Title

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Journal
Economic Development and Cultural Change, 65(4)

ISSN
0013-0079

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Publication Date
2017-07-01

DOI
10.1086/691971

Peer reviewed

Published in final edited form as:
Econ Dev Cult Change. 2017 July ; 65(4): 657–697. doi:10.1086/691971.

Intergenerational Transmission of Poverty and Inequality: Parental Resources and Schooling Attainment and Children's Human Capital in Ethiopia, India, Peru, and Vietnam*

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Abstract

*This research has been supported by the Bill and Melinda Gates Foundation (Global Health Grant OPP10327313), Eunice Shriver Kennedy National Institute of Child Health and Development (Grant R01 HD070993) and Grand Challenges Canada (Grant 0072-03 to the Grantee, The Trustees of the University of Pennsylvania). The data used in this study come from Young Lives, a 15-year survey investigating the changing nature of childhood poverty in Ethiopia, India (Andhra Pradesh), Peru and Vietnam (www.younglives.org.uk). Young Lives is core-funded by UK aid from the Department for International Development (DFID) and cofunded from 2010-2014 by the Netherlands Ministry of Foreign Affairs. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of the Bill and Melinda Gates Foundation, the Eunice Shriver Kennedy National Institute of Child Health and Development, Grand Challenges Canada, Young Lives, DFID or other funders. A previous version of this paper was presented at the "Inequalities in Children's Outcomes in Developing Countries" Conference at St Anne's College, Oxford University, 8-9 July 2013. The authors thank the assigned discussant at the conference, Karen Macours, and others at the conference for useful comments. The authors also thank participants in a session at the 2014 Population Association of America annual meetings and at the Duke Population Research Institute (DuPRI), particularly Duncan Thomas, for useful feedback and suggestions. Finally the authors thank the editor and two anonymous reviewers for very helpful comments on an earlier version that have helped reshape considerably this version.

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Academic and policy literatures on intergenerational transmissions of poverty and inequality suggest that improving schooling attainment and income for parents in poor households will lessen poverty and inequality in their children's generation through increased human capital accumulated by their children. However, magnitudes of such effects are unknown. We use data on children born in the 21st century in four developing countries to simulate how changes in parents' schooling attainment and consumption would affect poverty and inequality in both the parent's and their children's generations. We find that increasing minimum schooling or income substantially reduces poverty and inequality in the parent's generation, but does not carry over to reducing poverty and inequality substantially in the children's generation. Therefore, while reductions in poverty and inequality in the parents' generation are desirable in themselves to improve welfare among current adults, they are not likely to have large impacts in reducing poverty and particularly in reducing inequality in human capital in the next generation.

Keywords

Intergenerational transmission of poverty and inequality; human capital; developing countries

1. Introduction

The extent of intergenerational economic mobility has long been of considerable interest to policy makers, researchers, and social commentators. A strong component of this interest is whether there is intergenerational transmission of income/consumption poverty and inequality; that is, how likely are children from poor families to end up as adults in poor households because of limited investment in the children's human capital? A number of policy efforts are directed towards breaking the intergenerational transmission of poverty through increasing human capital investments in children from poor families. For example, Santiago Levy, the "father" of the wellknown Mexican PROGRESA/Opportunidades Conditional Cash Transfer (CCT) program on which many other programs have been explicitly modeled worldwide, states that the program's overall objective was "to break the vicious cycle of poverty" in which children of poor families become the next generation of adults in poor families (Levy 2006, p. 21). The primary goal of this and other CCT programs is to attempt to break the intergenerational transmission of poverty by improving the health and education of children in poor families today.

Policies thought to be promising to reduce poverty and inequality in the next generation of adults include ones that directly support greater investment in human capital of children of poor families, such as through CCTs, in hopes that such interventions will increase their earnings capacities and reduce the probabilities of these children living in poverty when they become adults and thereby also reduce inequality in their generation. There is also considerable emphasis on how improving the conditions of currently poor parents may not only improve their own welfare, but enhance the human capital of their children and, through this mechanism, reduce probabilities of their children living in poverty when they become adults and reduce inequality in that generation. For example, a recent influential World Bank study on inequalities of opportunities for children includes, inter alia, "[lack of] schooling of the family head [and low] per capita family income" as important limitations on poor children's opportunities (Barros et al. 2009, p. 59). Reports on the intergenerational transmission of poverty and inequality in developing countries by other international organizations, such as the Inter-American Development Bank (IADB) (Castañeda and Aldaz-Carroll 1999) and the U.K. Overseas Development Institute (ODI) (Bird 2007), also emphasize the importance of family per capita income or consumption and parental schooling (particularly mothers' schooling) among the critical factors that affect the intergenerational transmission of poverty and inequality in developing countries. The perspectives expressed in these papers suggest that there is a "virtuous cycle" in which a one-off reduction in poverty and inequality in one generation will carry over to future generations.[1]

The empirical literature underlying the assumption that changes in such parental family characteristics can have important impacts on reducing poverty and inequality when the children become adults can be categorized into two broad groups[2]: *First*, intergenerational associations often indicate limited intergenerational mobility when schooling and long-run income are considered and, generally, less mobility in developing than in developed countries (e.g., Behrman et al. 2001; Black and Devereux 2010; Birdsall and Graham 2000; Corak 2006; Solon 1999, 2002). Concomitantly, children whose families start at the bottom of income and consumption distributions are more likely than children whose families start higher to be poor when they become adults. *Second*, there are many empirical micro studies that report significant associations between parental family background, particularly parental schooling and family income, and investments in the human capital of children in developing countries. The papers cited in the previous paragraph give references to a number of these studies, as do various surveys, for example, Behrman and Knowles (1999), Orazem and King (2008), Strauss and Thomas (1998), and Strauss and Thomas (2008). These studies are widely interpreted to mean that increased parental schooling and income for poor families lead to increased human capital outcomes in their children, and thus lower rates of poverty and inequality in measures of human capital (and presumably consequently income) when the children become adults than otherwise would occur.

The literature summarized in the previous paragraph provides a strong basis for the assumption in the World Bank, IADB, and ODI reports noted above and elsewhere that higher parental schooling attainment and higher income/consumption for currently poor families are likely to improve human capital accumulated among their children and consequently, reduce the probabilities that the children in such families end up as poor adults and reduce inequality. However a critical question is how much increase in parental schooling and income is warranted for seeing desirable improvements in their children's generation. The Millennium Development Goals for example have targeted to: halve, between 1990 and 2015, the proportion of people whose income is less than $1 a day, and ensure that every child is able to complete a full course of primary schooling. Our aim is to examine if such (and alternative) targets in one generation are sufficient to cause much

[1]We thank an Associate Editor of the journal for suggesting that we add this characterization.

[2]There is also a literature examining the impacts of direct transfers from parents to children, including Dahl et al. (2012) and Hoynes et al. (2013) on the United States' experience. However, we focus here on the indirect transmission of human capital and resources between generations in developing countries.

improvements in the next. How much would the incidence of poverty and inequality in per capita income fall for the current adult generation if, for example, all parents had at least primary schooling? Or if all parents had at least 9 completed grades of schooling? Or if the per capita income/consumption of the households in the bottom of the distribution was increased to $1 a day or to that of the 20th percentile? And more importantly for consideration of intergenerational transmissions, to what extent would these changes in parental schooling and per capita incomes/consumption for poor families translate to changes in the distributions of children's human capital, including the proportions below some "poverty" cutoffs and inequality? Ferreira and Leite (2004) simulate increases to schooling and literacy in order to examine the resulting changes to inequality in Brazil and find reductions in poverty but little change in inequality. To our knowledge, the answers to such questions for any other developing countries (or for developed countries) remain unknown.

Our contribution in this paper is to provide answers to such questions for children born in the 21st century in four developing countries for which the data permit exploring these questions. To do so we develop and implement a combined estimation-simulation approach that allows exploration of impacts of changes in parental schooling and per capita consumption on poverty and inequality in the distribution of per capita consumption for the parent's generation and in the distribution of human capital for the children's generation. We investigate these questions for four quite different low- and middle-income countries – Ethiopia, India (Andhra Pradesh), Peru, and Vietnam. For both parents and children, to characterize poverty we use headcount ratios and to characterize inequalities we use Gini coefficients and percentile ratios: 90th percentile to that of the 10th percentile (p90/p10) and 75th percentile to that of the 25th percentile (p75/p25).[3]

We begin with a simple framework on human capital investment to help structure our investigation and note some possible biases in estimated intergenerational relations due to unobserved intergenerationally-correlated endowments and measurement errors. We then summarize our data, methods, results, and conclusions. A number of findings emerge from our analysis. *First*, consistent with much existing literature, there are strong positive associations between parental resources (as measured particularly by per capita consumption and parental schooling attainment) and children's human capital (cognitive outcomes and height). *Second*, increasing parental schooling to a minimum of primary schooling, that is, levels currently targeted by the Millennium Development Goals, does little to decrease the incidence of poverty and inequality in the parents' generation. Whereas, increasing parental schooling to 9 completed grades and/or increasing per capita consumption to $1 a day does result in substantial reductions in both the prevalence of poverty and inequality in the parents' generation. *Third*, similar increases in parental schooling (that is, to 9 completed grades) for parents with limited schooling and per capita consumption (that is, to $1 a day) for parents in the left tail of the distributions are predicted to reduce the prevalence of

[3]There are a number of alternative measures of poverty and inequality that are used in the literature (e.g., the Foster, Greer and Thorbecke (1984) class of poverty measures), but we limit our presentation to the poverty headcount, Gini and percentile ratio (p90/p10, p75/p25) inequality measures because we are presenting such measures for a number of simulations and these are the most common and best-known measures.

poverty (i.e., those to the left of some cutoff) in cognitive scores and height for their children but with the effects fairly small for inequality in cognitive scores and height. Therefore, while reducing poverty and inequality in the parents' generation probably is desirable in terms of improving welfare among current adults, improving parental schooling and per capita consumption for parents in the left tail of the respective distributions are not likely to have large impacts on reducing poverty and inequality in the human capital accumulated in the next generation, and consequently unlikely to have large effects on poverty counts and inequality in their incomes and consumption as adults.

2. Human Capital Investment Framework

A standard human capital investment framework, as in the well-known Becker (1967) Woytinksy Lecture, suffices for the purpose of this study. Consider Figure 1 in which the expected private marginal benefits and expected private marginal costs are measured on the vertical axis and schooling investments in children are measured on the horizontal axis (though the same points hold for any human capital investments, including those in health and nutrition). The expected private marginal benefits are downward-sloping as schooling increases in the relevant range due to diminishing marginal returns to fixed abilities and pre-schooling investments.[4] The expected private marginal costs are increasing due to increasing private opportunity costs of more schooling in terms of other time-use options (e.g. working on family farms, caring for younger siblings) and possibly increasing marginal costs of financing current schooling investments given imperfect or missing capital markets for such investments. The equilibrium private investment in schooling S* is given by the intersection of the expected private marginal benefits and expected private marginal costs curves in Figure 1, with the equilibrium expected private marginal benefits and expected private marginal costs equal to r*.

How do increased parental financial resources or incomes affect the equilibrium human capital investments in children? If capital markets for human capital investments were perfect, then increasing parental financial resources would do little to change the equilibrium investment made in children's schooling. However, in developing country contexts such as those under investigation in this study, capital markets for human capital are thought to be often quite imperfect and the private components of the marginal costs of such investments are generally thought to be primarily self-financed (Foster, 1995). As a result, if credit constraints are alleviated including through increased family resources, the private marginal cost curve is likely to shift down, and the equilibrium investment in child schooling is likely to increase.

[4]There are some studies suggesting that, at least over a range, the marginal benefit curve may be upward-sloping. For instance, Johannes and Noula (2011) estimate that the marginal benefit in primary and secondary schooling is increasing for the middle-income group in the Cameroons. However, this and most other such studies do not control for unobserved abilities, motivations, and family connections. If, as is suggested by the models of familial human capital investment in children in Becker and Tomes (1976) and Behrman et. al (1982, 1995) and seems plausible, students with greater abilities, higher motivation, and better family connections both have greater schooling and higher post-schooling incomes because of their abilities, motivations, and family connections, then these estimates are biased upward more for higher levels of schooling in a way that may obscure the declining returns to students with fixed abilities, motivations, and family connections. Finally we note that though presentations such as Figure 1 usually are drawn as if there are declining expected private marginal benefits with more schooling, there could be a stable equilibrium with increasing expected private marginal benefits as long as the slope of the increasing expected private marginal benefits curve is less than the slope of the increasing expected private marginal cost curve in the neighborhood of the equilibrium.

How does increased parental human capital affect the equilibrium human capital investments in children? Underlying the expected private marginal benefit curve in Figure 1 is a production function for earnings (or whatever outcomes are of interest) that includes as an input the schooling attainment the child will have as an adult. As the private returns (measured in earnings) to investment in schooling increases, the private marginal benefit curve will shift to the right, increasing equilibrium investment in children's schooling. Familial inputs play an important role in this process, including *inter alia* the quality of parental time spent in child stimulation particularly in early life and in help with homework when the children are of school age.[5] If these familial inputs are complementary with time in school as generally is thought to be the case, then greater parental human capital in the form say greater parental schooling attainment is likely to shift the expected private marginal benefit curve to the right, thus increasing the equilibrium investment in children's schooling.

Thus this simple framework predicts that increased parental financial and human capital resources in the contexts like those under consideration lead to increased investment in children's human capital. It is important to note, however, that this simple framework also points to a probable estimation challenge in ascertaining the impact of increased parental financial and human capital resources on investments in children's human capital. Underlying the expected private marginal benefits curve are intrinsic child endowments. These endowments range from innate ability and innate health to family connections for job and marriage markets. They are likely to enter directly into the production function determining the expected private marginal benefits. This means that the estimated relations between both parental financial and human capital resources on one hand and investments in children's human capital on the other hand may be biased as estimates of causality unless these endowments can be controlled in the estimation.

Though it is difficult to be absolutely sure without unbiased estimates of the underlying structural relations that determine investments in children (which limitations in the data do not permit us to undertake in this study), we perceive that the bias is likely to be upward if there are positive intergenerational correlations in such endowments so that parental endowments that are positively correlated with parental income/consumption and parental human capital are positively correlated with the children's endowments that are complementary with schooling in producing expected child marginal benefits. Empirical estimates on the impact of parental schooling on children's schooling attainment and schooling progression probability indeed generally report upward biases in estimated coefficients of parental schooling attainment in OLS relations in comparison with alternative estimates that control for unobserved parental characteristics/endogeneity of parental schooling (e.g., Lillard and Willis 1994; Behrman and Rosenzweig 2002; Black, Devereux and Salvanes 2005; Plug 2004).

We also note, as is well-known, that random measurement errors may cause biases towards zero. Some studies use reports of respondent's schooling from others (e.g., siblings or other

[5]Time-use surveys in the United States suggest that both men and women recently spent about 14% of their time on “educational” child-care activities that include reading to children, helping with homework, teaching children, and attending activities in school (Guryan et. al 2008). To our knowledge, such detailed time-use surveys on child-care activities are unavailable for our study countries.

relatives) in addition to reports from the respondents to estimate measurement error models and find estimated noise-to-signal ratios for adult schooling of 0.06–0.12 (Ashenfelter and Krueger 1994; Ashenfelter and Rouse 1998; Behrman, Rosenzweig and Taubman 1994; Bielby, Hauser and Featherman 1977). With a noise-to-signal ratio of 0.12, the OLS estimated schooling coefficient is about 89% of the true value. The estimates closest to our specifications below between per capita consumption and cognitive scores that we have been able to find are estimates for the coefficients of annual expenditure per capita in relations determining Vietnamese children's exam scores in their last completed grade that are 92% as large in OLS estimates as when instrumented per capita income is used (Behrman and Knowles 1999).[6] If the endowment biases are likely to be positive and the random measurement biases are negative, the overall biases could be in either direction.

3. Data

We use data on children from Young Lives, a cross-national cohort panel study on poverty and child well-being conducted in Ethiopia, India (Andhra Pradesh), Peru, and Vietnam. Our analysis uses data on the younger cohort, who were born in the 21st century, first surveyed in 2002 at ages 6-17.9 months (round 1) and subsequently followed through round 2 (2006-07) at about age 5 years, and round 3 (2009-10) at about age 8 years. These data permit estimates for four fairly different developing country contexts with comparable information on parental resources and schooling attainment over the early-life infant, pre-school, and initial school ages for children that are increasing emphasized as been critical for their longer-run development (Almond and Currie 2011; Behrman et al. 2009; Cunha et al. 2006; Currie 2009; Currie and Vogl 2013; Engle et al. 2007, 2011; Gertler et al. 2014; Heckman 2006; Hoddinott et al. 2008, 2013a,b; Maluccio et al. 2009; Schady et al. 2015; Victora et al. 2008), as well as on the children's cognitive scores and heights as of age 8 years that we use to represent their human capital up to that age.[7] Sampling details are at http://www.younglives.org.uk. Comparisons with representative data suggest that the samples represent a variety of contexts in each of the countries studied, though under-represent the highest parts of the income distributions. We include all children for whom there are data available on two cognitive scores (PPVT and math, described below) in round 3.[8] Attrition rates are fairly low in the Young Lives panel study, less than 2% per annum (see Schott et. al

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[6]OLS estimates of the impacts of per capita consumption expenditure on measures of children's education and health generally tend to be biased downward in comparison with estimates that use instrumental variables to control for measurement error and possibly biases due to unobserved endowments, though the instruments used would seem to be correlated with unobserved endowments so it is not likely that they eliminate the latter bias (see Behrman and Knowles 1999, Brown and Park 2002, Glewwe and Jacoby 2004, Mani et. al 2013, Haddad et. al 2003, Mani 2014).

[7]The Young Lives study also follows an older cohort of children initially surveyed at age 8 years in 2002 and followed through the 2006-07 and 2009-10 waves of the panel study. However, we focus on the younger cohort because they reflect 21st century experience during the early-life formative years in which families are thought to have great impact of children, as noted in the text. The older cohort sample does not include information on the children or their families when the children were younger than 8 years old, and the sample size for the older cohort is 50% smaller than for the younger cohort. Because the intergenerational associations between parental schooling attainment and income on one hand and indicators of child human capital on the other hand tend to be larger for the younger cohort than for the older cohort (Georgiadis, 2013), our use of the younger cohort probably leads to higher estimates of the impacts of improving schooling and consumption of poor parents than would result from similar analysis of the older cohort.

[8]Data are missing for some variables used in samples for the analysis. Per capita consumption is missing for 0.1% in Peru and 1% in India; mother's schooling is missing for 0.8% (Ethiopia), 0.2% (India), 0.9% (Peru), and 0.8% (Vietnam); father's schooling is missing for 4.3% (Ethiopia), 0.2% (India), 3.1% (Peru), and 2.6% (Vietnam); mother's age is missing for 2.5% (Ethiopia), 0.4% (India), 0.6% (Peru), and 0.2% (Vietnam); and hospital in community and secondary school in community are missing for 5.3% in Ethiopia and 2.2% in India. For the individual-level variables, we use the variable median at the community level to impute data for missing values, and include dummies for each human capital measure missing in the regressions.

2013). Our final sample size is 6,915: 1,669 in Ethiopia, 1,787 in India, 1,748 in Peru, and 1,711 in Vietnam. The main outcome variables of interest in the children's regressions are measures of human capital, namely cognitive scores and height; the main outcome variable of interest in the parents' generation is per capita consumption expenditure.

Children's Measures

We represent children's human capital at age 8 years (round 3) by nutritional status (height) and two cognitive scores (PPVT and math) obtained at age 8. We use raw height at round 3 to represent nutritional status (as opposed to height-for-age z-scores, HAZ) for the inequality analysis because Gini coefficients are not defined for negative values and for these poor populations many children have negative HAZ values.[9] The two cognitive exams at age 8 years are:[10]

1. The Peabody Picture Vocabulary Test (PPVT) uses items consisting of a stimulus word and a set of pictures and is a test of receptive language that has been widely used in low- and middle-income countries (Walker et al. 2000, Walker et al. 2005, Schady et al. 2015). The Spanish PPVT (*Test de Vocabulario Imagenes Peabody, TVIP* 125 items) was used in Peru while the PPVT III (204 items) was used in Ethiopia, India, and Vietnam. The PPVT (and TVIP) was adapted and standardized by Young Lives researchers in each country using consistent techniques. Psychometric characteristics of the test were examined by Young Lives researchers with results indicating a high degree of test reliability and validity (Cueto and Leon 2012).

2. The math achievement test administered had 29 items relating to counting, number discrimination, knowledge of numbers, and basic operations with numbers in which interviewers read the questions aloud to avoid bias resulting from poor reading skills. These scores were evaluated for psychometric properties by the Young Lives study team. Scores were corrected for items with indicators of low reliability and validity resulting in corrected data that exhibits strong psychometric characteristics (Cueto and Leon 2012).

We also control for the language in which the exam was conducted and for whether the exam was in the child's native language.[11] In addition, we control for age in months and the sex of each child to control for age-gender specific differences in performance on tests.

[9] Because the age range for the children is relatively small (measurements taken within 24, 20, 18, and 17 months of each other in Ethiopia, India, Peru and Vietnam, respectively), the variations in the median height and standard deviations for a well-nourished population in such an age interval around age 8 years old (used to calculate HAZ) are small and we control for child age in the estimates, the use of height at about age 8 years rather than HAZ at about age 8 years is not likely to make much difference in the relevant estimates.

[10] A third test is also available: The Early Grade Reading Assessment (EGRA) from the World Bank Living Standards Measurement Study to assess verbal achievement (Glewwe 1991). This test is typically administered orally and is used to evaluate the most basic skills for literacy acquisition in early grades, including pre-reading skills such as listening comprehension. The Young Lives adaptation of the EGRA explored the child's ability to identify familiar words, read and comprehend a small text, and to understand a small text read to them. We do not include this test because scores are missing for a large proportion of the children, particularly in Ethiopia (20.1%).

[11] There are missing data on the language of the exam. We coded missing data to the mode of the community, and then checked these values with language of exam in round 2 (when two other exams were given) as well as their native language in both rounds 2 and round 3. In the few cases where there was discordance between the imputed value and these other values, we recoded the missing data to the language of exam in the previous year (in these cases they were the same as the native language).

Table 1 shows descriptive statistics for the sample. It is worth noting that there is substantial variation in within-country performance on these scores, especially for children in Ethiopia and India.

Parental Measures

We use per capita daily household consumption expenditure, averaged over rounds 2 and 3 (the two rounds for which consumption data were collected), to characterize the parental household financial resource position. Consumption is generally considered to be a better indicator of the longer-run resource constraints than income for the same time periods because of the substantial transitory components of income, particularly for poorer households in rural environments that are subject to considerable shocks from weather, markets and other sources (Deaton, 1997; Behrman and Knowles, 1999). Per capita household consumption is calculated using adult respondents' estimation of food and non-food items with a recall period ranging from 15 days for food to 12 months for clothing. The total expenditures were first converted to real monthly expenditures in 2006 local currency and divided by household size (adult equivalent in Ethiopia).[12] We then convert the total monthly expenditures to daily consumption in 2006 USD. For parental human capital, we use continuous measures of maternal and paternal schooling attainment in grades and mothers' height (data on fathers' height were not available). We also control for mothers' age to capture lifecycle patterns.

Average per capita consumption per day in USD is reported in Table 1 and is highest for Peru (US$2.05) and lowest for Ethiopia (US$0.56).[13] Per capita consumption poverty below $1 US per day also varies considerably across countries, with Ethiopia and India having the highest prevalence (about 90% each), and Peru the lowest (16%).[14] Sample averages for parental schooling mimic this pattern: mothers' schooling (7.8 grades for Peru and 3.1 grades for Ethiopia) and fathers' schooling (9.1 grades for Peru and 5.0 grades for Ethiopia) are also highest in Peru and lowest for Ethiopia. Mothers' age is lowest in India (23.6 years) and highest in Ethiopia (27.4 years) and mother's height is highest in Ethiopia (158.7 cm) and lowest in Peru (150 cm).

Community Characteristics

We include in the specifications as controls some community variables: whether communities in which children lived have hospitals,[15] an indicator for urban residence, community wealth (constructed separately by country across three rounds as an assetbased index of the first principal component of 19 indicators of household durables, housing quality, and available services (e.g., safe water sources and electricity) (Filmer and Scott 2012)), the presence of a secondary school facility in the community, and an indicator for

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[12]Young Lives country teams calculated consumption independently, resulting in this slight methodological difference for Ethiopia.
[13]Since per capita consumption in Ethiopia is per adult equivalent, this value slightly over-represents consumption compared to values for the other three countries in this table.
[14]Given that we are defining per capita consumption poverty to be below the 20th percentile distribution, this measure of the poverty headcounts across countries for per capita consumption varies little across counties (though there is a little variation because of bunching up of reported per capita consumption at the 20th percentile).
[15]An alternative to this measure would be the presence of primary care facilities; however, we did not use this measure because there is no variation in Vietnam in the presence of primary care facilities.

whether children moved to different communities after round 1 (to control for unmeasured changes in these variables over time for those who moved).

The percentage of children living in an urban residence in round one varies from 18.1 (Vietnam) to 66.4 (Peru), the percentage who had moved over the time of the study ranges from 11.4 in India to 48.6 in Peru, the percentage of communities with a hospital ranges from 30.3 in Ethiopia to 89.5 in Vietnam, the percentage of communities with a secondary school present is also highest in Vietnam (98.1) and lowest in Ethiopia (34.7). The presence of substantial heterogeneity in community resources across countries points to the possible importance for controlling for these factors in the regression models as we do in the sections to follow.

4. Empirical Specification

We are interested in (1) characterizing poverty and inequality in per capita consumption and human capital among the parents' generation, (2) examining the associations between key parental variables and children's human capital outcomes, and (3) documenting the prevalence of poverty and inequality in per capita income and parental schooling for the parent's generation and human capital for the children's generation. We then use these relations to simulate under different scenarios how changing the distribution of per capita consumption and schooling attainment of the parents would affect the distribution of the children's human capital under assumptions that we discuss below.

We begin with the following relation for the per capita consumption (C_P) in the parents' generation (subscript P) as dependent (presumably through their income) on father's and mother's schooling attainment (FS_P and MS_P), maternal age (MA_P), maternal height (MH_P) and an unobserved family factor (u_P) related to unobserved income-generating factors that are assumed to be uncorrelated with the right-side variables[16]

$$\text{In}\, C_P = \beta_0 + \beta_1\, \text{MS}_P + \beta_2\, \text{FS}_P + \beta_3\, \text{MH}_P + \beta_4\, \text{MA}_P + \beta_5\, \text{MA}^2{}_P + u_P \quad (1)$$

We estimate this relation with ordinary least squares (OLS) to obtain coefficient estimates for mother's schooling, father's schooling, mother's age, and maternal height, and compute the predicted residual, all of which we use to predict per capita consumption under the hypothetical scenarios of increased parental schooling discussed below.

We next estimate how children's human capital (H_C) at age 8 years is determined by parental financial resources as represented by (C_P), parental schooling attainment MS_P and FS_P, other individual child and family characteristics (X) and community/village characteristics (Z), as well as uncorrelated child-specific factors (u_C)[17]:

[16]We are limited in the variables that we may include in this relation to those that are available for the parents' generation.
[17]Both X and Z may be vectors, but for simplicity are written as scalars here.

$$H_C = \gamma_0 + \gamma_1 C_P + \gamma_2 \mathrm{MS}_P + \gamma_3 \mathrm{FS}_P + \gamma_4 X + \gamma_5 Z + u_C \quad (2)$$

Measures of child human capital H_C are scores on the PPVT and math exams and height in cm at age 8 years. Other individual demographic and family characteristics (X) include sex and age (in months) of the child at the time of the survey, mother's height, mother's age, and, for the cognitive exams, whether the child took the exam in his or her native language and dichotomous variables for the language of the exam.[18] Community characteristics (Z) include urban residence, community wealth, whether there is a hospital in the community, whether there is a secondary school in the community, and—to control for changes for households who no longer live in the community in which these data were collected—whether the family moved after round 1. We include splines in mother's and father's schooling, as well as consumption, to allow the coefficients to vary by whether schooling attainment was less than or more than 9 grades, and whether the family consumed less than or more than the 20th percentile of per capita consumption. We use seemingly unrelated regression (SUR) methods to obtain estimates of equation (2) in order to allow the errors to be correlated across the child cognitive scores (PPVT, math) and thereby increase efficiency. We use OLS with standard errors clustered by community to estimate relation (2) for height.

Next, using the coefficients and residuals estimated in equation (2), we insert hypothetical values for maternal and paternal schooling and per capita consumption in order to simulate what the child's cognitive scores and height at age 8 years would be under a number of scenarios, with the assumption that our estimates in relation (2) represent a causal relationship.[19] We calculate the resulting poverty headcounts, Gini coefficients, and percentile ratios. The differences between the poverty measures, Gini coefficients, and percentile ratios for the baseline simulations and those of the hypothetical scenarios thus reflect the effects on poverty and inequality in the children's human capital of hypothetical changes in schooling attainment and per capita consumption in the parental generation. The scenarios that we consider are:[20]

1. Increased parental schooling attainment to completion of primary schooling (6 grades in Peru, 5 grades in India and Vietnam, and 4 grades in Ethiopia) for all parents who did not complete primary schooling.

2. Increased parental schooling attainment to 9 grades for all parents who did not complete 9 grades of schooling.

3. Increased per capita household consumption to the 20th percentile of per capita household consumption for all households below the 20th percentile in the parental generation.

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[18]Examination of the psychometric qualities of the tests suggests that test performance varied by language, so scores should be compared within languages only (Cueto and Leon 2012). Hence we include language dummies for each language. The dummy for whether a child was tested in a language other than his or her native tongue controls for a possible deficiency resulting from being tested in a second language.

[19]In these simulations we assume that the effects of parental schooling are the direct effects as estimated for relation (2) and also the indirect effects through per capita household consumption as estimated with relation (1).

[20]Note that households with parental human capital values above the thresholds listed below remain unaltered in the simulations. We are primarily concerned with improving the conditions for those in the lower tails of the distributions.

4. Increased per capita household consumption to $1 US per day for all households with per capita daily consumption below $1US.

5. Increased parental schooling to 9 grades for all parents with less than 9 grades of schooling, **and** increased per capita household consumption to $1 US per day for all households with per capita daily consumption below $1 US.

Figures 2 and 3 show the actual versus hypothetical changes in parental schooling and per capita consumption respectively. The hypothetical changes to schooling depicted in Figure 2 are quite substantial in all four countries. The changes to per capita consumption depicted in Figure 3 result in substantial increases in Ethiopia and India, but much smaller increases in Peru and Vietnam. Finally, we note explicitly that we assume that parental schooling and per capita consumption is not affected except as indicated for the left tails of the distributions. This is a strong assumption that is likely to overstate the impacts of our simulations on reducing inequality because the general equilibrium effects are likely to induce more schooling and higher consumption among those who are assumed not to be affected by the changes that we simulate (e.g., Contreras 1996, 2003).

5. Results: Regression Estimates and Simulations

5.1 Per Capita Consumption in Parents' Generation

Table 2 gives the estimated coefficients for equation (1). The R^2s for these regressions range from 0.15 in India to 0.35 in Ethiopia, indicating a range of explanatory power across countries though with substantial unexplained variance. Mother's and father's schooling are significant in explaining per capita consumption in all countries. The coefficient estimates on parental schooling indicate that every additional grade of mother's schooling increases per capita consumption by 5.3% in Ethiopia, 1.5% in India, 4.5% in Peru, and 4.8% in Vietnam and that every additional grade of father's schooling increases per capita consumption by 2.7% in Ethiopia and India, 4.2% in Peru, and 3.7% in Vietnam. The association with mother's height is significant in all countries but India. Mother's age has a very small association with the log of per capita consumption and is significant only in Ethiopia.

5.2 Poverty Headcounts and Inequality Measures for Parents' Generation

Table 3 gives the poverty headcounts and inequality measures (Gini coefficients and percentile ratios: 90p/10p and 75p/25p) for the distributions for per capita consumption and parental schooling for the parents' generation.

With the "poverty" threshold for schooling set at 5 grades of schooling attainment and per capita consumption set at the 20th percentile of the original distribution, there is substantial heterogeneity in deprivations in parental schooling (with Ethiopia performing the worst and Vietnam the best) and little variation in the deprivation in per capita consumption poverty (prevalence of poverty: 19.8% (Ethiopia), 16.8% (India), 20%, (Peru) and 19% (Vietnam)). The majority of both mothers (72.1%) and fathers (58.8%) in Ethiopia, and the majority of mothers (60.7%) in India fall below this threshold of 5 grades of schooling attainment.

Vietnam has the lowest percentage of mothers (22.7%) below this threshold, and Peru has the lowest percentage of fathers below this threshold (11.7%).

Parental education is most unequally distributed in Ethiopia, with Gini coefficients of 0.302 for mother's schooling attainment, and 0.307 for father's schooling attainment. Father's schooling is most equally distributed in Peru, with a Gini coefficient of 0.226, and mother's schooling is most equally distributed in Vietnam with a Gini coefficient of 0.241. It is not possible to calculate the 90p/10p ratio for both mother's and father's schooling in Ethiopia and India because the bottom decile has zero completed grades of schooling. The 90p/10p ratio for Peru indicates substantial inequality in mother's schooling, where the 90th percentile is 14 times the level of schooling of the 10th percentile. Inequality in per capita consumption as measured by Gini coefficients is worst in Peru with a Gini coefficient of 0.322 and lowest in India with a Gini coefficient of 0.246. Notice that there is very little variation in income inequality across three of the four countries as measured by Gini coefficients. Further, inequality as measured by the 90p/10p and 75p/25p ratios is also relatively similar across all the four countries, with the former equal to about 4 and the latter about 2.

5.3 Estimates of the Associations of Child Human Capital Outcomes with Parental Family Per Capita Consumptions and Parental Schooling

Table 4 gives the full set of estimated coefficients from the regressions of child outcomes at age 8 years as related to parental characteristics in equation (2) above. These results suggest that the lower end of the schooling distributions for both mothers and fathers and the lower tails of consumption per capita all tend to be significantly associated with children's cognitive scores and, to some extent, their height. The R^2s indicate that these relations predict 16% (India) to 50% (Ethiopia) of the variance in PPVT, 23% (India) to 49% (Ethiopia) of the variance in math scores, and 17% (Ethiopia) to 37% (Peru) of the variance in child height. Thus, while parental schooling and per capita consumption are significantly associated with children's human capital, half or more of the variance in children's human capital is due to the residual. Per capita consumption is significantly positively associated with every child human capital outcome in every country, though there is variation among outcomes and among countries in the magnitudes of these associations including between households below and above the 20th percentile of the per capita consumption distribution. Mother's schooling is also significantly positively associated with every child human capital outcome in every country, with significant positive associations in each case with mother's schooling < 9 grades and in two-thirds of the cases for mother's schooling ≥ 9 grades – again with variation among outcomes and among countries in the magnitudes of these associations including between mother's schooling below and above 9 grades. Father's schooling also is significantly positively associated with every child human capital outcome in every country with the exception of child height in India. The point estimates are larger for father's schooling for seven of the 12 outcomes for parent's schooling < 9 grades and for three of the 12 cases for parent's schooling ≥ 9 grades. Although many of these differences are not significant, these results do not seem to provide strong support for the conventional wisdom regarding the greater importance of mother's than father's schooling (e.g., King and Mason 2001, LeVine et al. 2011). Appendix A gives more detail, including how the estimates differ across the three outcomes and four countries and below and above the cutoffs for the splines in per capita consumption and in parental grades of schooling attained.

5.5 Simulations of Five Scenarios Regarding Improving Those in the Left Tails of the Distributions of Parental Per Capita Consumption and Parental Schooling Attainment

5.5.1 Distributions for Parental Per Capita Consumption and Schooling—First, to provide some perspective about the variation in poverty head counts and Gini coefficients for consumption per capita over time and across countries, Figure 4 gives poverty head counts based on World Bank estimates using a poverty threshold of $1.25 per day in purchasing-power-parity (PPP) terms for 1982-1986 and 2008-2012 for our four study countries (data are not available for Vietnam for 1982-1986 and are not available for any of the four countries using $1 US per day values). Figure 4 indicates considerable variation across countries, with much higher poverty headcount rates in Ethiopia and India than in Peru and Vietnam, but with substantial declines between 1982-1986 and 2008-2012 particularly for Ethiopia (over 30 percent) and India (over 20 percent). Figure 5 gives similar information for Gini coefficients. This figure indicates about the same levels of inequality in 2008-2012 for three of the countries, but much higher inequality in Peru. It also suggests some increase in inequality between 1982-1986 and 2008-2012 for the three countries for which the estimates are available for 1982-1986. For these three countries the two figures suggest substantial drops in the poverty head count rates so that the absolute levels of consumption of the poorer members of the society in the left tails of the distributions increased at the same time that inequality increased.

We now turn to the five simulations described in section 4. To characterize the changes implied by these simulations, we simulate the poverty headcounts and the inequality measures (Gini coefficients, 90p/10p and 75p/25p ratios) for parental schooling and per capita consumption under these scenarios in Table 5.

Comparing the poverty headcounts in Table 3 (no simulations) and Table 5 (with simulations) for both maternal schooling and paternal schooling shows that “poverty” in schooling attainment, as defined as less than 5 grades of schooling attainment, would be eliminated by increasing the minimum grades of schooling to primary schooling as currently targeted by the Millennium Development Goals (or, of course, to 9 grades) except in Ethiopia. Ethiopia is different because in this country primary school is completed after 4 grades, so individuals who complete primary school but do not go beyond primary school are below our poverty cutoff of 5 completed grades. Therefore for Ethiopia, bringing everyone up to a minimum of primary school completion does not affect the poverty headcount if the cutoff is 5 grades (though, of course, it does reduce some measures of poverty, such as the poverty gap measure). Changing minimum consumption to $1 US per day would decrease per capita consumption headcounts to zero in all countries except Peru (where the 20th percentile of consumption is above $1, see Table 1).

Comparing the Gini coefficients in Table 3 and Table 5 for both maternal schooling and paternal schooling, however, shows that inequality in schooling would not be substantially reduced by increasing the minimum grades of schooling to primary schooling as currently targeted by the Millennium Development Goals. In contrast, inequality in schooling would be reduced substantially by increasing the minimum schooling completed to 9 grades in these countries. For instance, increasing mother's schooling to a minimum of 9 grades would reduce the Gini coefficients for mother's schooling in Ethiopia from 0.302 to 0.026, in India from 0.248 to 0.036, in Peru from 0.260 to 0.089 and in Vietnam from 0.241 to 0.063. Similar effects are observed for father's schooling. Likewise, the p90/p10 and p75/25 ratios would be reduced to near equality between these respective decile pairs if minimum schooling levels were raised to 9 grades. We also find that changing minimum consumption to $1 US per day would decrease consumption inequality substantially in all countries though less for Peru (where, again, the mean per capita daily consumption in USD is much higher in comparison to the other three countries).

5.5.2 Distributions for Children's Cognitive Scores and Heights—Table 6 gives the percentage increases in the PPVT and math scores as well as height at age 8 years under the simulated scenarios. Increasing parental schooling to a minimum of 9 grades and/or minimum consumption to $1 US per day substantially increases predicted math scores and PPVT scores (and to some extent, height) for these children.

Table 7 gives the poverty headcount, or the proportion of children performing below certain thresholds that are held fixed for the baseline and other simulations. Under these hypothetical scenarios, the lower end of the distribution performs better for all countries and outcomes, as expected, given the positive intergenerational associations in human capital in the estimates of Table 4. For example, for Ethiopia the percentage below the threshold of the 20th percentile in the original distribution of PPVT scores [21] would fall to 13.7% if all parents had at least primary school and to 6.7 % if all parents had at least 9 grades of schooling. It would fall to 9.5% if parental per capita consumption were increased to $1 US per day for all households below that level. In the most generous hypothetical scenario, where schooling and consumption are assumed to be at their highest levels, only 2.0% remain below this threshold. These numbers are similar in general terms, though the degree of simulated change varies, for the other three countries.

Table 8 gives the Gini coefficients for the predicted values of the age 8 outcomes under the various scenarios.[22] Under each of these scenarios in which parental schooling and per capita consumption are increased for the left sides of the distributions, inequality is reduced. For example, the Gini coefficient for the PPVT in Ethiopia falls from 0.296 to 0.275 in the first hypothetical scenario, when all parents with less than primary schooling are assigned primary schooling, and falls to 0.230 in the last hypothetical scenario, when all parents with less than 9 grades of schooling are assigned 9 grades of schooling and households with per capita consumption of less than $1 US per day are assigned $1 US per capita consumption per day. Similarly, in India, the Gini coefficient for PPVT falls from 0.280 in the original distribution to 0.250 in the primary schooling scenario and to 0.218 in the last scenario. While reductions in inequality occur across the board for the cognitive outcomes, the reductions are not large in magnitude. Declines in the Gini coefficients are a bit larger for

[21]The poverty headcount is less than 0.20 in some cases since only those performing lower than the 20th percentile are measured as being below the “poverty line.”

[22]Since the Gini coefficient may only be calculated using nonzero values, we coded any scores of 0 (possible for the Math scores) to 0.4. While this is an arbitrary value, it rounds to zero and allows for the Gini coefficient to be calculated for the full sample of scores.

math in Ethiopia, where for the primary schooling scenario, the Gini coefficient falls from 0.447 to 0.405 and then to 0.321 under the last scenario.

Related to the Gini coefficients, Figures 6 and 7 show the Lorenz curves for the distributions of PPVT and math scores under the actual and the most generous hypothetical scenario of a minimum of 9 grades of parental schooling and $1 per day minimum consumption. Visually, there is not much difference between these two distributions for either of the exams in any of the four countries.

Table 9 shows the differentials for the 90^{th} to 10^{th} percentiles ratio and the 75^{th} to 25^{th} percentiles ratio. For the PVVT for Ethiopia, for example, in the original distribution, the 90^{th} percentile score is 4.4 times the score of the 10^{th} percentile; this ratio reduces to 3.93 when all parents have primary schooling, and to 3.04 when parents have 9 grades of schooling and household consumption is increased to $1 per day. The changes for math appear more pronounced, yet many math scores are near zero, which tends to inflate this measure. There are very modest to no changes in the ratios for height.

Thus our simulations seem to indicate fairly small impacts on inequality for children's human capital even of fairly large changes in poverty and inequality for the parents. This may reflect reality. Or it may reflect biases in the intergenerational relations in Table 4. As discussed at the end of section 3, these may be biased (probably upward) due to positively intergenerationally correlated endowments or biased negatively due to random measurement error. If the net bias is negative, we may be underestimating the net effects. To explore this possibility, we have undertaken estimates in which we assume all the coefficient estimates in Table 4 for per capita consumption and parental schooling are underestimated by 20%. This is equal to a noise-to-signal ratio of 0.25 if there is no endowment bias. We think that this is an overestimate of any likely bias due to measurement error because it is a much larger noise-to-signal ratio than generally found in the previous literature summarized at the end of section 3. Moreover, this calculation assumes no positive endowment bias, even though our a priori reasoning and previous estimates suggest an upward endowment bias (again, see the discussion at the end of section 3). The resulting statistics (see Appendix Table A1) indicate in comparison to our simulations in Tables 6-8, further reductions in poverty headcounts on the order of 1-2 percentage points, further but very slight reductions in the Gini coefficients (of less than 0.01), and varying reductions in the 90p/10p and 75p/25p ratios. Thus our results seem fairly robust to biases of such an order of magnitude.

Another reason that the simulated effects of increases in schooling attainment and per capita consumption in the parents' generation translated into smaller reductions in poverty and inequality in the children's generation than may have been expected by some could be that in the absence of the simulated changes, many children of poor parents would have been enough higher in the distributions than their parents so that increasing their human capital through improvements in their cohort of poor parents did not reduce poverty or inequality much because they would have been enough higher in the distribution in any case. Figures 8-10 provide some evidence on this possibility, respectively for children's PPVT scores, math scores, and heights. Each figure considers the children only from parents who were in the bottom quintile of the per capita consumption distribution (figures from parents in the bottom quintile of the parental schooling attainment distribution look very similar). The figures illustrate for the four countries the distribution of the children in the three human capital measures with each normalized so that the range is from 0 to 1. If the children of the parents in the bottom per capita consumption quintile were largely in the bottom quintile of the three human capital distributions in the absence of the simulated changes for the parents, these distributions should be concentrated in the left side, below 0.2. Some of the distributions had such concentration, perhaps most strikingly for Ethiopia for PPVT and math and for India for PPVT. But in many cases, children of parents in the bottom consumption quintile performed higher than in the lowest quintile of children in the actual distributions. For these cases, the stimulated improvements in parental resources could have increased significantly their children's human capital with no impact on these children being in "poverty" as defined as the bottom quintile of the cognitive score/height distributions and could have had little or no impact on reducing inequality (and may even have increased inequality).

6. Conclusions

Theoretical models, empirical estimates, and policy prescriptions place considerable emphasis on the importance of the family and its role in improving life chances of children, with the early child ages of particular importance. With this comes a widely-held perception that improving schooling attainment and income/consumption for parents in poor households will substantially improve living standards in the current generation as well as improve the human capital accumulated among children and consequently, reduce poverty and inequality in the next generation of adults. Our aim is to examine if attaining specific targets (such as decreasing the proportion of people living on less than $1 a day and or ensuring primary school completion as currently targeted by the Millennium Development Goals) in one generation would result in substantial reductions in poverty and inequality in the next.

We find that changing parental schooling to at least the primary level does little to change the prevalence of poverty as measured by the proportion below some cutoff and inequality in the distribution of parental schooling. Increasing parental schooling much more to a minimum of 9 grades, however, reduces inequality in terms of parental schooling considerably, but results in little change in the poverty (again in the sense of the proportion below some cutoff) and very little change in the inequality of the distribution of the human capital of their children. The same is true when we raise the per capita consumption of parents to a minimum of $1 a day or to the 20th percentile of the per capita consumption distribution.

Were the Millennium Development Goal of universal primary education to be achieved today, it would imply some 57 million additional children of primary school age in developing regions attending school (UNDP 2014). This would be an important gain. However, it is likely that even in this scenario, substantial inequality in human capital would remain. To some, it may seem trivial that inequalities remain, since even in these hypothetical scenarios, the parents at the bottom of the distribution remain at the bottom (albeit at a higher level). However, for the parents of Young Lives children to have met this

Millennium Development Goal would have implied an additional 1 to 3 grades on average per parent with less than primary schooling; to have achieved the goal of a universal 9 grades of schooling would have implied an additional 5-7 grades of schooling per Young Lives parent. These are very large increases as compared, for example, with the estimated impacts of about 0.7 grades of the very visible Mexican conditional cash transfer PROGRESA/Oportunidades program (Behrman, Sengupta and Todd 2005; Schultz 2004). The latter scenario would move the bottom tail of the parental schooling distribution well above the current mean in almost all cases, yet still lead to very small changes in inequality for their children's human capital. Furthermore, despite finding strong associations between child cognitive scores and parental human capital and per capita consumption for all countries, these scenarios with substantial changes for the parents at the bottom tail of the distribution do very little to decrease poverty (in the sense of the proportion of children below the 20th percentile of the distribution before the simulated change) or inequality for their children.

While increases in parental schooling attainment and per capita consumption for poor households are likely to be desirable in themselves to improve welfare among current poor households, they are not likely to have large impacts on reducing human capital (and eventually probably adult per capita consumption) poverty and certainly not inequality in the next generation of adults. Thus, investing in programs to increase parental schooling and income is without a doubt a worthy objective, but doing so with the expectation that important benefits include that this would bring down substantially the prevalence of poverty and inequality in the next generation would be misguided. Our estimates do not support the position summarized in the introduction that there is a “virtuous cycle” in which a one-off reduction in poverty and in inequality for one generation will result in substantially reduced poverty and inequality in the next generation. Instead they suggest that to reduce poverty and inequality across the generations, such efforts to reduce poverty and inequality must be sustained over decades.

Appendix

Table A1

Supplementary Table A1. Poverty and Inequality Statistics, Inflated Coefficient Scenario

		Actual		Simulated (S=9,C=$1dd)		Simulated with adjusted coefficients (S=9,C=$1dd)	
		PH	Std err	PH	Std err	PH	Std err
Ethiopia	PPVT	0.200	0.010	0.020	0.003	0.011	0.003
	Math	0.141	0.009	0.016	0.003	0.008	0.002
India	PPVT	0.175	0.009	0.019	0.003	0.013	0.003
	Math	0.167	0.009	0.049	0.005	0.031	0.004
Peru	PPVT	0.193	0.009	0.137	0.008	0.126	0.008
	Math	0.172	0.009	0.111	0.008	0.092	0.007
Vietnam	PPVT	0.189	0.009	0.061	0.006	0.052	0.005
	Math	0.157	0.009	0.092	0.007	0.079	0.007

		Actual		Simulated (S=9,C=$1dd)		Simulated with adjusted coefficients (S=9,C=$1dd)	
		PH	**Std err**	**PH**	**Std err**	**PH**	**Std err**
		Gini	**Std err**	**Gini**	**Std err**	**Gini**	**Std err**
Ethiopia	PPVT	0.296	0.003	0.230	0.003	0.220	0.002
	Math	0.447	0.005	0.321	0.004	0.303	0.004
	Height	0.031	0.001	0.029	0.001	0.028	0.001
India	PPVT	0.280	0.004	0.218	0.004	0.211	0.004
	Math	0.304	0.006	0.231	0.003	0.221	0.003
	Height	0.028	0.000	0.026	0.001	0.026	0.001
Peru	PPVT	0.156	0.004	0.131	0.003	0.127	0.003
	Math	0.229	0.005	0.190	0.004	0.184	0.004
	Height	0.028	0.000	0.026	0.000	0.026	0.000
Vietnam	PPVT	0.161	0.003	0.136	0.002	0.134	0.002
	Math	0.176	0.003	0.148	0.003	0.144	0.002
	Height	0.028	0.000	0.026	0.000	0.026	0.001
		p90/p10	**p75/p25**	**p90/p10**	**p75/p25**	**p90/p10**	**p75/p25**
Ethiopia	PPVT	4.40	2.28	3.04	1.84	2.88	1.79
	Math	15.00	5.00	4.77	2.51	4.29	2.31
	Height	1.13	1.07	1.13	1.06	1.13	1.06
India	PPVT	3.54	1.97	2.67	1.64	2.62	1.59
	Math	5.25	2.29	3.17	1.85	2.94	1.81
	Height	1.13	1.07	1.12	1.06	1.12	1.06
Peru	PPVT	2.07	1.40	1.85	1.33	1.81	1.34
	Math	3.67	1.80	2.55	1.58	2.52	1.57
	Height	1.14	1.07	1.12	1.07	1.12	1.07
Vietnam	PPVT	1.96	1.44	1.78	1.39	1.76	1.39
	Math	2.36	1.64	2.04	1.50	2.01	1.48
	Height	1.14	1.07	1.13	1.07	1.13	1.07

Appendix A. More Detailed Discussion of the Estimates of the Associations of Child Human Capital Outcomes with Parental Family and Community Characteristics

Table 4 lists the full set of estimated coefficients from the regressions of outcomes at age 8 years. The R-squared for the cognitive regressions ranges from 0.16 for PPVT in India to 0.50 for PPVT in Ethiopia. The R-squared for the math regressions is also highest for Ethiopia (0.49) and lowest for India (0.23). The R-squared for the regressions of height at age 8 years is highest in Peru (0.37) and lowest in Ethiopia (0.17).

Consumption per capita is associated with higher PPVT scores in all four countries, with differing coefficients based on whether the household is above or below the 20th percentile. Consumption per capita per day in USD for households in the lowest income quintile is associated with significant increases of 59.5 points in Ethiopia and 12.7 points in Peru for

PPVT score, while beyond the 20th percentile of consumption, it is associated with significant increases of 12.1 points in Ethiopia, 6.8 points in India, 0.6 points in Peru, and 2.4 points in Vietnam. For Math, greater gains also appear in the lowest quintiles for all four countries, India, Peru and Vietnam, with significant increases of 11.5, 4.9, and 7.6 points, respectively in math scores (in India the pattern is the same but the coefficient on consumption for the higher quintiles is not significant). Similarly, for height, there is a higher association with consumption in the lowest quintile, where an additional USD in consumption per capita is associated with 35.8 cm increase in height in Ethiopia, 3.5 cm increase in height in Peru, and 11.3 cm increase in height in Vietnam, compared to increases of 1.4 in Ethiopia, 1.8 in India, 0.2 in Peru, and 0.5 Vietnam, for increases in consumption at the higher income quintiles. These numbers are quite large in magnitude in some cases because an increase of 1USD per capita per day is large in magnitude, considering average levels of per capita consumption per day for these countries.

We also include a spline in mother's schooling, so that coefficients may be determined separately by whether the mother has greater or less than 9 grades of schooling. Here, we find differences in associations with earlier schooling grades that vary by exam and country. For Ethiopia, India, and Peru, earlier schooling grades are associated with smaller increases to PPVT scores (0.6, 1.0, and 0.4) compared to schooling after grade 9 (1.2, 1.3, 1.0, respectively, though not significant for Ethiopia after grade 9). For Vietnam, the reverse is true, where increases in schooling at earlier grades are associated with a greater change in PPVT (1.6) compared to increases at higher levels of schooling (1.5). For math, this pattern holds somewhat for Ethiopia, India and Peru (an additional schooling grade in the early schooling grades is associated with increases of 0.1, 0.3, and 0.2 in Ethiopia, India, and Peru, while in later schooling grades an additional schooling grade is associated with increases of 0.2, 0.4, and 0.4 in Ethiopia, India, and Peru, though not significant in for Ethiopia at higher levels; Vietnam shows significant increases only at lower schooling grades, with coefficient 0.2). For height in cm, an additional schooling grade at lower levels of schooling is again associated with significant increases that are smaller in magnitude in India, Peru, and Vietnam (0.2, 0.2, 0.1) compared to an additional schooling grade at higher levels of schooling (0.3, 0.3, 0.3).

Fathers’ schooling at the earlier grades is significant for both exams in all countries, while additional schooling at greater than 9 grades is significant in five (PPVT in India and Peru, Math in India, and EGRA in India) of the eight possible cases. Fathers’ schooling is significant for height only in Ethiopia and Peru for lower levels of schooling, and significant at higher levels of schooling in Vietnam.

Community wealth is significant in all countries for both exams in all four countries. Its magnitude for PPVT ranges from 1.1 in Peru to 5.4 in Ethiopia, and for math, from 0.2 in Peru to 0.9 in India. For height, community wealth is significant in Ethiopia, India and Peru (coefficients of 0.3 for all three).

These results suggest that increases in the lower end of the schooling distribution for both mothers and fathers, and in the lower tails of consumption per capita may all have significant implications for children's cognitive scores and, to some extent, their height.

References

Almond, Douglas, Currie, Janet. Killing Me Softly: The Fetal Origins Hypothesis. Journal of Economic Perspectives. 2011; 25(3):153–72. [PubMed: 25152565]

Ashenfelter, Orley, Krueger, Alan. Estimates of the Economic Return to Schooling from a New Sample of Twins. American Economic Review. 1994; 84(5):1157–74.

Ashenfelter, Orley, Rouse, Cecilia. Income, Schooling, and Ability: Evidence from a New Sample of Identical Twins. Quarterly Journal of Economics. 1998; 113(1):253–84.

Barros, Ricardo PE., Ferreira, Francisco HG., Vega, Jose RM., Chanduvi, Jaime S. Measuring Inequalities of Opportunities in Latin America and the Caribean. Washington, DC: International Bank for Reconstruction and Development; 2009.

Becker, Gary S., Tomes, Nigel. Child Endowments and the Quantity and Quality of Children. Journal of Political Economy. 1976; 84(4):S143–62.

Becker, Gary S. Human Capital. 2. Vol. 1975. New York: NBER; 1967. Human Capital and the Personal Distribution of Income: An Analytical Approach; p. 94-117.University of Michigan, Woytinsky Lecture republished in Gary S. Becker

Behrman, Jere R., Trujillo, Alejandro Gaviria, Székely, Miguel. Intergenerational Schooling Mobility in Latin America. Economia. 2001; 2(1):1–31.

Behrman, Jere R., Knowles, James C. Household Income and Child Schooling in Vietnam. World Bank Economic Review. 1999; 13(2):211–56.

Behrman, Jere R., Calderon, Maria Cecilia, Preston, Samuel, Hoddinott, John, Martorell, Reynaldo, Stein, Aryeh D. Nutritional Supplementation of Girls Influences the Growth of their Children: Prospective Study in Guatemala. American Journal of Clinical Nutrition. 2009; 90(5):1372–1379. [PubMed: 19793851]

Behrman, Jere R., Pollak, Robert A., Taubman, Paul. Parental Preferences and Provision for Progeny. Journal of Political Economy. 1982; 90(1):52–73.

Behrman, Jere R., Pollak, Robert A., Taubman, Paul. The Wealth Model: Efficiency in Education and Distribution in the Family. In: Behrman, JR.Pollak, RA., Taubman, P., editors. From Parent to Child: Intrahousehold Allocations and Intergenerational Relations in the United States. Chicago: University of Chicago Press; 1995.

Behrman, Jere R., Rosenzweig, Mark R. Does Increasing Women's Schooling Raise the Schooling of the Next Generation. American Economic Review. 2002; 92(1):323–334.

Behrman, Jere R., Rosenzweig, Mark R., Taubman, Paul. Endowments and the Allocation of Schooling in the Family and in the Marriage Market: The Twins Experiment. Journal of Political Economy. 1994; 102(6):1131–74.

Behrman, Jere R., Sengupta, Piyali, Todd, Petra. Progressing through Progresa: An Impact Assessment of a School Subsidy Experiment in Rural Mexico. Economic Development and Cultural Change. 2005; 54(1):237–75.

Bielby, William T., Hauser, Robert M., Featherman, David L. Response Errors of Non-Black Males in Models of the Stratification Process. In: Aigner, DA., Goldberger, AS., editors. Latent Variables in Socio-Economic Models. Amsterdam: North Holland; 1977.

Bird, K. The intergenerational transmission of poverty: An Overview. London: Overseas Development Institute, Chronic Poverty Research Centre; 2007.

Birdsall, Nancy, Graham, Carol. New Markets, New Opportunities? Economic and Social Mobility in a Changing World. Washington, DC: The Brookings Institution and the Carnegie Endowment for International Peace; 2000.

Black, Sandra E., Devereux, Paul J. Recent Developments in Intergenerational Mobility. IZA Discussion Paper Series No. 4866. 2010

Black, Sandra E., Devereux, Paul J., Salvanes, Kjell G. Why the Apple Doesn't Fall Far: Understanding Intergenerational Transmission of Human Capital. American Economic Review. 2005; 95(1):437–49.

Brown, Philip H., Park, Albert. Education and Poverty in Rural China. Economics of Education Review. 2002; 21(6):523–41.

Castañeda, Tarsicio, Aldaz-Carroll, Enrique. The Intergenerational Transmission of Poverty: Some Causes and Policy Implications. Washington, DC: Inter-American Development Bank; 1999. Working paper

Contreras, Dante. PhD dissertation. University of California; Los Angele: 1996. Household and Individual Welfare: Evidence from Less Developed Economies.

Contreras, Dante. Poverty and Inequality in a Rapid Growth Economy: Chile 1990-96. Journal of Development Studies. 2003; 39(3):181–200.

Corak, Miles. Do Poor Children Become Poor Adults? Lessons from a Cross-Country Comparison of Generational Earnings Mobility. Research on Economic Inequality. 2006; 13:143–88.

Cueto, Santiago, Leon, Juan. Psychometric Characteristics of Cognitive Development and Achievement Instruments in Round 3 of Young Lives. Oxford: Young Lives (England); 2012. p. 47Technical Note No. 15

Cunha, Flavio, Heckman, James J., Lochner, Lance. Handbook of the Economics of Education. Elsevier; 2006. Interpreting the Evidence on Life Cycle Skill Formation.

Currie, Janet. Healthy, Wealthy, and Wise? Socioeconomic Status, Poor Health in Childhood, and Human Capital Development. Journal of Economic Literature. 2009; 47(1):87–122.

Currie, Janet, Vogl, Tom. Early-life health and adult circumstance in developing countries. Annual Review of Economics. 2013; 5:1–36.

Dahl, Gordon, Lochner, Lance. The Impact of Family Income on Child Achievement: Evidence from Changes in the Earned Income Tax Credit. American Economic Review. 2012; 102(5):1927–1956.

Deaton, Angus. The Analysis of Household Surveys: A Microeconometric Approach to Development Policy. Baltimore and London: The Johns Hopkins University Press for the World Bank; 1997.

Engle, Patrice L., Fernald, Lia CH., Alderman, Harold, Behrman, Jere, O'Gara, Chloe, Yousafzai, Aisha, Cabral de Mello, Meena, Hidrobo, Melissa, Ulkuer, Nurper, Ertem, Ilgi, et al. Strategies for Reducing Inequalities and Improving Developmental Outcomes for Young Children in Low-Income and Middle-Income Countries. Lancet. 2011; 378(9799):1339–53. [PubMed: 21944378]

Engle, Patrice L., Black, Maureen M., Behrman, Jere R., Cabral de Mello, Meena, Gertler, Paul J., Kapiriri, Lydia, Martorell, Reynaldo, Young, Mary Eming. Strategies to Avoid the Loss of Developmental Potential in More Than 200 Million Children in the Developing World. Lancet. 2007; 369(9557):229–42. [PubMed: 17240290]

Ferreira, Francisco, Leite, Phillippe. Educational Expansion and Income Distribution: A micro-simulation for Ceará. In: Hoeven, van der, Shorrocks, editors. Growth, Inequality and Poverty. London: Oxford University Press; 2004.

Filmer, Deon, Scott, Kinnon. Assessing Asset Indices. Demography. 2012; 49(1):359–392. [PubMed: 22135117]

Foster, Andrew D. Prices, Credit markets, and Child Growth in Low-Income Rural Areas. Economic Journal. 1995; 105(430):551–570.

Foster, James E., Greer, Joel, Thorbecke, Erik. A Class of Decomposable Poverty Measures. Econometrica. 1984; 52(3):761–766.

Georgiadis, Andreas. Parental Background and Children's Human Capital Development Throughout Childhood and Adolescence: Evidence from Four Low- and Middle-Income Countries. University of Oxford; UK: 2013. Unpublished manuscript

Gertler, Paul, Heckman, James, Pinto, Rodrigo, Zanolini, Arianna, Vermeerch, Christel, Walker, Susan, Chang, Susan M., Grantham-McGregor, Sally. Labor Market Returns to an Early Childhood Stimulation Intervention in Jamaica. Science. 2014; 344(6187):998–1001. [PubMed: 24876490]

Glewwe, Paul. Working Paper No. 76. Vol. 69. Washington, D.C.: World Bank (USA); 1991. Schooling, Skills, and the Returns to Government Investment in Education: An Exploration using Data from Ghana.

Glewwe, Paul, Jacoby, Hannan G. Economic Growth and the Demand for Education: Is there a Wealth Effect. Journal of Development Economics. 2004; 74(1):33–51.

Guryan, Jonathan, Hurst, Erik, Kearney, Melissa. Parental Education and Parental Time with Children. Journal of Economic Perspectives. 2008; 22(3):23–46.

Haddad, Lawrence, Alderman, Harold, Appleton, Simon, Song, Lina, Yohannes, Yisehac. Reducing Child Malnutrition: How Far Does Income Growth Take Us? World Bank Economic Review. 2003; 17(1):107–31.

Heckman, James J. Skill Formation and the Economics of Investing in Disadvantaged Children. Science. 2006; 312(5782):1900–02. [PubMed: 16809525]

Hoddinott, John, Alderman, Harold, Behrman, Jere R., Haddad, Lawrence, Horton, Susan. The Economic Rationale for Investing in Stunting Reduction. Maternal and Child Nutrition. 2013; 9(Suppl 2):69–82. [PubMed: 24074319]

Hoddinott, John, Maluccio, John A., Behrman, Jere R., Flores, Rafael, Martorell, Reynaldo. The Impact of Nutrition During Early Childhood on Income, Hours Worked, and Wages of Guatemalan Adults. Lancet. 2008; 371(9610):411–416. [PubMed: 18242415]

Hoddinott, John, Maluccio, John A., Behrman, Jere R., Martorell, Reynaldo, Melgar, Paul, Quisumbing, Agnes R., Ramirez-Zea, Manuel, Stein, Aryeh D., Yount, Kathryn M. Adult Consequences of Growth Failure in Early Childhood. American Journal of Clinical Nutrition. 2013; 98(5):1170–1178. [PubMed: 24004889]

Hoynes, Hilary, Schanzenbach, Diane, Almond, Douglas. Long Run Impacts of Childhood Access to the Safety Net. NBER Working Paper No. 18535. 2013

Johannes, Tabi A., Noula, Armand G. Gender and Increased Access to Schooling in Cameroon: A Marginal Benefit Incidence Analysis. Journal of International Women Studies. 2011; 12(1)

King, Elizabeth, Mason, Andrew D. Engendering Development: Through Gender Equality in Rights, Resources, and Voice--World Bank Policy Research Report. New York: World Bank and Oxford University Press; 2001.

LeVine, Robert A., LeVine, Sarah, Schnell-Anzola, Beatrice, Rowe, Meredith L., Dexter, Emily. Literacy and Mothering: How Women's Schooling Changes the Lives of the World's Children. London: Oxford University Press; 2011.

Levy, Santiago. Progress Against Poverty: Sustaining Mexico's PROGRESAOportunidades Program. Washington, DC: The Brookings Institution; 2006.

Lillard, Lee A., Willis, Robert J. Intergenerational Educational Mobility: Effects of Family and State in Malaysia. Journal of Human Resources. 1994; 29(4):1126–1166.

Mani, Subha, Hoddinott, John, Strauss, John. Determinants of Schooling –Empirical Evidence from Rural Ethiopia. Journal of African Economies. 2013; 22(5):693–731.

Mani, Subha. Socioeconomic Determinants of Child Health - Empirical Evidence from Indonesia. Asian Economic Journal. 2014; 28(1):81–104.

Orazem, Peter F., King, Elizabeth M. Schooling in Developing Countries: The Roles of Supply, Demand and Government Policy. In: Schultz, TP., Strauss, J., editors. Handbook of Development Economics. Vol. 4. 2008.

Plug, Erik. Estimating the Effect of Mother's Schooling on Children's Schooling Using a Sample of Adoptees. American Economic Review. 2004; 94(1):358–68.

Schady, Norbert, Behrman, Jere R., Araujo, Maria Caridad, Azuero, Rodrigo, Bernal, Raquel, Bravo, David, Lopez-Boo, Florencia, Macours, Karen, Marshall, Daniela, Paxson, Christina, Vakis, Renos. Wealth Gradients in Early Childhood Cognitive Development in Five Latin American Countries. Journal of Human Resources. 2015 forthcoming.

Schott, Whitney, Crookston, Benjamin T., Lundeen, Elizabeth A., Stein, Aryeh D., Behrman, Jere R., The Young Lives Determinants and Consequences of Growth Project Team. Periods of Child Growth up to Age 8 years in Ethiopia, India, Peru and Vietnam: Key Distal Household and Community Factors. Social Science and Medicine. 2013; 97:278–287. [PubMed: 23769211]

Schultz, T Paul. School Subsidies for the Poor: Evaluating the Mexican Progresa Poverty Program. Journal of Development Economics. 2004; 74(1):199–250.

Solon, Gary. Intergenerational Mobility in the Labor Market. In: Ashenfelter, Orley, Card, David, editors. Handbook of Labor Economics. Vol. 3. Amsterdam: NorthHolland; 1999. p. 1761-800.

Solon, Gary. Cross-Country Differences in Intergenerational Earnings Mobility. Journal of Economic Perspectives. 2002; 16(3):59–66.

Strauss, John, Thomas, Duncan. Health, Nutrition and Economic Development. Journal of Economic Literature. 1998; 36(2):766–817.

Strauss, John, Thomas, Duncan. Health over the Life Course. In: Schultz, TP., Strauss, J., editors. Handbook of Development Economics. Vol. 4. Elsevier; 2008.

UNDP. [Accessed 7/23/2014] Millenium Development Goals and Beyond. 2014. http://www.un.org/millenniumgoals/education.shtml

Victora, Cesar G., Adair, Linda, Fall, Caroline, Hallal, PedroC, Martorell, Reynaldo, Richter, Linda, Sachdev, Harshpal Singh, on behalf of the Maternal and Child Undernutrition Study Group. Undernutrition 2: Maternal and Child Undernutrition: Consequences for Adult Health and Human Capital. Lancet. 2008; 371(9609):340–357. [PubMed: 18206223]

Walker, Susan P., Chang, Susan M., Powell, Christine A., Grantham-McGregor, Sally M. Effects of Early Childhood Psychosocial Stimulation and Nutritional Supplementation on Cognition and Education in Growth-Stunted Jamaican Children: Prospective Cohort Study. Lancet. 2005; 366:1804–07. [PubMed: 16298218]

Walker, Susan P., Grantham-McGregor, Sally M., Powell, Christine A., Chang, Susan M. Effects of Growth Restriction in Early Childhood on Growth, IQ, and Cognition at age 11 to 12 years and the Benefits of Nutritional Supplementation and Psychosocial Stimulation. Journal of Pediatrics. 2000; 137:36–41. [PubMed: 10891819]

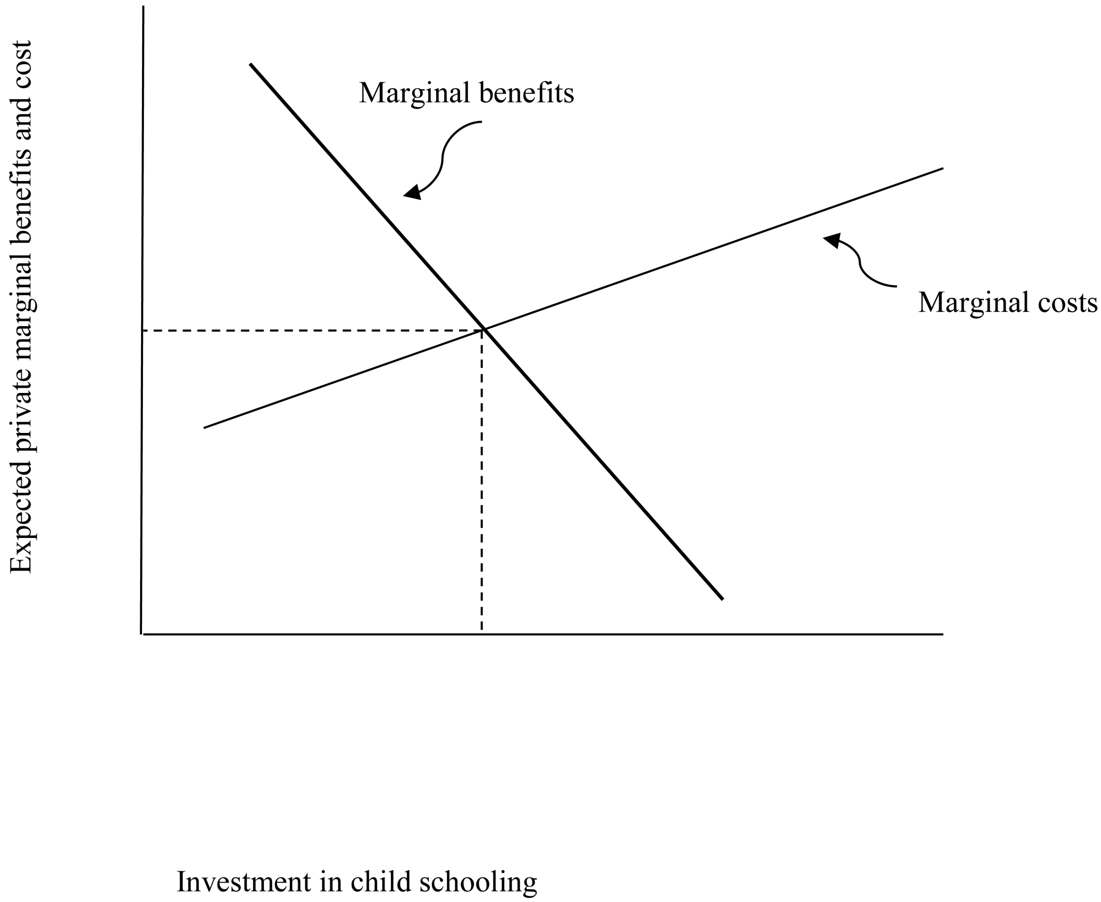

Figure 1. Expected Private Marginal Benefits and Costs for Investment in Children's Schooling from Becker's (1967) Woytinsky Lecture

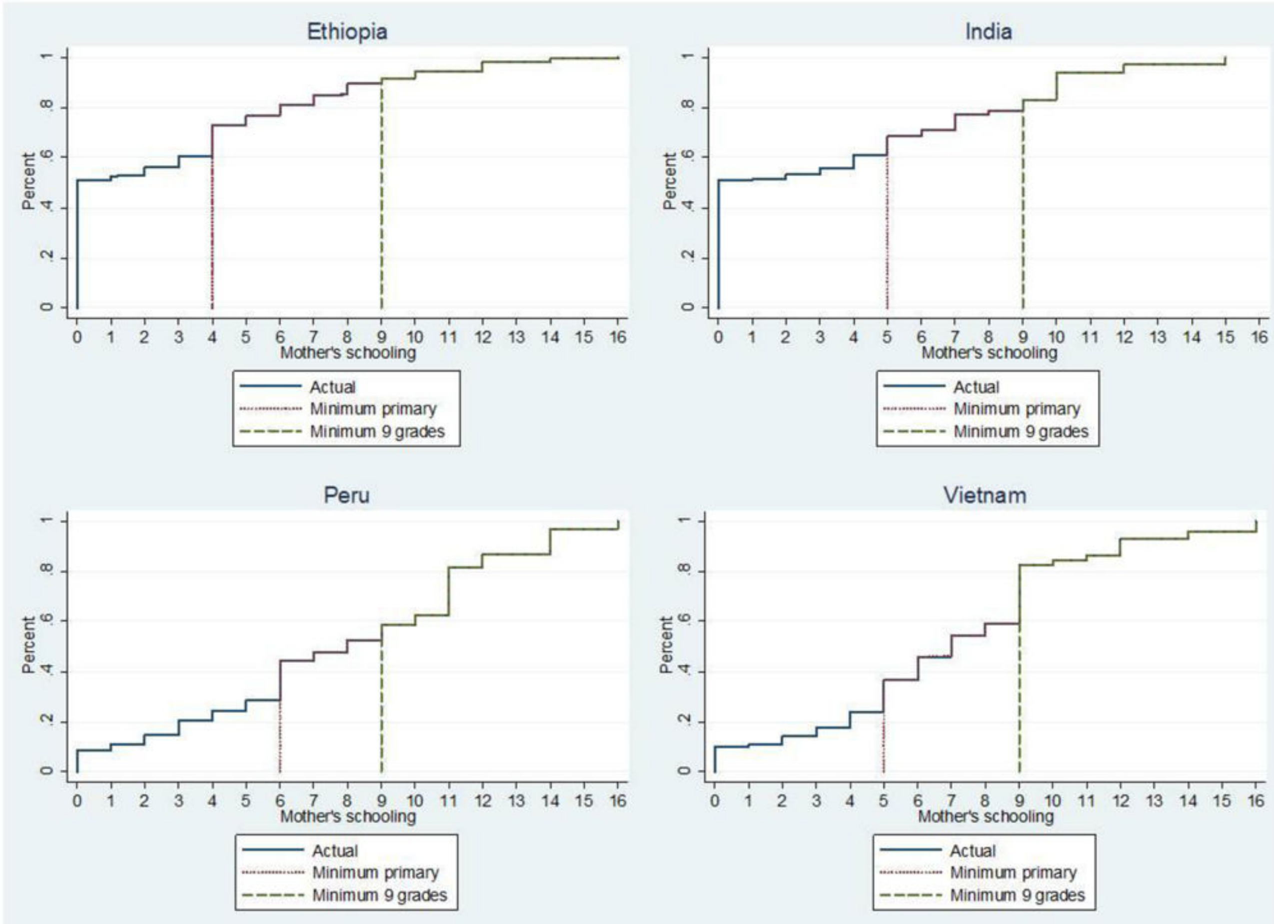

Figure 2. CDFs of Years of Mother's Schooling: Actual and Hypothetical Scenarios

CDFs of Grades of Mother's Schooling: Actual and Hypothetical Scenarios

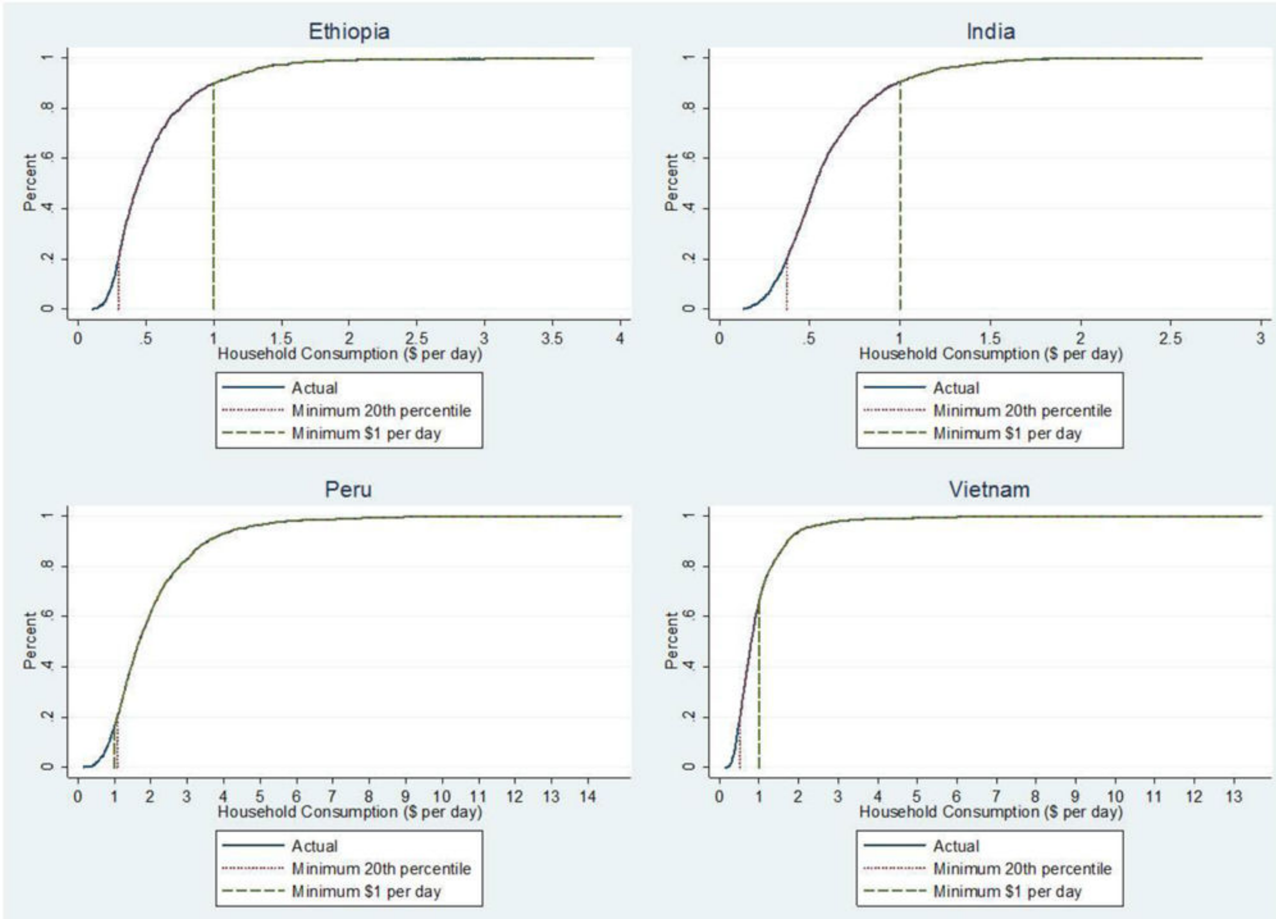

Figure 3. CDFs of Household Consumption: Actual and Hypothetical Scenarios

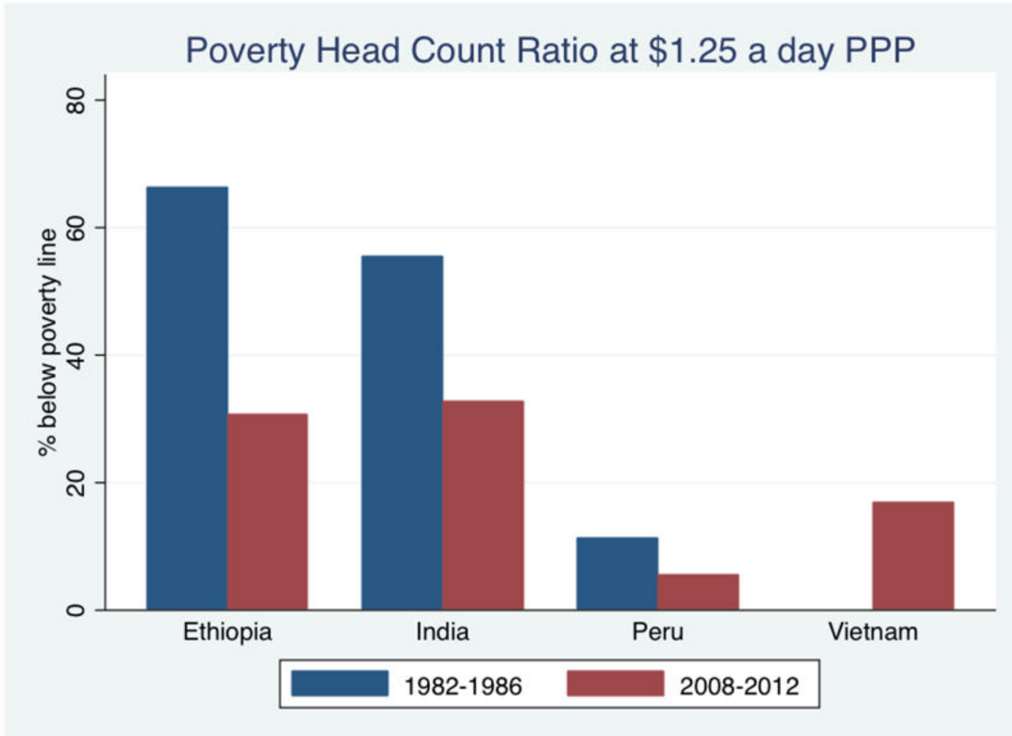

Figure 4. Percent Below Poverty Line defined at $1.25 a day Purchasing Power Parity

Notes: Author calculations based on World Bank Data. The World Bank poverty incidence is computed using the $1.25 per day per person value. Data for Vietnam 1982-1986 are not available.

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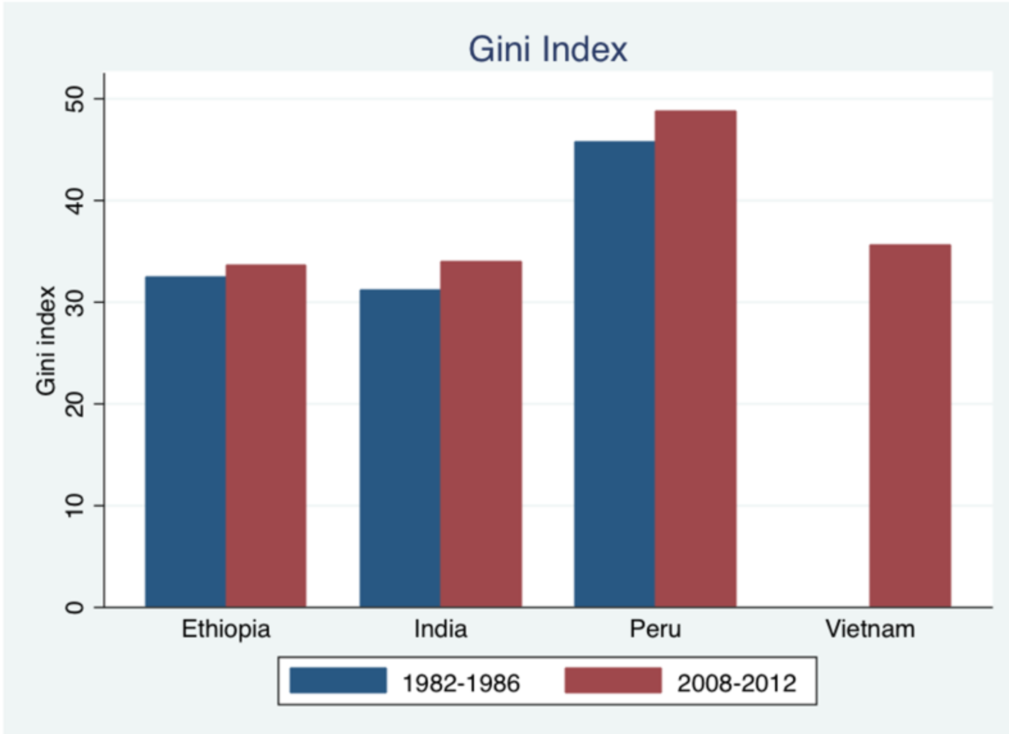

Figure 5. Gini Index

Notes: Author calculations based on World Bank Data. A Gini index of 0 implies perfect equality and 100 inequality (i.e., all resources are consumed by one individual). Data for Vietnam 1982-1986 are not available.

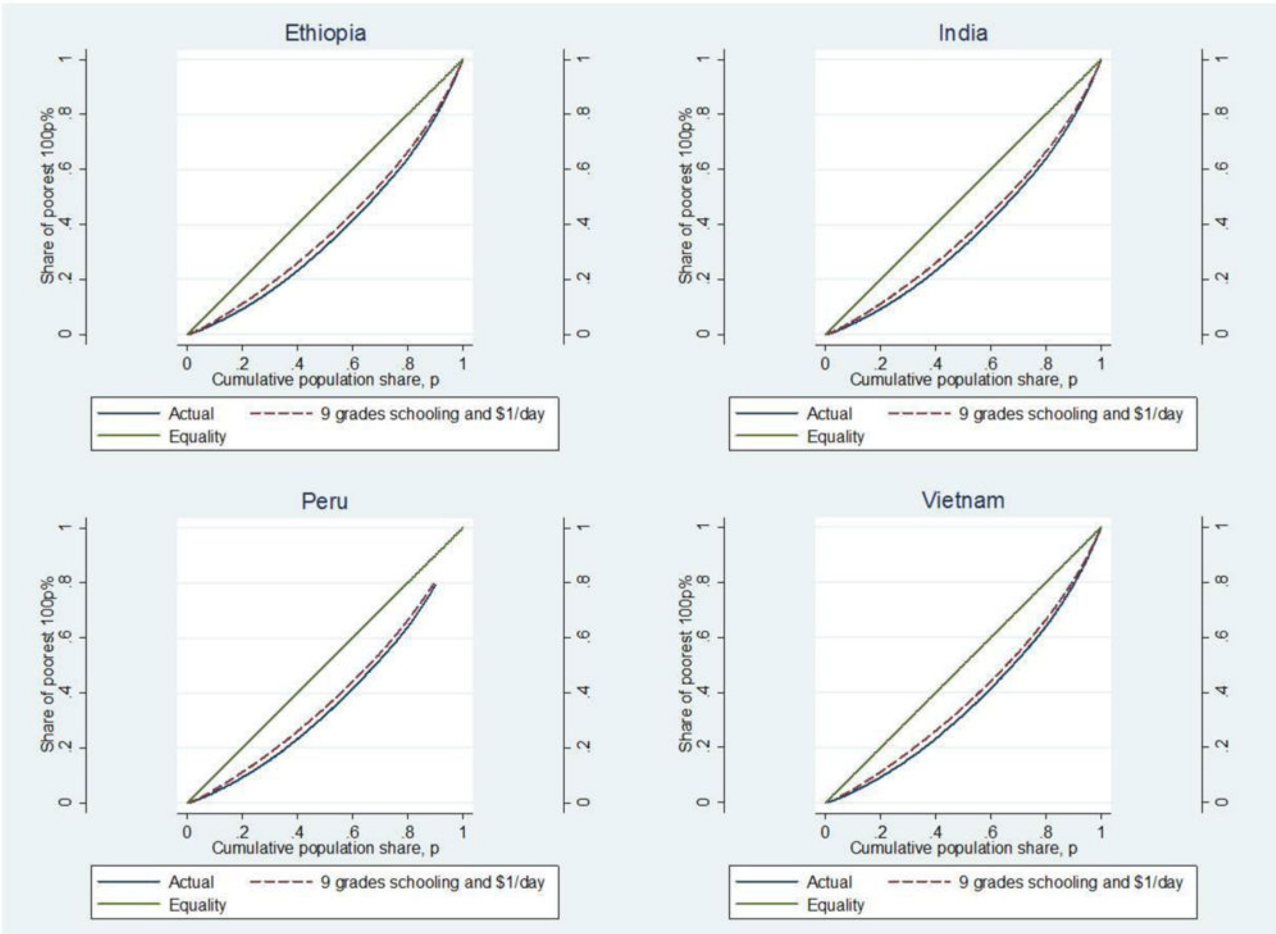

Figure 6. Lorenz Curves for PPVT Scores: Actual and Hypothetical Scenarios

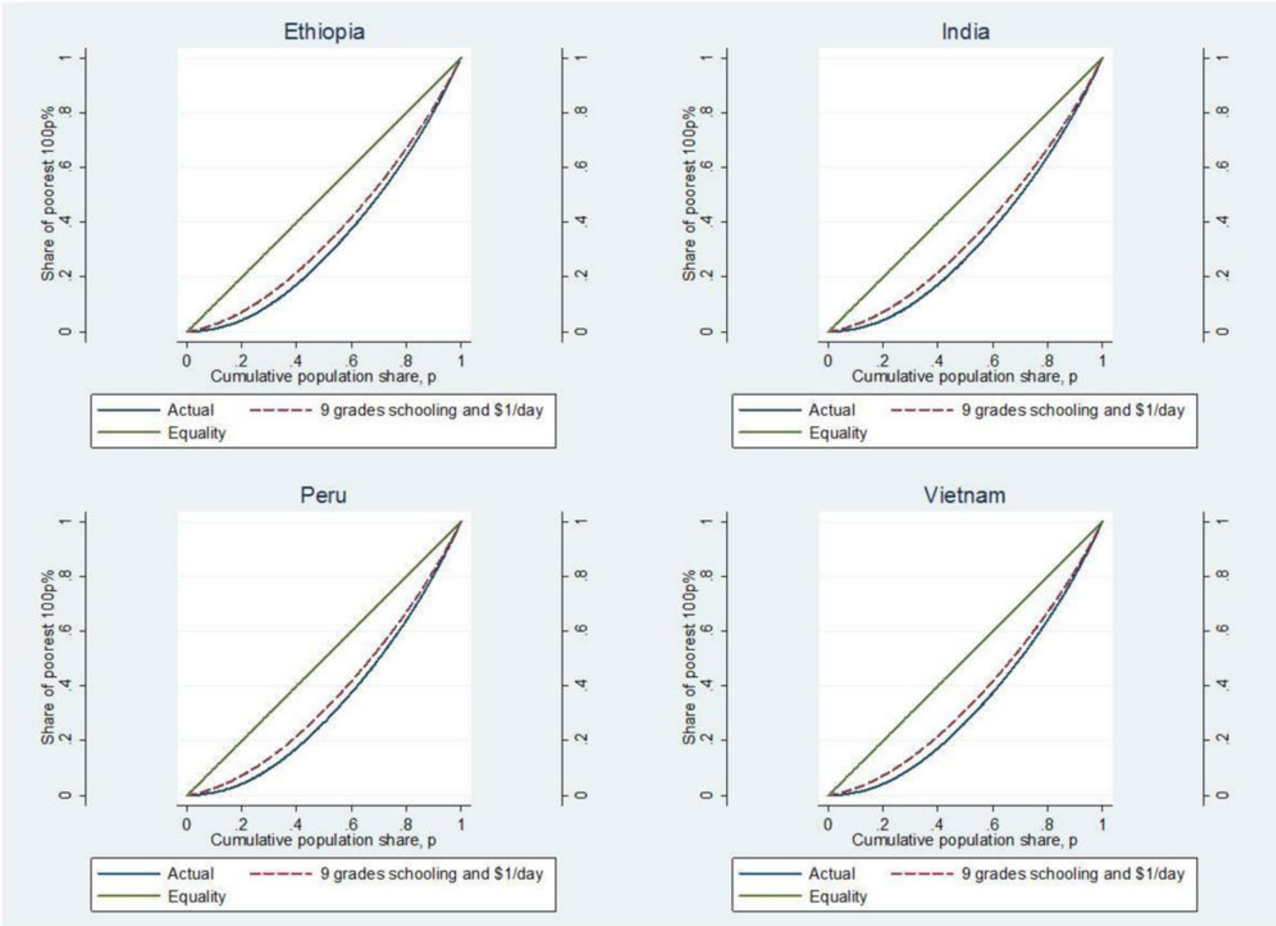

Figure 7. Lorenz Curves for Math Scores: Actual and Hypothetical Scenarios

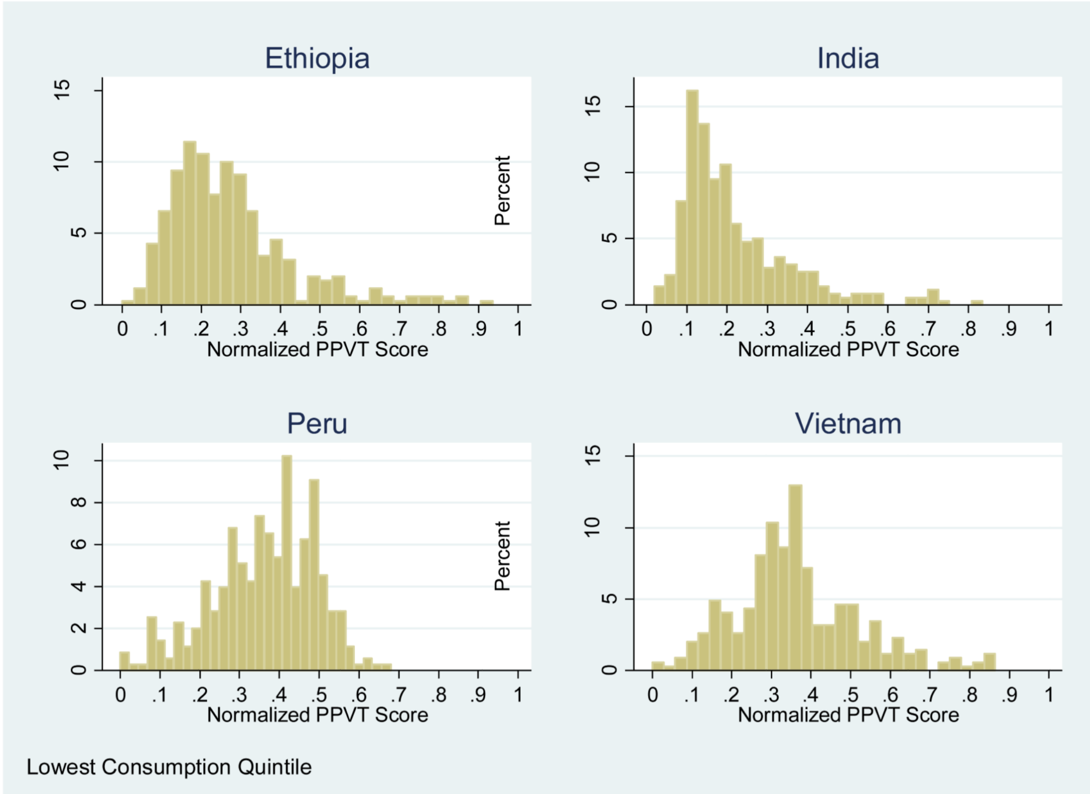

Figure 8. Distribution of PPVT Scores among the Lowest Consumption Quintile

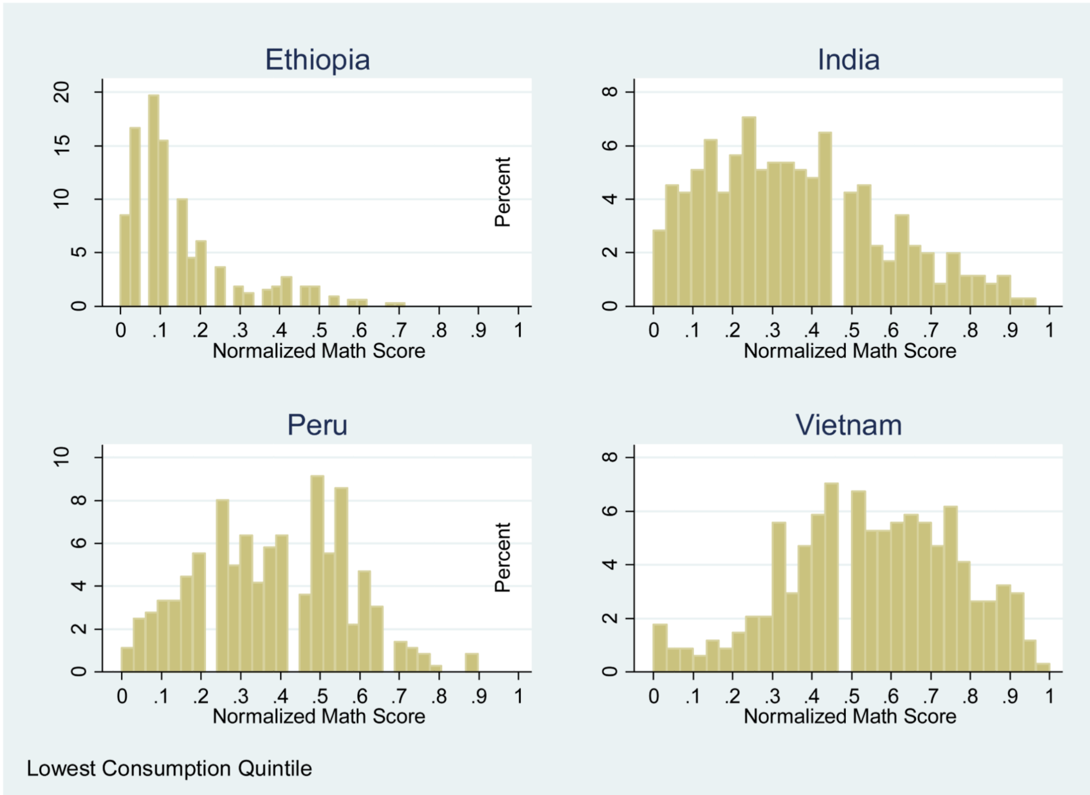

Figure 9. Distribution of Math Scores among the Lowest Consumption Quintile

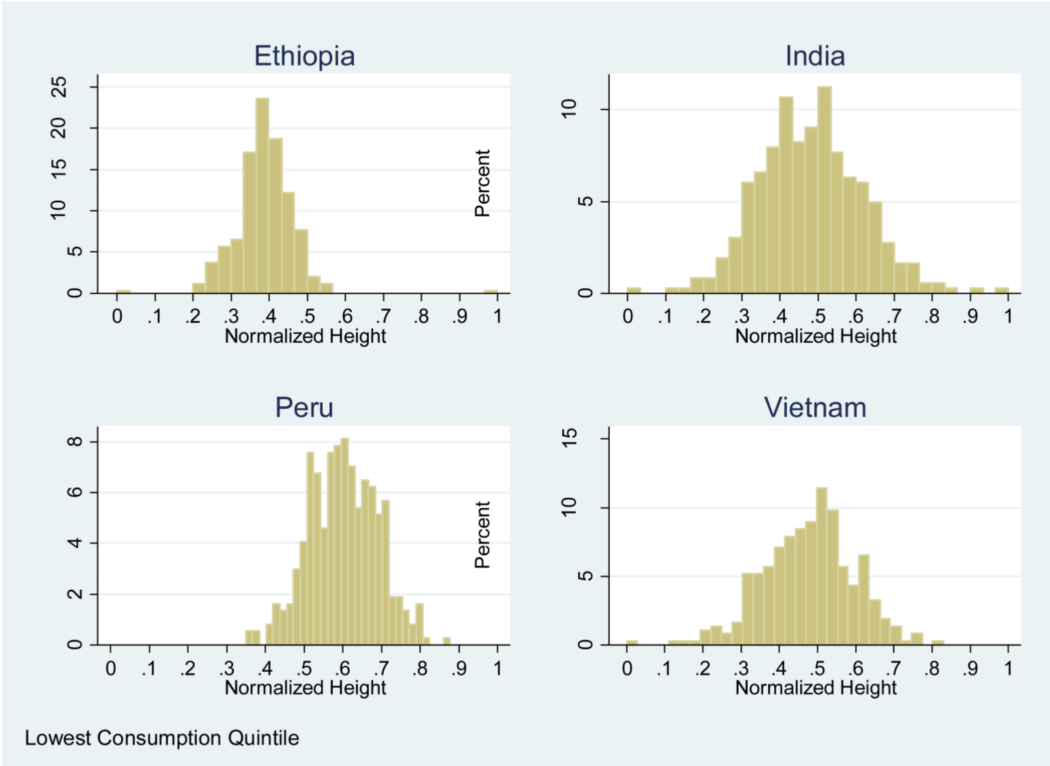

Figure 10. Distribution of Height among the Lowest Consumption Quintile

Table 1

Descriptive Statistics

	Ethiopia (n=1,669)		India (n=1,787)		Peru (n=1,748)		Vietnam (n=1,711)	
	Mean/percent	SD	Mean/percent	SD	Mean/percent	SD	Mean/percent	SD
Child Measures								
PPVT	68.6	36.8	49.1	26.7	47.1	13.4	77.8	23.4
Math	6.6	5.4	12.0	6.4	14.3	5.8	18.5	5.7
HAZ (height-for-age z score)	-1.21	1.05	-1.45	1.00	-1.14	1.02	-1.09	1.01
Height	120.66	6.95	118.61	5.93	120.11	5.99	121.10	6.03
Female	46.7		46.3		50.1		48.9	
Age in (months)	97.1	3.7	95.4	3.9	95.0	3.6	96.6	3.4
Parental Measures								
Per capita consumption per day (USD)	0.56	0.38	0.60	0.30	2.05	1.37	0.99	0.76
Percent per capita consumption per day<1USD	89.9		90.5		16.4		65.9	
20^{th} percentile per capita consumption per day USD	0.30		0.37		1.08		0.52	
Mother's schooling	3.1	3.9	3.7	4.4	7.8	4.4	7.1	3.9
Father's schooling	5.0	4.3	5.6	5.0	9.1	3.8	7.7	3.9
Percent mothers <5 yrs schooling	72.4		60.6		24.2		22.7	
Percent fathers <5 yrs schooling	59.7		44.5		11.9		18.9	
Mother's age in round 1	27.4	6.4	23.6	4.3	26.8	6.7	27.0	5.7
Mother's height	158.7	5.9	151.5	6.0	150.0	5.4	152.2	5.8
Community Measures								
Community wealth (PCA index)	0.11	2.73	-0.01	2.38	-0.05	2.61	-0.02	2.42
Moved after round 1	21.1		11.4		48.6		15.0	
Urban	36.5		24.7		66.4		18.1	
Hospital in community	30.3		46.3		34.3		89.5	
Secondary school in community	34.7		43.8		78.1		98.1	

Table 2

Regressions of the natural log of per Capita Consumption, Parents' Generation

	Ethiopia	India	Peru	Vietnam
Mother's schooling	0.053*	0.015*	0.045*	0.048*
	[0.004]	[0.003]	[0.003]	[0.004]
Father's schooling	0.027*	0.027*	0.042*	0.037*
	[0.003]	[0.003]	[0.004]	[0.004]
Mother's height	0.008*	0.001	0.008*	0.010*
	[0.002]	[0.002]	[0.002]	[0.002]
Mother's age	-0.072*	-0.006	-0.017	-0.001
	[0.012]	[0.018]	[0.013]	[0.015]
Mother's age squared	0.001*	0.00	0.00	0.00
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	-1.156*	-0.989*	-1.167*	-2.248*
	[0.335]	[0.335]	[0.362]	[0.359]
Observations	1,669	1,787	1,748	1,711
R-squared	0.352	0.156	0.336	0.335

Notes:

* Indicates significance at $p<0.05$. Standard errors in brackets.

Table 3

Poverty Headcounts, Gini Coefficients, and p90/p10 and p75/p25 Ratios, Parents' Generation

	Ethiopia				India			
	Poverty Headcount	**Gini**	**p90/p10**	**p75/p25**	**Poverty Headcount**	**Gini**	**p90/p10**	**p75/p25**
Per Capita Consumption	0.198	0.320	4.04	2.10	0.168	0.246	3.05	1.78
	[0.010]	[0.006]			[0.009]	[0.005]		
Mother's schooling	0.721	0.302	*a*	*a*	0.607	0.248	*a*	*a*
	[0.011]	[0.006]			[0.012]	[0.005]		
Father's schooling	0.588	0.307	*a*	8.00	0.445	0.257	*a*	*a*
	[0.012]	[0.004]			[0.012]	[0.004]		
	Peru				**Vietnam**			
	Poverty Headcount	**Gini**	**p90/p10**	**p75/p25**	**Poverty Headcount**	**Gini**	**p90/p10**	**p75/p25**
Per Capita Consumption	0.200	0.322	4.20	2.14	0.190	0.319	3.97	2.01
	[0.010]	[0.006]			[0.009]	[0.009]		
Mother's schooling	0.241	0.260	14.00	2.20	0.227	0.241	6.00	1.80
	[0.010]	[0.005]			[0.010]	[0.005]		
Father's schooling	0.117	0.226	3.50	1.83	0.185	0.237	4.00	1.80
	[0.008]	[0.004]			[0.009]	[0.004]		

Notes: Poverty line is 20th percentile of original distribution for consumption per capita and 5 grades of schooling for mother's and father's schooling. Standard errors in brackets.

[*] Indicates significance at $p<0.05$. Standard errors in brackets.

[a] Lowest percentile value = 0

Table 4

Seemingly Unrelated Regressions of PPVT and Math and OLS Regression of Height

	PPVT				Math				Height			
	Ethiopia	**India**	**Peru**	**Vietnam**	**Ethiopia**	**India**	**Peru**	**Vietnam**	**Ethiopia**	**India**	**Peru**	**Vietnam**
HH per capita consumption USD per day (<=20p)	59.48*	4.26	12.68*	12.4	4.22	11.49*	4.93*	7.60*	35.83*	-0.28	3.45*	11.27*
	[24.50]	[15.49]	[1.92]	[10.31]	[3.64]	[3.57]	[0.90]	[2.42]	[7.45]	[2.90]	[1.05]	[3.12]
HH per capita consumption USD per day (>20p)	12.13*	6.84*	0.57*	2.39*	1.06*	0.34	0.37*	0.53*	1.40*	1.83*	0.21*	0.46*
	[2.16]	[2.37]	[0.22]	[0.82]	[0.32]	[0.55]	[0.10]	[0.19]	[0.52]	[0.48]	[0.10]	[0.24]
Child female	0.16	-4.54*	-0.80*	-0.25	-0.08	-0.21	-0.65*	0.42*	0.41	-0.4	-0.75*	-0.38
	[1.29]	[1.17]	[0.48]	[0.95]	[0.19]	[0.27]	[0.23]	[0.22]	[0.28]	[0.25]	[0.23]	[0.23]
Age in months in R3	2.08*	0.57*	0.54*	1.25*	0.17*	0.27*	0.37*	0.49*	0.39*	0.37*	0.40*	0.44*
	[0.17]	[0.15]	[0.07]	[0.15]	[0.03]	[0.04]	[0.03]	[0.03]	[0.04]	[0.03]	[0.04]	[0.04]
Mother's height	0.03	0.03	-0.07	0.04	0	0.05*	-0.01	0.05*	0.21*	0.26*	0.33*	0.32*
	[0.11]	[0.10]	[0.05]	[0.09]	[0.02]	[0.02]	[0.02]	[0.02]	[0.03]	[0.03]	[0.02]	[0.03]
Mother's schooling (<=9)	0.61*	0.99*	0.38*	1.64*	0.11*	0.32*	0.24*	0.24*	0.13*	0.17*	0.21*	0.14*
	[0.29]	[0.22]	[0.13]	[0.23]	[0.04]	[0.05]	[0.06]	[0.05]	[0.06]	[0.04]	[0.06]	[0.05]
Mother's schooling (>9)	1.23	1.31*	1.01*	1.53*	0.18	0.35*	0.39*	0.09	-0.13	0.32*	0.26*	0.26*
	[0.80]	[0.67]	[0.19]	[0.37]	[0.12]	[0.15]	[0.09]	[0.09]	[0.12]	[0.13]	[0.11]	[0.11]
Father's schooling (<=9)	0.70*	0.65*	0.77*	0.64*	0.17*	0.13*	0.32*	0.29*	0.15*	0.05	0.22*	0.09
	[0.28]	[0.20]	[0.15]	[0.24]	[0.04]	[0.05]	[0.07]	[0.05]	[0.05]	[0.04]	[0.08]	[0.07]
Father's schooling (>9)	0.65	1.13*	0.40*	0.29	0.20*	0.34*	0.1	0.14*	0	0	-0.02	0.18*
	[0.55]	[0.48]	[0.17]	[0.35]	[0.08]	[0.11]	[0.08]	[0.08]	[0.12]	[0.10]	[0.09]	[0.09]
Mother's age	0.33*	0.17	0.05	-0.07	0.03*	0.01	0.01	0	0.07*	0.05*	0.05*	-0.05*
	[0.10]	[0.14]	[0.04]	[0.09]	[0.02]	[0.03]	[0.02]	[0.02]	[0.03]	[0.03]	[0.02]	[0.02]
Moved after R1	-1.54	-1.43	1.37*	-9.10*	0.13	-1.07*	0.55*	0.41	-1.01*	0.27	-0.06	-0.67
	[1.82]	[2.06]	[0.52]	[1.67]	[0.27]	[0.48]	[0.25]	[0.39]	[0.51]	[0.50]	[0.41]	[0.64]
Urban residence	-8.51*	-8.28*	0.8	-1.01	0.63	-5.93*	0.56	-0.69	-1.19	0.04	0.65	2.09*
	[3.33]	[3.19]	[0.86]	[2.27]	[0.50]	[0.74]	[0.40]	[0.53]	[0.78]	[0.70]	[0.49]	[0.94]
Exam in native language	5.91	-2.62	3.62*	-0.07	0.06	1.21*	0.07	-1.13*				

	PPVT				Math				Height			
	Ethiopia	India	Peru	Vietnam	Ethiopia	India	Peru	Vietnam	Ethiopia	India	Peru	Vietnam
	[7.93]	[2.66]	[1.19]	[1.46]	[0.80]	[0.63]	[0.51]	[0.34]				
Language 1	13.83*	-11.41*	-8.56*	-0.33	2.19*	-1.27*	-2.86*	-8.17*				
	[2.26]	[3.12]	[1.50]	[13.81]	[0.34]	[0.71]	[0.77]	[1.68]				
Language 2	-12.68*	6.31*	2.08	-4.04	-2.06*	-0.18	-1.03	0.77				
	[2.25]	[3.68]	[1.55]	[5.75]	[0.33]	[0.93]	[0.76]	[1.34]				
Language 3	-1.79				-0.80*							
	[2.19]				[0.33]							
Community wealth	5.37*	2.40*	1.10*	1.80*	0.71*	0.95*	0.17*	0.40*	0.27*	0.33*	0.27*	0.09
	[0.64]	[0.62]	[0.18]	[0.37]	[0.10]	[0.14]	[0.08]	[0.09]	[0.15]	[0.15]	[0.13]	[0.14]
Hospital presence in community	13.71*	-5.27*	-1.64*	-1.33	0.41	-0.16	-0.44	1.66*	0.8	1.58*	0.21	1.03*
	[2.11]	[1.38]	[0.68]	[1.86]	[0.31]	[0.32]	[0.32]	[0.44]	[0.73]	[0.32]	[0.65]	[0.41]
Secondary school presence in community	6.28*	4.95*	1.31*	5.49	-0.42*	1.23*	-0.32	1.36*	-0.35	-0.31	-0.67*	-0.84*
	[1.53]	[1.34]	[0.67]	[3.52]	[0.23]	[0.31]	[0.31]	[0.82]	[0.60]	[0.32]	[0.37]	[0.38]
Missing mother's schooling	-4.86	10.57	-0.68	-3.55	-0.11	-0.4	0.04	-2.03	-1.08	1.83	-0.66	-3.43*
	[7.17]	[15.03]	[2.61]	[5.33]	[1.07]	[3.46]	[1.22]	[1.24]	[1.73]	[3.19]	[1.00]	[1.22]
Missing father's schooling	6.17*	-16.14	-3.12*	4.41	-1.31*	0.97	-1.68*	-0.78	1.58*	-1.04	-0.87	1.58*
	[3.26]	[17.37]	[1.41]	[3.06]	[0.49]	[4.01]	[0.66]	[0.72]	[0.70]	[2.81]	[0.62]	[0.79]
Missing presence of hospital in community	31.15*	11.97*			2.22*	0.54			1.94*	-0.1		
	[3.67]	[4.60]			[0.54]	[1.06]			[0.92]	[0.71]		
Missing per capita consumption per day		3.24	16.88*			-1.14	-1.63			-0.85	7.84*	
		[6.09]	[10.03]			[1.40]	[4.71]			[1.22]	[0.47]	
Constant	-183.48*	-17.14	-24.21*	-73.51*	-14.17*	-25.81*	-29.96*	-45.35*	35.68*	41.28*	23.95*	24.00*
	[26.23]	[21.97]	[10.01]	[20.50]	[3.81]	[5.08	[4.68]	[4.79]	[6.18]	[4.91]	[4.67]	[5.29]
Observations	1,669	1,787	1,748	1,711	1,669	1,787	1,748	1,711	1,669	1,787	1,748	1,711
R-squared	0.50	0.16	0.44	0.29	0.49	0.23	0.34	0.36	0.17	0.27	0.37	0.33
P-value Test: Cons splines equal	0.06	0.87	0.00	0.34	0.39	0.00	0.00	0.00	0.00	0.47	0.00	0.00
P-value Test: Mother's schooling	0.50	0.67	0.02	0.82	0.58	0.87	0.24	0.17	0.09	0.32	0.61	0.30
splines equal P-value Test: Father's schooling splines equal	0.94	0.42	0.17	0.45	0.77	0.12	0.07	0.18	0.15	0.67	0.11	0.40

Notes:

* Indicates significance at $p<0.05$. Standard errors in parentheses.

Table 5

Estimated Poverty Headcounts and Inequalities in Distributions of Hypothetical Scenarios for Changes in Parental Schooling and Consumption

	Mother's schooling							
	Poverty Headcount		**Gini**		**p90/p10**		**p75/p25**	
	MS=P	***MS=9g***	***MS=P***	***MS=9g***	***MS=P***	***MS=9g***	***MS=P***	***MS=9g***
Ethiopia	0.721	0.000	0.194	0.026	2.25	1.00	1.25	1.00
	[0.011]	[0.000]	[0.006]	[0.002]				
India	0.000	0.000	0.172	0.036	2.00	1.11	1.40	1.00
	[0.000]	[0.000]	[0.004]	[0.002]				
Peru	0.000	0.000	0.188	0.089	2.33	1.56	1.38	1.22
	[0.000]	[0.000]	[0.002]	[0.002]				
Vietnam	0.000	0.000	0.204	0.063	2.40	1.33	1.80	1.00
	[0.000]	[0.000]	[0.003]	[0.003]				
	Father's schooling							
	Poverty Headcount		**Gini**		**p90/p10**		**p75/p25**	
	MS=P	***MS=9g***	***MS=P***	***MS=9g***	***MS=P***	***MS=9g***	***MS=P***	***MS=9g***
Ethiopia	0.588	0.000	0.257	0.057	3.00	1.33	2.00	1.00
	[0.012]	[0.000]	[0.004]	[0.003]				
India	0.000	0.000	0.219	0.069	2.40	1.33	2.00	1.11
	[0.000]	[0.000]	[0.002]	[0.003]				
Peru	0.000	0.000	0.183	0.098	2.33	1.56	1.10	1.22
	[0.000]	[0.000]	[0.002]	[0.002]				
Vietnam	0.000	0.000	0.205	0.076	2.40	1.33	1.80	1.00
	[0.000]	[0.000]	[0.003]	[0.003]				
	Consumption							
	Poverty Headcount		**Gini**		**p90/p10**		**p75/p25**	
	MC=20p	***MC=$1d***	***MC=20p***	***MC=$1d***	***MC=20p***	***MC=$1d***	***MC=20p***	***MC=$1d***
Ethiopia	0.198	0.000	0.297	0.040	3.44	1.03	2.10	1.00
	[0.007]	[0.000]	[0.007]	[0.005]				
India	0.000	0.000	0.228	0.026	2.65	1.00	1.81	1.00
	[0.000]	[0.000]	[0.004]	[0.003]				

	Mother's schooling							
	Poverty Headcount		**Gini**		**p90/p10**		**p75/p25**	
	MS=P	***MS=9g***	***MS=P***	***MS=9g***	***MS=P***	***MS=9g***	***MS=P***	***MS=9g***
Peru	0.000	0.000	0.292	0.299	3.33	3.60	2.14	2.14
	[0.000]	[0.000]	[0.007]	[0.007]				
Vietnam	0.000	0.000	0.296	0.155	3.26	1.70	2.02	1.16
	[0.000]	[0.000]	[0.008]	[0.008]				

Notes: Poverty line is 20th percentile of parents' distribution for consumption per capita and is 5 grades of schooling for mother's and father's schooling; MS= minimum schooling, MC=minimum consumption, P=primary, 9g=9 grades, 20p=20th percentile, $1d=$1 per day. Standard errors in brackets.

Table 6

Percentage Increases in Children's Human Capital, Simulated Scenarios

	MS=P	*MS=9g*	*MC=20p*	*MC=$1d*	*MS=9g &MC=$1d*
			PPVT		
Ethiopia	7.7	18.0	1.5	13.5	28.6
India	12.1	24.4	0.2	7.6	31.0
Peru	4.3	9.0	2.9	2.2	10.0
Vietnam	3.1	9.6	0.4	1.2	10.4
			Math		
Ethiopia	19.7	53.8	1.8	18.5	68.4
India	21.0	40.8	3.7	5.8	45.2
Peru	8.1	17.0	4.0	3.0	18.1
Vietnam	4.0	11.0	1.3	2.1	12.2
			Height		
Ethiopia	0.7	1.6	0.3	0.9	2.1
India	0.5	1.0	0.0	0.6	1.6
Peru	0.4	0.8	0.2	0.1	0.9
Vietnam	0.2	0.6	0.2	0.3	0.8

Notes: MS= minimum schooling, MC=minimum consumption, P=primary, 9g=9 grades, 20p=20th percentile, $1d=$1US per day.

Table 7

Poverty Headcounts for Children's PPVT and Math Scores, Simulated Scenarios

		none	*MS=P*	*MS=9g*	*MS=20p*	*MS=$1d*	*MS=9g &MC=$1*
Ethiopia	PPVT	0.200	0.137	0.067	0.187	0.095	0.020
		[0.010]	[0.008]	[0.006]	[0.010]	[0.007]	[0.003]
	Math	0.141	0.107	0.029	0.141	0.130	0.016
		[0.009]	[0.008]	[0.004]	[0.009]	[0.008]	[0.003]
India	PPVT	0.175	0.067	0.034	0.175	0.098	0.019
		[0.009]	[0.006]	[0.004]	[0.009]	[0.007]	[0.003]
	Math	0.167	0.117	0.060	0.164	0.163	0.049
		[0.009]	[0.008]	[0.006]	[0.009]	[0.009]	[0.005]
Peru	PPVT	0.193	0.169	0.142	0.180	0.185	0.137
		[0.009]	[0.009]	[0.008]	[0.009]	[0.009]	[0.008]
	Math	0.172	0.151	0.120	0.161	0.164	0.111
		[0.009]	[0.009]	[0.008]	[0.009]	[0.009]	[0.008]
Vietnam	PPVT	0.189	0.144	0.065	0.185	0.177	0.061
		[0.009]	[0.008]	[0.006]	[0.009]	[0.009]	[0.006]
	Math	0.157	0.142	0.098	0.155	0.152	0.092
		0.009	0.008	0.007	0.009	0.009	0.007

Notes: poverty threshold=20 percentile of actual scores; MS=minimum schooling, MC=minimum consumption, P=primary, 9g=9 grades, 20p=20th percentile, $1d=$1 per day; standard errors in brackets.

Table 8

Gini Coefficients for Children's Human Capital, Simulated Scenarios

		none	*MS=P*	*MS=9g*	*MS=20p*	*MS=$1d*	*MS=9g &MC=$1*
Ethiopia	PPVT	0.296	0.275	0.252	0.291	0.262	0.230
		[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
	Math	0.447	0.405	0.343	0.443	0.408	0.321
		[0.005]	[0.005]	[0.004]	[0.006]	[0.005]	[0.004]
	Height	0.030	0.030	0.029	0.030	0.029	0.029
		[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
India	PPVT	0.280	0.250	0.229	0.280	0.263	0.218
		[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.003]
	Math	0.304	0.264	0.236	0.296	0.293	0.231
		[0.005]	[0.004]	[0.003]	[0.005]	[0.005]	[0.003]
	Height	0.030	0.027	0.027	0.028	0.028	0.026
		[0.001]	[0.000]	[0.000]	[0.001]	[0.001]	[0.000]
Peru	PPVT	0.156	0.144	0.133	0.148	0.150	0.131
		[0.003]	[0.003]	[0.003]	[0.003]	[0.004]	[0.003]
	Math	0.229	0.210	0.192	0.220	0.222	0.190
		[0.005]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]
	Height	0.030	0.027	0.026	0.028	0.028	0.026
		[0.001]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Vietnam	PPVT	0.161	0.151	0.138	0.160	0.158	0.136
		[0.003]	[0.002]	[0.002]	[0.003]	[0.003]	[0.003]
	Math	0.176	0.165	0.150	0.172	0.170	0.148
		[0.004]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
	Height	0.030	0.027	0.027	0.027	0.027	0.026
		[0.001]	[0.001]	[0.001]	[0.000]	[0.000]	[0.000]

Notes: Zeros coded to 0.4; MS=minimum schooling, MC=minimum consumption, P=primary, 9g=9 grades, 20p=20th percentile, $1d=$1 per day; standard errors in brackets.

Table 9

p90/p10 and p75/p25 Ratios for Children's Human Capital, Simulated Scenarios

				p90/p10			
		none	***MS=P***	***MS=9g***	***MS=20p***	***MS=$1d***	***MS=9g &MC=$1***
Ethiopia	PPVT	4.40	3.93	3.45	4.26	3.59	3.04
	Math	15.00	8.59	5.47	15.00	8.82	4.77
	Height	1.13	1.14	1.13	1.14	1.14	1.13
India	PPVT	3.54	3.07	2.80	3.54	3.25	2.67
	Math	5.25	4.03	3.22	5.25	5.05	3.17
	Height	1.13	1.13	1.13	1.13	1.13	1.12
Peru	PPVT	2.07	1.99	1.88	2.00	2.00	1.85
	Math	3.67	2.62	3.14	3.14	2.55	2.36
	Height	1.14	1.13	1.12	1.13	1.13	1.12
Vietnam	PPVT	1.96	1.90	1.80	1.96	1.93	1.78
	Math	2.36	2.17	2.04	2.31	2.26	2.04
	Height	1.14	1.13	1.13	1.14	1.13	1.13
					p75/p25		
		none	***MS=P***	***MS=9g***	***MS=20p***	***MS=$1d***	***MS=9g &MC=$1***
Ethiopia	PPVT	2.28	2.17	2.00	2.24	2.02	1.84
	Math	5.00	3.57	2.73	5.00	3.89	2.51
	Height	1.07	1.07	1.07	1.07	1.07	1.06
India	PPVT	1.97	1.78	1.68	1.97	1.89	1.64
	Math	2.29	2.02	1.87	2.29	2.25	1.85
	Height	1.07	1.07	1.06	1.07	1.07	1.06
Peru	PPVT	1.40	1.37	1.34	1.39	1.40	1.33
	Math	1.80	1.66	1.59	1.70	1.76	1.58
	Height	1.07	1.07	1.07	1.07	1.07	1.07
Vietnam	PPVT	1.44	1.41	1.38	1.44	1.42	1.39
	Math	1.64	1.55	1.51	1.62	1.61	1.50
	Height	1.07	1.07	1.07	1.07	1.07	1.07

Notes: poverty threshold=20 percentile of actual scores; MS=minimum schooling, MC=minimum consumption, P=primary, 9g=9 grades, 20p=20th percentile, $1d=$1 per day.