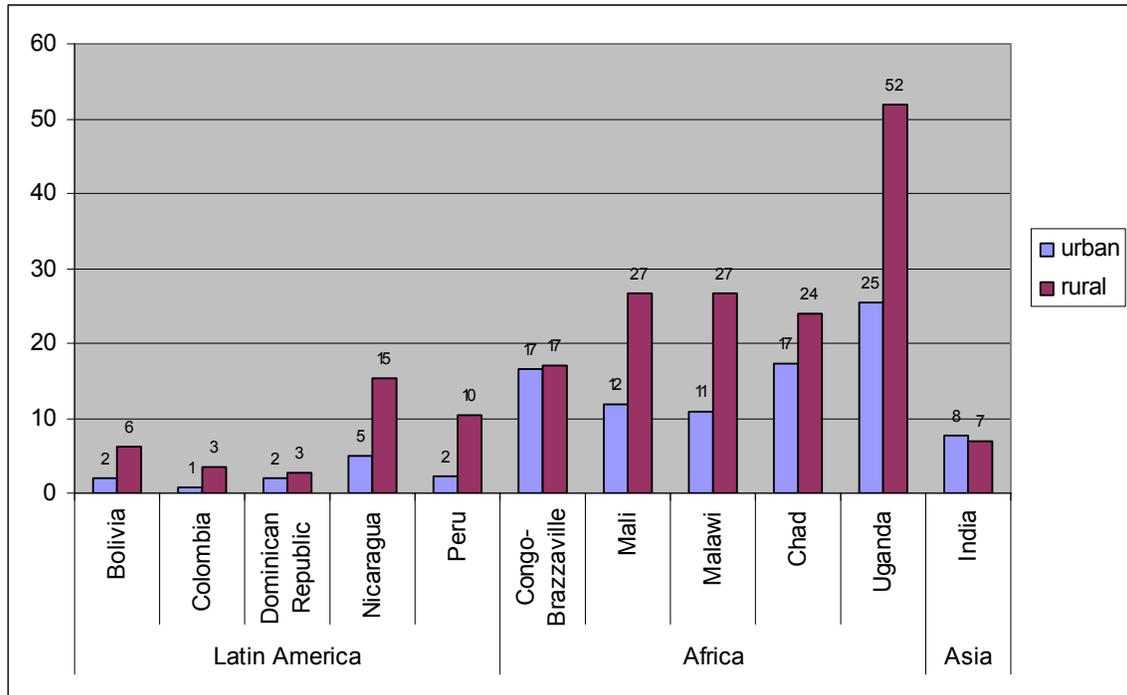


Figure 4. Percentages of children aged 8-13 engaged in child labor by wealth status

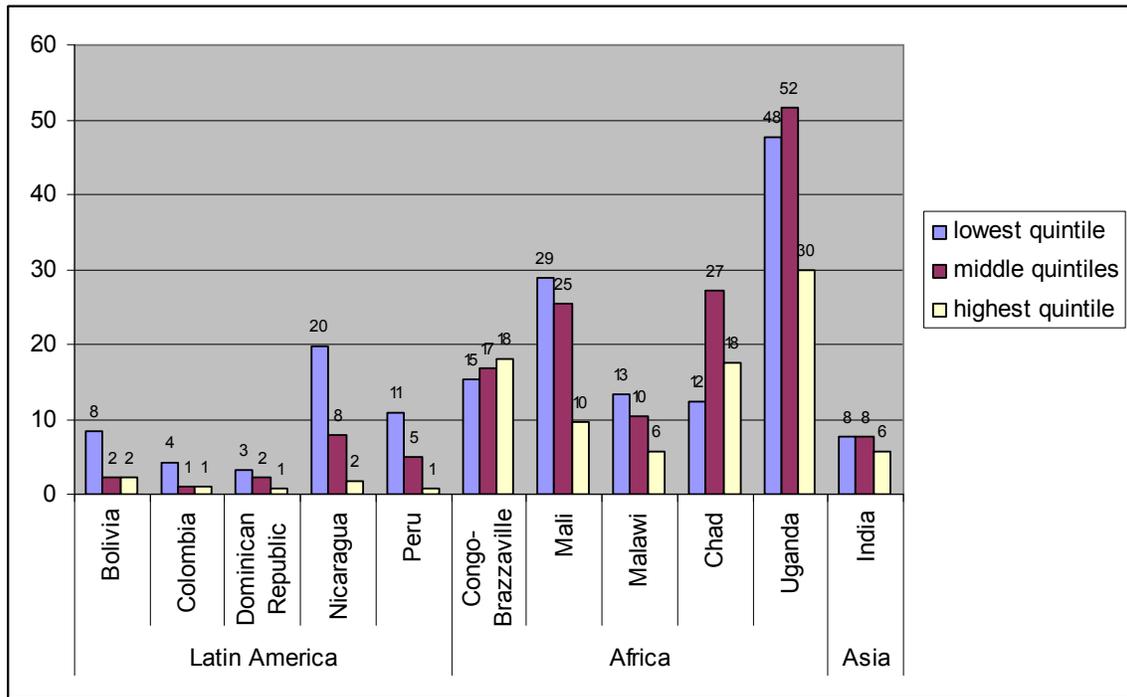


Table 1. Bivariate coefficients of multilevel logistic regression models explaining variation in child labor among boys and girls aged 8-13

	Boys	All	Girls
Household level			
Socio-economic factors			
Occupation father			
<i>Farm</i>		<i>Ref.</i>	
<i>Lower non-farm</i>		-0.161**	
<i>Upper non-farm</i>		-0.506**	
Mother employed		0.152**	
Education father			
<i>None</i>		<i>Ref.</i>	
<i>At least some primary</i>		0.107*	
<i>At least some secondary</i>		-0.331**	
Education mother at least some primary		-0.199**	
Household wealth			
<i>Lowest quintile</i>		<i>Ref.</i>	
<i>Middle quintiles</i>		0.045	
<i>Upper quintile</i>		-0.538**	
Demographic factors			
Boys		0.303**	
Age	0.176**		0.133**
Father missing		0.054	
Mother missing		0.092*	
Extended family	-0.012		0.048*
Biological child		-0.042	
Birth order child			
<i>First born child</i>		<i>Ref.</i>	
<i>2nd to 4th child</i>		-0.002	
<i>5th or later child</i>		-0.203**	
Number of sisters			
<i>None</i>		<i>Ref.</i>	
<i>One or two</i>	-0.034		0.032
<i>Three or more</i>		0.018	
Number of brothers			
<i>None</i>		<i>Ref.</i>	
<i>One or two</i>		-0.043	
<i>Three or more</i>	0.164**		0.086*
Mother got 1st child under age 18	0.044*		0.001
Living in rural area		0.467**	
District level			
District level of development		-0.029**	
Number of teachers per 1000 pupils		0.009	
Percentage women in age group 40-69	1.633		2.486
Country level			
GDP per capita		-0.001**	
N	84, 934	167, 383	82, 449

* $P < 0.05$ ** $P < 0.01$

Table 2: Coefficients of multilevel logistic regression analyses explaining variation in child labor among boys and girls aged 8-13 on the basis of household, district and country variables

	Model 1			Model 2		
	Boys	All	Girls	Boys	All	Girls
Intercepts						
Country level		0.201*			0.167*	
District level		0.725**			0.709**	
Individual level	-3.287*		-2.880	-3.007*		-2.599
Household level						
Socio-economic factors						
Occupation father						
<i>Farm</i>		<i>Ref.</i>			<i>Ref.</i>	
<i>Lower non-farm</i>		-0.055			-0.042	
<i>Upper non-farm</i>		-0.283**			-0.272**	
Mother employed	0.082		0.349**	0.176**		0.383**
Education father						
<i>None</i>		<i>Ref.</i>			<i>Ref.</i>	
<i>At least some primary</i>		-0.031			-0.084	
<i>At least some secondary</i>		-0.133**			-0.185**	
Education mother at least some primary		-0.068			-0.162**	
Household wealth						
<i>Lowest quintile</i>		<i>Ref.</i>			<i>Ref.</i>	
<i>Middle quintiles</i>		-0.137**			-0.193**	
<i>Upper quintile</i>		-0.461**			-0.486**	
Demographic factors						
Boys		0.325**			0.332**	
Age	0.182**		0.133**	0.183**		0.134**
Father missing	0.019		0.140**	0.029		0.140**
Mother missing		0.149**			0.167**	
Extended family	0.026		-0.082**	0.004		-0.100**
Biological child		-0.027			-0.039	
Birth order child						
<i>First born child</i>		<i>Ref.</i>			<i>Ref.</i>	
<i>2nd to 4th child</i>		-0.078*			-0.082*	
<i>5th or later child</i>		-0.230**			-0.335**	
Number of sisters						
<i>None</i>		<i>Ref.</i>			<i>Ref.</i>	
<i>One or two</i>		0.040**			0.043**	
<i>Three or more</i>		0.084			0.085	
Number of brothers						
<i>None</i>		<i>Ref.</i>			<i>Ref.</i>	
<i>One or two</i>		0.076**			0.072**	
<i>Three or more</i>		0.210**			0.205**	
Mother got 1 st child under age 18		-0.013			-0.016	
Living in rural area		0.269			0.310**	
District level						
District level of development		-0.020*			-0.015*	
Number of teachers per 1000 pupils		0.018			0.005	
Percentage women in age group 40-69		-0.554			-0.737	
Country level						
GDP per capita		-0.001**			-0.001**	
N	84, 934	167, 383	82, 449	84, 934	167, 383	82, 449

* $P < 0.05$ ** $P < 0.01$

Table 3: Cross level interaction coefficients of Model 2 in Table 2

Interactions with living in a rural area	
Education mother at least some primary	0.293**
Wealth index upper quintile	0.342**
District level of development	-0.276**
GDP	0.280**
number of teachers per 1000 pupils	0.141**
Percentage women in age group 40-69	0.222*
Extended family	0.095**
Interactions with district development index	
Mother missing	0.082*
Mother employed	0.191**
Wealth index middle quintiles	-0.101**
Interactions with number of teachers per 1000 pupils	
Mother missing	0.087**
Education mother at least some primary	-0.165**
Birth order 5+ child	-0.130**
Nr brothers 1-2	-0.033**
Interactions with percentage women in age group 40-69	
Education mother at least some primary	-0.098*
Education father primary	0.039**
Interactions with GDP	
Education father more than primary	-0.115*
Birth order 5+ child	-0.088**
N	167,383

* $P < 0.05$ ** $P < 0.01$