

Remittances, Child Labor and Education in Ethiopia

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Abstract: This paper explores the impact of remittances on educational investments and child labor in Ethiopia. We propose a two period model to explain the family's behavior with respect to allocating children's time to work and school. We test aspects of this model using the 2000 wave of the Ethiopian Urban Socio-Economic Survey. We find that remittances appear to promote educational investments in children and reduce child employment during school days. However, during the weekend, when school no longer competes for time, remittances have no impact on work. These results suggest that policies to reduce child labor are likely to prove most effective when they are accompanied by increases in the availability and accessibility of schooling.

Keywords: worker's remittances, education, child labor, Africa, Ethiopia

JEL Codes: O12, O15, O55

A. Introduction

Child labor and its potential multi-dimensional negative impact on child development has been an important issue among policy makers and academics for some time. Concerted efforts have been made to understand the causes as well as consequences of child labor, which is especially prevalent in poor economies. The latest report by the International Labour Office (ILO) shows that for the first time the number of child workers has decreased around the world, from 246 million to 218 million over the last four years (ILO, 2006). Nonetheless, the incidence rates are still considered too high.

The economic literature often casts the sources of child labor in poor economies to be multi-faceted. On the one hand, a simple, pragmatic model of the family as a welfare-maximizing unit depicts child labor supply as a rational decision by the household. With appropriate discounting, a household derives optimal child labor supply by equating benefits and costs—of augmenting current income versus future transfers dependent on accumulated human capital. This process is impacted by variables that affect relative returns, including household income from other sources (or the degree of subsistence living or poverty), the human capital accumulation process and access to financial resources (Basu and Van, 1998; Grootaert and Kanbur, 1995). In such models, it is also shown that inefficiently high child labor may arise due to factors such as concerns over loyalty of children, zero parent-to-child bequests, credit rationing and income inequalities (Baland and Robinson 2000; Ranjan, 2001).

On the other hand, in developing economies child labor may serve as a potential *ex ante* and *ex post* insurance mechanism. In developed countries, due to the availability of formal financial sectors and instruments, economic agents trade contingencies in a neutral risk market to insure themselves against idiosyncratic income shocks. In contrast, due to lack of such instruments in developing economies, households often resort to informal insurance avenues before and after the incidence of shocks. Such alternative avenues include involvements in altruistic transfers, informal loans and various village-level risk pooling associations, engaging in low-risk yet low-yielding income generating activities,

sending of family members to geographically (and/or occupationally) dispersed areas, and diversifying into secondary income-generating activities (see Morduch 1995; Besley, 1995 and Hoogeveen, 2001 for review). One such secondary income activity is child labor. Households may withdraw children from school and send them to earn labor income to augment other income sources and essentially smooth current consumption. There are some studies that investigate this phenomenon – tracking the use of children’s income as a response to increased household income uncertainty (Jacoby and Skoufias, 1997; Fitzsimons, 2003).

In this scenario, one expects remittances to reduce child labor and thereby have a positive impact on child schooling in developing countries. Two effects can be mentioned for expecting this to be the case. First, since remittances potentially provide an alternative mechanism by which one can smooth income, households can use them as the priority means of current consumption smoothing rather than relying on children’s income. This frees children to stay in school and may also provide extra resources for better schooling logistics for the children. Second, remittance senders can sometimes earmark receipts to be used specifically for children’s schooling, which constrains households to look for other income augmenting and smoothing mechanisms apart from children’s income.

Data from UNESCO (2004) indicated that levels of education in Ethiopia are relatively low. Primary school net enrollment ratios (constructed by dividing total primary school enrollment by the total stock of primary aged children) are 0.52 for boys and 0.41 for girls. Secondary school enrollment ratios are even lower, falling to 0.19 for males and 0.11 for females. In contrast, public resources devoted to education as a percentage of Ethiopian GDP stands at 4.9 comparing favorably to other nations in Africa (UNESCO, 2004). For example, Botswana expends 2.1 percent of its GDP on education, while Gambia expends 2.7 percent. Comparative statistics indicate that on average Africa lags behind Latin America and Asia in minimizing the incidence of child labor. While about 5.1 and 18.8 percent of Latin American and Asian children (aged 5-14) were found to be economically active, in Africa the participation rate is 26.4 percent (ILO, 2006). The ILO

also notes that sub-Saharan Africa remains the biggest challenge since it has made the least progress in combating child labor despite experiencing the highest incidence.

While our data do not permit us to address all the issues we have delineated regarding the interaction of child labor, schooling and income variations, we do explore a few simple hypotheses about the relationship between remittance receipt, child schooling and child labor. We use survey data from the Ethiopian Urban Socio-Economic Survey (EUSES), conducted by the Department of Economics of Addis Ababa University, Ethiopia, in collaboration with Goteborg University of Sweden. The survey collects detailed information on household demographics, employment, consumption, health and welfare from a nationally representative sample of 1500 households in seven major urban centers in the country. We use the fourth (2000) round of the survey given its extensive coverage of child schooling and child labor. We attempt to measure how remittance receipt impacts on both schooling and child work decisions with respect to children aged 5-15 residing in the sample households.

B. Literature Review

Many countries have laws that prohibit children under the age of 15 from engaging in market work. Nonetheless, national surveys that inform on the time-use of individuals within the family indicate that a large proportion of children in LDCs do engage in market work. A number of papers on child labor strive to understand why parents persist in steering or allowing their children to participate in market work. What can be done to reduce the incidence of child labor and in its place increase educational attainment? Are certain incentives more effective in reducing child labor? Should our stance regarding child labor differ depending on whether the activity is remunerated in the marketplace in contrast to involving intra-family work? These are some of the issues we could grapple with in analyzing and understanding what drives child labor and education in urban Ethiopia.

With respect to policies aimed at reducing child labor, the International Labour Office has taken the position to promote policies to increase the level of education since it is presumed that more hours in school will automatically reduce hours at work. Ravallion and Wodon (2000) use the results of a "food for education" experiment in rural Bangladesh to quantify whether work and school are substitutes. Families were given food subsidies if their children attended school. In an examination of the family's behavior in response to the subsidies, they found that subsidies increase schooling while only minimally decreasing labor, but in line with earlier studies they found considerably more substitution of school for work in the case of boys. Only one-eighth of the increase in school attendance is attributable to a decrease in work for girls. Girls' schooling is more likely to come at the expense of leisure therefore minimizing the impact on hours of work.

Yang (2004) uses the Asian currency crisis to map out how variations in remittance receipts affect education and child labor in the Philippines. He uses the fact that the magnitude of the economic shock differed across Philippine recipient families depending on the host country of the family's emigrating members (because of differences in currency depreciation). Exploiting this variation across households he concludes that favorable economic shocks (which he translates into greater remittance flows) increases educational investments in girl children and decreases the number of hours worked by boy children.

C. Modeling Schooling, Work and Remittances

In order to devise hypotheses about the potential impacts of remittances on schooling and child labor, we first devise a simple two-period model that outlines the schooling and child labor decisions of a household that does not receive remittances. We then observe how household behavior changes in the case that the household is a recipient of remittances.

Baseline Model of Schooling and Work: Parents obtain utility from consumption in periods one and two with δ representing the value of consumption in the future relative to today.

$$U = \ln C_1 + \delta \ln C_2 \quad (1)$$

Consumption in period 1 is limited by earnings (Y) but can be augmented with children's labor.

$$C_1 \leq Y + w(T - h) \quad (2)$$

Children's contribution of income to the family is $w(T - h)$. T represents time available for either work or school by children. The fewer the hours that the child spends in school (h) the more the child can work. The child's monetary contribution to the family is measured by w , which could represent the child's wage in the marketplace, or the parent's wage. In other words, when children reduce the hours they spend in school the family's income can grow either because the child commands a wage in the marketplace, or because by having the child engage in home production, an adult in the family can increase the hours they spend in the marketplace.

In period 2 the household is expected to earn Y but these earnings will be augmented by transfers from the child (who is now an adult).

$$C_2 \leq Y + a(h) \quad (3)$$

We assume that $a'(h) > 0$ and that $a''(h) < 0$. The child's transfers to the parent, $a(h)$, rise with the level of investments in education with which the parent provided the child, but at a decreasing rate. The objective is for the parent to choose h to maximize utility subject to the constraints specified in (2) and (3) above. Substituting these into utility function (1) we obtain:

$$U = \ln[Y + w(T - h)] + \delta \ln[Y + a(h)] \quad (4)$$

There is only one choice variable in this model: h

$$\text{FOC}_h: \frac{\partial U}{\partial h} = \frac{-w}{C_1} + \frac{\delta a'(h)}{C_2} = 0 \quad (5)$$

This can be rewritten as:

$$\frac{C_2}{C_1} = \frac{\delta a'(h)}{w} \quad (6)$$

The ratio of consumption in period 2 to consumption in period 1 will be equalized to the ratio of the discounted marginal return to investing in human capital in period one (and realizing that investment in period 2 due to transfers) to the return to working in period 1. Hence we see that the first order condition is specifying that there is consumption smoothing taking place with respect to investments in education versus work in period 1. Next we explore how remittances impact the above decisions. This analysis is undertaken for two separate cases. In the first case the family expects remittances in the second period. We then compare this outcome to one where remittances are forthcoming in period 1.

Case 1: Remittances forthcoming in period 2: To analyze how behavior changes with the prospect of remittances, we add a remittance receipt term in period 2 which we denote as R . The first period's consumption equation remains unchanged at:

$$C_1 \leq Y + w(T - h) \quad (7)$$

A term is added to represent remittance receipt in period 2

$$C_2 \leq Y + a(h) + R \quad (8)$$

Now two transfers can augment income in period 2--transfers from the child to the parent, $a(h)$, and transfers from emigrant family members, R .

Substituting 7 and 8 into the utility function (1) yields the following expression for utility:

$$U = \ln[Y + w(T - h)] + \delta \ln[Y + a(h) + R] \quad (9)$$

The first order condition remains as before:

$$\text{FOC}_h: \frac{\partial U}{\partial h} = \delta a'(h)C_1 - wC_2 = 0 \quad (10)$$

$$\frac{\partial \text{FOC}_h}{\partial h} = \delta a''(h)C_1 - w\delta a'(h) - wa'(h) \quad (11)$$

$$\frac{\partial \text{FOC}_h}{\partial R} = -w \quad (12)$$

$$\frac{dh}{dR} = -\frac{\frac{\partial \text{FOC}_h}{\partial R}}{\frac{\partial \text{FOC}_h}{\partial h}} = -\frac{-w}{\delta a''(h)C_1 - w\delta a'(h) - wa'(h)} < 0 \quad (13)$$

Increases in remittances expected in period 2 result in lower levels of investment in education. Given that the household expects greater income in period 2, the family increases consumption in period 1 by having children work. The level of work by children in period 1 is, however, tempered by the fact that increases in educational attainment by children in period 1 will result in greater income in period 2 since children's contributions to the family in period 2 rise with education in period 1.

Case 2: Remittances forthcoming in period 1: We consider an alternative model which has the household receiving remittances in period 1. Perhaps there are household members that emigrated before and they respond to a shortfall in earnings by their families by remitting instantaneously. In such a case our model would look as follows. The first period's consumption equation includes the remitting term:

$$C_1 \leq Y + w(T - h) + R \quad (14)$$

Period 2's consumption is augmented with child's altruistic payments alone when they become adults then.

$$C_2 \leq Y + a(h) \quad (15)$$

These are substituted into the utility function:

$$U = \ln[Y + w(T - h) + R] + \delta \ln[Y + a(h)] \quad (16)$$

Optimization yields the following:

$$\frac{\partial U}{\partial h} = \delta a'(h)C_1 - wC_2 = 0 \quad (17)$$

$$\frac{\partial FOC_h}{\partial h} = \delta a''(h)C_1 - w\delta a'(h) - wa'(h) \quad (18)$$

$$\frac{\partial FOC_h}{\partial R} = \delta a'(h) \quad (19)$$

implying that

$$\frac{dh}{dR} = -\frac{\frac{\partial FOC_h}{\partial R}}{\frac{\partial FOC_h}{\partial h}} = -\frac{\delta a'(h)}{\delta a''(h)C_1 - w\delta a'(h) - wa'(h)} > 0 \quad (20)$$

Increases in remittances will raise investments in education. Since remittances increase income in period 1, resources are freed to educate children today (foregoing their current earnings) and thereby pushing consumption into the future (via the child's future earnings).

The notion that remittances raise the educational attainment of family members left behind has received support in studies by Jensen and Nielsen (1996) for Zambia, Wahba (1996) for Egypt, Ilahi (2001) for Peru, Cox Edwards and Ureta (2003) for El Salvador, Kabki (2003) for West Africa, Hanson and Woodruff (2003) for Mexico, Amuedo-Dorantes and Pozo (2004) for the Dominican Republic and Gitter and Barham (2005) for Honduras.

But our model does point out that the timing of remittances is important. Future remittances in fact have a dampening effect on education, prompting instead child labor. This is interesting in that it suggests a mechanism by which the so called "disruptive effect of migration" operates. Current emigration causes the family to anticipate a higher level of consumption in the future, due to anticipated remittances once the emigrant is settled at his/her destination and has resources to aid his/her family. In the interests of

smoothing consumption, the family increases today's income via a means that it has at its disposal--children's labor.

D. Empirical Methodology

Our model suggests that the impact of remittances depends on when those flows are expected. If they are expected in the current period, investments in education should rise and work by children will fall. But if remittances are expected for the future, investments in education will fall, in the interest of consumption smoothing. Work by children will be used to compensate for income "shortfall" relative to tomorrow's levels of income. Credit constraints prevent families from borrowing against these future increases in income.

Since our data only inform us on whether households are receiving remittances today, and we have no information on future flows or expectations of future flows, we test the hypothesis that families with remittance inflows have their children work fewer hours, substituting more education in its place. As such we could estimate equations of the following form:

$$(E1) \quad S_{if} = f(R_{if}, X_{if}) + \varepsilon_{if}$$

and

$$(E2) \quad W_{if} = f(R_{if}, X_{if}) + \varepsilon_{if}$$

where S_{if} represents the educational outcome being examined, W_{if} represents child labor, X_{if} is a vector of child (i) and family (f) descriptors—including economic and human capital characteristics. Our equations also control for the receipt of remittances (R_{if}) and ε_{if} is the error term.

Estimation of (E1) or (E2) is problematic should there be any correlation between remittance receipt and the error terms. The coefficient estimates for remittance receipt in

our regression analyses may suffer from omitted variable bias. For example, unobserved heterogeneity may exist if remittance receipt by the family is affected by variables such as household income and wealth, which, in turn, are likely to be correlated to children's educational attainment and their work behavior. If so, this correlation will result in biased estimates of the educational and work impacts of remittance receipt.

To account for this potential complication, we employ a two-step procedure and first estimate a reduced-form probit model to capture the likelihood of receiving remittances.

$$(E3) \quad R_f = \beta_1 + \beta_2' X_{f,2} + v_f.$$

The vector $X_{f,2}$ incorporates information on a variety of covariates thought to be important determinants of remittance receipt. These variables include the employment status and educational attainment of the household head, the asset holdings of the family, dependency ratio, disability status of the head, geographic, ethnic and religious dummies. The predicted linear index values from equation (E3) are then used to instrument remittance receipt in equations (E1) and (E2) which model the education and work behavior of children. As such we should be able to get unbiased coefficients on the remittance receipt variables and discern how the receipt of remittances influences schooling and work.

E. Results

To test the hypotheses we have delineated we use information from the 2000 wave of the Ethiopian Urban Socio-Economic Survey (EUSES). This is a nationally representative survey of 1500 households in seven major urban centers in the country. Descriptive statistics for the data are displayed in tables 1a-1d for the household and child files that we used to estimate the remittance receipt, education and work equations. Missing data reduces our household sample to 1309 households. A total of 1366 children between the ages of 5 and 15 reside in these households. Almost 18% of households claim to receive remittances. Slightly fewer than half of the households own their home and 42 percent are female headed. About 26 percent of the household heads were unemployed at the

time of the survey and 8 percent were chronically disabled and/or had long-term illness. The average age of children in our study is 10.7 years. The capital city of Ethiopia, Addis Ababa, is where 60 percent of the sample is located. Fifty-two percent of the sample households belong to the Amhara ethnic group while Muslims account for about 13 percent and Christians 87 percent of households.

The hypotheses we set out to test is whether receipt of remittances increases schooling and whether remittances decrease child work. To test the effect of remittances on schooling we use one categorical variable and one continuous variable. The categorical variable is a dummy variable assuming the value “1” if the child has had to miss school and hence has had a semester or more of interruption during their school history. About 5 percent of children in our sample have experienced schooling interruptions of this sort. We also test to see how remittances impact on the number of months of school interruption. Average months of school interruption for the sample is 0.4. Conditional on having experienced one or more spells of school interruption, however, children on average have missed 7 months of school.

The companion hypothesis that we test is whether remittances protect children from work. Does the receipt of remittances lead to fewer hours of work for children in those families? To test the work hypothesis, we examine hours of work by children. We, however, distinguish between school day work hours and weekend work hours. In this sample, children work on average 1.3 hours per school day and 3.5 hours per weekend.

Simple comparisons of household descriptive statistics by remittance-recipient status do not lend support to the hypotheses that remittances induce households to invest more in human capital. According to the descriptive statistics displayed in Table 2, on average, children in remittance-receiving households are marginally more likely to miss school and miss more months of school in comparison to children in households that do not enjoy remittance receipts. However, for a variety of reasons, these simple comparisons cannot be used to address the issue at hand. First of all, the differences are not statistically significant. Secondly, and more importantly, we need to recognize that

remittance-receiving households are likely to differ in their characteristics from households that do not receive remittances, and thus, it is not appropriate to use these crude comparisons to draw conclusions about the impact of remittances on school and work. Instead we ask; in the absence of remittances, how much education would the children who currently reside in remittance recipient households be receiving? How does this compare to the actual level of education received given the receipt of remittances?

Similarly, we note that the simple descriptive statistics indicate that households who enjoy remittances have children working fewer hours. Nonetheless, this information is of limited reliability given the statistical insignificance of the difference of the means and given that we have not controlled for differences in the other characteristics of households who do and do not receive remittances. Our two-step strategy attempts to discern instead the true impacts of remittances on schooling and work decisions by controlling for an array of household characteristics.

Results from estimation of the remittance receipt equation are presented in Table 3. This equation is estimated at the household level. In estimating this equation, our goal is to obtain predictions detailing which households are likely to be recipients of remittances. We find that household belonging to the Tigrayan ethnic group, and households with unemployed heads are the ones most likely to be recipients of remittances. Unemployed heads are 15 percentage points more likely to receive remittances. Surprisingly, higher dependency ratios reduce the odds of receiving remittances. Perhaps the higher ratios point to households without the luxury of age-appropriate members who can migrate to earn elsewhere. We use the predictions from the household level regression in the two schooling and two work equations.

A probit model of the likelihood that the individual's schooling has ever been interrupted for one semester or more is estimated. In addition to the predicted probability of remittance receipt (from equation E3), we include the household head's work, marital and disability statuses, assets of the household (proxied by homeownership), the education of

parents, gender and age of the child, the ethnicity and religious affiliation of the household head and the household's geographic location.

The results of the probit estimation are displayed in Table 4. We find that children living in families with unemployed heads are considerably more likely to experience interruptions in their education. Unemployment raises the probability of experiencing a schooling interruption by 24 percentage points. In contrast to unemployment, the disability of a household head *reduces* the odds of schooling interruptions by 3 percentage points. While at first this may seem counterintuitive it is important to note that our disability variable is measuring chronic disability. Households may be in a better position to adjust to chronic disability than to unemployment which may be more difficult to anticipate and may be considered a temporary rather than a permanent state. The results also indicate that, not surprisingly, older children are more likely to suffer interruptions in their schooling. Of greatest interest to us, however, is the significance and magnitude of the coefficient on remittances. Children in households with a greater likelihood of remittance recipiency are less likely to suffer from interruptions in education. In fact those children are 16 percentage points less likely to have their schooling interrupted. Hence, we find that while controlling for all other factors the receipt of remittances significantly reduces the likelihood of school interruptions.

Next we analyze how remittances impact the length of school interruptions. We ask, do remittances serve to reduce days of school missed? While length of school interruptions is a continuous dependent variable, it is nonetheless the case that we are dealing with a zero-inflated variable. While a number of children experience time out of school for a semester or more (from 1 to 36 months in this data), many have no school interruptions and hence time out of school assumes a value of zero. In this case estimation via OLS will produce biased estimates of the impact of the covariates on schooling interruptions. Estimation via Tobit is warranted instead.

Estimates of the Tobit equation are displayed in Table 5. As in the earlier schooling model, to account for the possibility of endogeneity of remittances with schooling, the

linear prediction from the probit detailing the likelihood of remittance receipt is used. As in the estimation of the probit model, we find that unemployment of the head is disruptive of educational investments in children. Conditional on non-zero months of school interruption, living with an unemployed head increases time out of school by about 5 months. In contrast, children in households with disabled heads miss less school. Perhaps, chronically disabled heads, while less able to work outside the home, are able to take on some of the housework, freeing children to attend school on a more regular basis. We find that older children miss more school. We also observe variation in the amount of school missed according to ethnic and religious affiliation and according to geographic location.

Our main concern, however, is the impact of remittance reciprocity on schooling interruptions. Our estimates suggest that remittance reciprocity reduces schooling interruptions by 5 months. Since average time missed among children who missed school is 7 months, the additional schooling that remittances promote translates into a significant gain in schooling.

Tables 6 and 7 detail the impact of remittances on hours worked by children. We use two separate measures of child work: school-day hours and weekend hours of work. Our presumption is that work during school days is more likely to compete with educational investments than does work performed during non-school days. Table 6 reports on hours of work during school days. As in the “length of schooling interruption” equation, work hours is a zero-inflated dependent variable warranting the use of Tobit for estimation purposes. We find that in female headed households and in households with unemployed heads, children work longer hours per school day. Girls work more as do older children. It is interesting that in households with more educated mothers, children work fewer hours. The education of the father, on the other hand, does not seem to impact school day hours of work. Finally, we note that remittances do significantly reduce hours worked during the school day. Remittance reciprocity reduces work by one and one-quarter hours per school day.

The Tobit estimates of child work hours per weekend are similar to those obtained for child work hours per school day. Children in households with unemployed or female heads work more weekend hours, as do older and female children. As in the school day case, mother's schooling reduces work by children while father's schooling has no impact. However, in one important respect the determinants of school day hours and weekend hours differ. The receipt of remittances has no impact on weekend hours worked as we observe that children work similar amounts during the weekend irrespective of remittance receipt status. Remittances do not protect children from work during weekend hours.

F. Conclusions

This paper has analyzed the effect of remittance reciprocity on school and work for children in Ethiopia between the ages of 5 and 15. The presumption is that remittances may benefit children by reducing their participation in work and by increasing educational investments made in children. A theoretical model outlining this possibility was developed followed by the estimation of schooling and work equations. The results are supportive of the idea that the lifting of liquidity constraints via remittances increases the schooling of children if these remittances are received today. A companion result obtained was that remittances reduce work efforts by children during school days. This is consistent with the notion that school and work are substitutes for one another. Such information is useful to the policymaker wishing to induce reductions in child labor. Providing schools and subsidizing their cost may do the trick if one's objective is to spare children from work as it seems that the two compete with one another for hours. By altering the calculus of work and school it may be possible to induce families to choose school over child labor.

However, these results also point out that while school and work may substitute during school days, this is not an option during non-school days. The lifting of liquidity constraints does not work similarly during non-school days. Children do not reduce hours of work during non-school days on account of remittance reciprocity.

In sum, understanding the complicated interplay between school and work is important for tailoring policy to reduce child labor. Our results indicated that remittances increase schooling and they decrease work by children. However, when schools are unavailable our results suggest that pure income subsidies will not suffice to reduce child labor. As such the availability of schools may be paramount to reducing the incidence of child labor.

References

Amuedo-Dorantes, Catalina and Susan Pozo, "Migration, Remittances and the Education of Children in the Dominican Republic," Western Michigan University Working Paper, October 2004.

Baland, Jean-Marie and James A. Robinson. 2000. "Is Child Labor Inefficient?" *Journal of Political Economy*, Vol. 108, No. 4, pp. 663-679.

Basu, Kaushik and Hoang Pham Van. 1998. "The Economics of Child Labor," *American Economic Review*, Vol. 88, No. 3, pp. 412-427.

Besley, Timothy. 1995. "Nonmarket Institutions for Credit and Risk Sharing in Low-income Countries," *Journal of Economic Perspectives*, Vol. 9, No. 3, pp. 115-127.

Cox Edwards, Alejandra and Manuelita Ureta. 2003. "International Migration, Remittances, and Schooling: Evidence from El Salvador," *Journal of Development Economics*, Special Issue, Vol. 72, No. 2, pp. 429-461.

Fitzsimons, Emla, "The Effects of Risk on Education and Child Labor," *The Institute for Fiscal Studies*, WP/02/07, 2003.

Gitter, Seth R. and Bradford L. Barham. 2005. "Credit, Natural Disasters, Coffee, and Education Attainment in Rural Honduras," Department of Agricultural and Applied Economics, University of Wisconsin-Madison working paper

Grootaert, Christiaan and Ravi Kanbur. 1995. "Child Labor: An Economic Perspective," *International Labour Review*, Vol. 134, No. 2, pp. 187-203.

Hanson, Gordon H., and Christopher Woodruff. "Emigration and Educational Attainment in Mexico," University of California, San Diego, mimeo, 2003.

Hoogeveen, J. 2001. "Income Risk, Consumption Security and the Poor," *Oxford Development Studies*, Vol. 30, No. 1, pp.105-121.

Ilahi, Nadeem. "Children's Work and Schooling: Does Gender Matter? Evidence from the Peru LSMS Panel Data, LAC-PREM," The World Bank, mimeo, 2001.

International Labour Office, *The End of Child Labour: Within Reach*, Report Presented at the 95th Session, International Labour Conference, 2006.

Jacoby, Hanan and Emmanuel Skoufias. 1997. "Risk, Financial Markets and Human Capital in a Developing Country," *Review of Economic Studies*, Vol. 64, No. 3, pp. 311-335.

Jensen, Peter and Helena Skyt Nielsen. "Child Labour or School Attendance? Evidence from Zambia," Working Paper 96-14, Centre for Labour Market and Social Research, University of Aarhus, Denmark, 1996.

Kabki, Mirjam. "The Economic Impact of Remittances of Holland based Ghanaian migrants on rural Ashanti," Sussex Centre for Migration Research, International Workshop on Migration and Poverty in West Africa, 2003.

Morduch, Jonathan. 1995. "Income Smoothing and Consumption Smoothing," *Journal of Economic Perspectives*, Vol. 9, No. 3, pp. 103-114.

Ranjan, Priya. 2001. "Credit Constraints and the Phenomenon of Child Labor," *Journal of Development Economics*, Vol. 64. No. 1, pp. 81-102.

Ravallion, Martin and Quentin Wodon. 2000. "Does Child Labour Displace Schooling? Evidence on Behavioural Responses to an Enrollment Subsidy," *Economic Journal*, Vol. 110, No. 462, pp. C158-175.

UNESCO. *Global Education Digest 2004, Comparing Education Statistics across the World*, Montreal: UNESCO Institute for Statistics, 2004.

Wahba, Sadek. 1996. "Temporary Labor Migration in Egyptian Agricultural Households: Implications for Gender Differences in School Enrollment," *Forum*, Vol. 3, No. 4 (Available at: www.erf.org.eg/nletter/Dec96-05.asp).

Yang, Dean, "International Migrating Human Capital and Entrepreneurship: Evidence from Philippine Households with Members Working Overseas," Mimeo, University of Michigan, March 2004.

Table 1a: Descriptive Statistics: Household Variables

<i>Variable</i>	<i>Description</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>
Female head	Dummy for female headed households	0	1	0.4156
Household size	Size of household	1	22	7.0856
Dependency ratio	Ratio of dependents to household size	0	1	0.3038
Head unemployed	Dummy for unemployed heads	0	1	0.2613
Head disabled	Dummy for chronically disabled heads	0	1	0.0802
Own house	Dummy for house ownership	0	1	0.4545
Remittance receipts	Dummy for remittance receipts	0	1	0.1765
Head schooling	Head's years of schooling	0	18	5.0405
N			1309	

Table 1b: Sample Location

<i>Location</i>	<i>Percent</i>
Addis Ababa	60.28
Awassa	5.58
Bahir Dar	6.57
Dessie	6.72
Dire Dawa	7.94
Jimma	6.65
Mekele	6.26
N	1309

Table 1c: Sample Ethnicity and Religious Affiliation

	<i>Percent</i>
Ethnic group	
Amhara	51.87
Oromo	18.26
Tigre	10.70
Gurage	11.69
Other ethnic	7.49
Religion	
Christian	87.24
Muslim	12.76
N	1309

Table 1d: Descriptive Statistics: Child Variables

<i>Variable</i>	<i>Description</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>
Age	Child's age in years	5	15	10.7295
Mother's schooling	Mother's years of schooling	0	18	3.7555
Father's schooling	Father's years of schooling	0	18	5.5578
Female	Dummy for female child	0	1	0.5417
School interrupted	Dummy for child interrupted school	0	1	0.0542
Months interrupted	Number of months child interrupted school	0	36	0.3953
Weekday work hours	Number of hours of work per school day	0	10	1.3036
Weekend work hours	Number of hours of work during weekends	0	30	3.4700
N			1366	

Table 2: Descriptive Statistics on Important Child-level Variables, by Household Remittance Receipt Status

<i>Variable</i>	<i>Children in households that did not receive remittances</i>		<i>Children in households that received remittances</i>		<i>Test H_0: diff in means (proportions) = 0; H_a: diff > 0</i>
	<i>Mean</i>	<i>Std. Dev.</i>	<i>Mean</i>	<i>Std. Dev.</i>	
School interrupted	0.0526	0.2233	0.0631	0.2437	0.7306
Months interrupted	0.3948	2.1485	0.3981	1.9017	0.5081
Weekday work hours	1.3182	1.7368	1.2217	1.3581	0.2245
Weekend work hours	3.4927	4.7960	3.3418	4.3438	0.3366
N	1160		206		

Table 3: Probit Estimates of Remittance Receipts

<i>Variable</i>	<i>Coefficient</i>	<i>Robust S.E.</i>	<i>Marginal Effect</i>
Female head	0.0833	0.1030	0.0206
Dependency ratio	-0.4478**	0.2126	-0.1098
Head unemployed	0.5481***	0.1034	0.1511
Head schooling	0.0049	0.0086	0.0012
Own house	0.1178	0.0892	0.0290
Head disabled	-0.2658	0.1724	-0.0581
Awassa	0.0464	0.1907	0.0116
Bahir Dar	-0.3236	0.2006	-0.0685
Dessie	-0.0511	0.1770	-0.0123
Dire Dawa	-0.0972	0.1572	-0.0229
Jimma	-0.4080*	0.2156	-0.0829
Mekele	-0.4445*	0.2425	-0.0886
Oromo	-0.1495	0.1231	-0.0349
Tigre	0.2929*	0.1787	0.0799
Gurage	-0.2369	0.1562	-0.0529
Other ethnic	-0.4318**	0.1976	-0.0871
Muslim	0.3134**	0.1380	0.0856
Constant	-0.9842***	0.1299	
N		1309	
Wald Chi2 (p-value)		0.000	

Notes: *** shows statistical significance at 1% level; ** shows statistical significance at 5% level; * shows statistical significance at 10% level. The omitted categories are Addis Ababa, Amhara, and Christian.

Table 4: Probit Estimates of Child School Interruption

<i>Variable</i>	<i>Coefficient</i>	<i>Robust S.E.</i>	<i>Marginal Effect</i>
Remittances	-2.1262**	1.0761	-0.1639
Female head	0.1548	0.1644	0.0125
Head unemployed	1.4277**	0.6177	0.2408
Own house	0.0358	0.2109	0.0028
Head disabled	-0.6928*	0.3833	-0.0313
Father's schooling	-0.0134	0.0151	-0.0010
Mother's schooling	-0.0090	0.0176	-0.0007
Age	0.0366*	0.0224	0.0028
Female	-0.1635	0.1134	-0.0128
Awassa/Jimma	-1.5793**	0.7126	-0.0571
Bahir Dar	-0.6281	0.4357	-0.0306
Dessie	-0.5457*	0.3270	-0.0279
Dire Dawa	-0.2963	0.2337	-0.0183
Mekele	-0.6906	0.6428	-0.0319
Oromo	-0.2076	0.2428	-0.0141
Tigre	0.3772	0.4297	0.0379
Gurage	-0.3541	0.3048	-0.0219
Other ethnic	-1.0881**	0.5393	-0.0414
Muslim	0.3417	0.3813	0.0329
Constant	-4.1351***	1.3316	
N		1366	
Wald Chi2 (p-value)		0.0055	

Notes: *** shows statistical significance at 1% level; ** shows statistical significance at 5% level; * shows statistical significance at 10% level. The dependent variable is 'dummy for child interrupted school'. Because one of the location dummies (Jimma) perfectly predicts failure in the dependent variable, it is merged with another region (Awassa) to construct a single dummy for this particular estimation. The omitted categories are Addis Ababa, Amhara, and Christian.

Table 5: Tobit Estimates of Number of Months of School Interruption

<i>Variable</i>	<i>Coefficient</i>	<i>Robust S.E.</i>	<i>Unconditional marginal effect</i>	<i>Conditional marginal effect</i>
Remittances	-46.8049***	13.5534	-0.8716	-5.1243
Female head	2.9046	2.3288	0.0587	0.3231
Head unemployed	30.0792***	7.9433	3.0905	4.8844
Own house	2.5509	2.6999	0.0487	0.2805
Head disabled	-14.0103***	5.5990	-0.1134	-1.2692
Father's schooling	-0.2009	0.2097	-0.0037	-0.0220
Mother's schooling	-0.1507	0.2534	-0.0028	-0.0165
Age	0.6259*	0.3378	0.0117	0.0685
Female	-1.9007	1.8351	-0.0360	-0.2087
Awassa	-9.4161	5.8729	-0.0996	-0.9101
Bahir Dar	-14.2776**	5.8340	-0.1209	-1.3028
Dessie	-10.1857**	5.2199	-0.1023	-0.9728
Dire Dawa	-6.2772*	3.6804	-0.0790	-0.6315
Jimma	-98.8245	17.6472	-0.3469	-4.6400
Mekele	-17.3978*	9.1903	-0.1272	-1.5251
Oromo	-4.7489	3.1824	-0.0697	-0.4937
Tigre	9.7194	6.8122	0.3432	1.2168
Gurage	-8.7164**	4.3710	-0.1059	-0.8662
Other ethnic	-23.7447***	7.6226	-0.1557	-1.9750
Muslim	10.5430**	5.0919	0.3758	1.3207
Constant	-81.0444***	17.6080		
N			1366	
LR chi2(p-value)			0.0000	

Notes: *** shows statistical significance at 1% level; ** shows statistical significance at 5% level; * shows statistical significance at 10% level. The omitted categories are Addis Ababa, Amhara, and Christian. Conditional marginal effect is given positive number of months of school interruption.

Table 6: Tobit Estimates of Child Work Hours per School Day

<i>Variable</i>	<i>Coefficient</i>	<i>Std .Error</i>	<i>Unconditional marginal effect</i>	<i>Conditional marginal effect</i>
Remittances	-2.9059***	0.9129	-1.7473	-1.2294
Female head	0.4657***	0.1714	0.2859	0.2010
Head unemployed	1.9536***	0.5352	1.3651	0.9749
Own house	0.1701	0.1876	0.1025	0.0721
Head disabled	-0.0284	0.3805	-0.0170	-0.0120
Father's schooling	-0.0146	0.0155	-0.0088	-0.0062
Mother's schooling	-0.0848***	0.0181	-0.0510	-0.0359
Age	0.2917***	0.0247	0.1754	0.1234
Female	0.5368***	0.1321	0.3206	0.2259
Awassa	0.6765***	0.2565	0.4393	0.3085
Bahir Dar	-1.2883***	0.4157	-0.6513	-0.4742
Dessie	0.0236	0.2873	0.0143	0.0100
Dire Dawa	-1.0228***	0.2795	-0.5369	-0.3870
Jimma	-0.7651*	0.4699	-0.4158	-0.2973
Mekele	-2.4919***	0.6137	-1.0382	-0.8066
Oromo	-0.5737**	0.2353	-0.3253	-0.2308
Tigre	1.0480***	0.4212	0.7008	0.4936
Gurage	-0.2268	0.3145	-0.1332	-0.0939
Other ethnic	-1.3405***	0.4790	-0.6776	-0.4935
Muslim	0.4618	0.3489	0.2907	0.2041
Constant	-5.7975***	1.1310		
N			1366	
LR chi2 (p-value)			0.0000	

Notes: *** shows statistical significance at 1% level; ** shows statistical significance at 5% level; * shows statistical significance at 10% level. The omitted categories are Addis Ababa, Amhara, and Christian. Conditional marginal effect is given positive work hours per school day.

Table 7: Tobit Estimates of Child Work Hours per Weekend

<i>Variable</i>	<i>Coefficient</i>	<i>Std .Error</i>	<i>Unconditional marginal effect</i>	<i>Conditional marginal effect</i>
Remittances	-3.7787	2.3349	-2.3895	-1.6760
Female head	0.8804**	0.4381	0.5647	0.3961
Head unemployed	2.6144*	1.3672	1.7874	1.2604
Own house	-0.5286	0.4812	-0.3334	-0.2339
Head disabled	-1.2932	0.9854	-0.7688	-0.5420
Father's schooling	-0.0287	0.0397	-0.0182	-0.0127
Mother's schooling	-0.1749***	0.0459	-0.1106	-0.0776
Age	0.7782***	0.0631	0.4921	0.3452
Female	1.5670***	0.3384	0.9836	0.6910
Awassa	1.6554***	0.6617	1.1192	0.7868
Bahir Dar	0.6291	1.0600	0.4085	0.2864
Dessie	-0.3289	0.7467	-0.2050	-0.1439
Dire Dawa	-0.8366	0.6992	-0.5096	-0.3583
Jimma	0.0364	1.1995	0.0230	0.0162
Mekele	-4.0658***	1.5575	-2.0952	-1.5220
Oromo	-0.9277	0.6036	-0.5675	-0.3989
Tigre	2.9194***	1.0766	2.0476	1.4489
Gurage	-0.2629	0.8099	-0.1646	-0.1155
Other ethnic	-0.9394	1.2292	-0.5706	-0.4013
Muslim	0.4613	0.8955	0.2966	0.2080
Constant	-10.9522***	2.8905		
N			1366	
LR chi2 (p-value)			0.0000	

Notes: *** shows statistical significance at 1% level; ** shows statistical significance at 5% level; * shows statistical significance at 10% level. The omitted categories are Addis Ababa, Amhara, and Christian. Conditional marginal effect is given positive work hours per weekend.