Simulating the impacts of cash transfers on poverty and school attendance: The case of Cambodia

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by

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Abstract

Using the Cambodia Socioeconomic Survey 2004 and employing micro-static simulation techniques, we measure the potential impacts of cash transfer programs for children to identify targeted groups that will have the most effect on poverty and school attendance. We conclude that the largest impacts occur by targeting poor children. If this proves to be too administratively costly, then targeting children in rural areas or targeting all children living in the ten poorest provinces will also yield significant poverty reduction. With regard to improving school attendance, the same targeted groups generally provide the biggest impacts as well, though the impacts on school attendance tend to be smaller than on poverty reduction.

Keywords: cash transfer, poverty, school attendance, Cambodia.

JEL classification code: H52, H53, I38

Introduction

An emerging consensus suggests that cash transfer programs are an important policy component for reducing poverty and vulnerability among people, and particularly among children, in developing countries. Numerous forms of cash transfer programs for children now exist in many countries. These programs have grown in prominence on the global policy agenda. Cash transfers can potentially help to fulfill basic human needs such as nutrition, health, shelter, education, and access to social services. They are also recognized as a way to promote household productivity, generate more income, and improve the living standards and welfare of all household members.

In developing countries, cash transfers targeting children are of utmost importance, since children are a particularly impoverished and vulnerable group. For income poverty indicators, the findings of UNICEF (2000) indicate that children make up the majority of the poor and their risk of poverty is very high. In terms of other non-income indicators, a study by Gordon et al. (2003), which deploys household survey data from 46 developing countries, finds that one in two children suffer from severe deprivation in at least one dimension, and one in three children suffer from two or more forms of severe deprivation. A number of studies also show that poverty incidence among children is rather high compared to the population as a whole (Deaton and Paxson 1997; Lanjouw et al. 1998). Moreover, the presence of children tends to be correlated with chronic and persistent poverty for households, and children are important players in breaking the vicious inter-generational transmission of poverty. Poverty reduction policies targeting children thus should be a priority.

As with other developing countries, poverty haunts the people of Cambodia, though poverty has been decreasing over time. The World Bank (2006a) shows that between 1993 and 2004, the poverty rate was reduced to 35 percent from an estimated 47 percent, as the economy grew at an average rate of 7 percent. Both income and non-income indicators have demonstrated the improving living standards of the people. However, the poor, particularly the extreme poor, obtain a small share of these gains. While the poverty rate in the Capital and other urban areas fell by 60 percent and 44 percent, respectively, over this one decade, it fell by only 22 percent in the rural areas, where about 90 percent of the population and the majority of the poor reside. As well, poor people in Cambodia tend to have more children than the non-poor, as a woman in the poorest quintile aged 15-49 has on average 2.6 children, while a woman in the richest quintile has 1.5 children (World Bank 2006a). This implies that a disproportionate share of children reside in poor households.

For Cambodia, the estimates of relative vulnerability among different groups by World Bank (2006b) indicate that children are a particularly vulnerable group. Comparing the 2000

Demographic and Health Survey and 2004 Cambodia Socio-economic Survey data, there has been no improvement in malnutrition rates, and these rates are much higher than those in other low income countries in the region (World Bank 2006a). Child mortality increased from 115 in 1990 to 141 per 1,000 live births in 2004, which is among the highest in the world (UNICEF 2006). Despite marked progress in primary school enrolment rates, the dropout rate before completion remains a challenge. It is difficult to prevent children from dropping out of school before completing the primary level and even more difficult to keep them attending at the secondary level. The main potential factors explaining this high dropout rate and low completion rate are household's resource constraints, lack of transfers and financial services (Wang and Moll 2010), and the importance for children to contribute to the livelihood of their households. Seeing the challenges of unequal distribution of benefits between the poor and the non-poor and the particular vulnerability of the poor as well as their children, it is important and urgent for policies to be designed to target them. Cash transfers can potentially provide a good policy option in this context, and this is the issue we seek to consider.

In this regard, existing studies on cash transfer programs are broadly divided into two complementary approaches, ex-post analysis and ex-ante analysis. Ex-post analysis aims at evaluating the actual impacts of cash transfer programs already implemented, while ex-ante analysis aims at estimating, as best as possible, the appropriate program parameters and design for countries considering the adoption or modification of a cash transfer program. Using ex-post evaluation, existing studies generally find a positive impact of programs on child poverty and school attendance (as summarized by Fiszbein et al. 2009). Focusing on the ex-ante approach that will be used in this study, Kakwani et al. (2006) and UNICEF (2009) study the potential impact of cash transfer programs on poverty for African countries and find a potential for them to reduce poverty for children and the whole population. Kakwani et al. (2006) also show that cash transfer programs can positively affect child education, though the impact is small without incorporating conditions for receipt. Bourguignon et al. (2003) simulate the *Bolsa Escola* in Brazil and show that its impact on school attendance is large but is muted on the poverty rate. Son and Florentino (2008), who apply a similar approach for the *Pantawid Pamilyang Pilipino* in the Philippines, show that this cash transfer program can increase school attendance and decrease poverty, with particularly large impacts when targeting poor households.

Inarguably, the success of cash transfer programs in some countries does not guarantee that they will be similarly successful in other countries, as countries may have different and unique characteristics. Those successes can only be examples and guides for practice and caution. Before applying the program, ex-ante analysis is important in designing suitable

parameters and assessing the potential impacts of those designed program so that policy makers can identify the most effective program for implementation.

In Cambodia, there has not been any ex-ante research conducted so far to explore various cash transfer designs and to see their potential impacts on poverty rates and child education. This matter is crucial when we want to find the most effective programs given a limited government budget. Therefore, this paper aims to contribute in this area, providing the first approximation of simulated impacts of cash transfer programs with various schemes and targeted groups on poverty and school attendance in Cambodia, which are two of the prioritized areas of the Cambodian Millennium Development Goals.

Data and Methodology

Data

We use the Cambodian Socio-Economic Survey 2004 (CSES 2004) which is conducted by the National Institute of Statistics, Cambodia, with technical support from Statistics Sweden and the World Bank. The survey was designed to provide information about the social and economic conditions of households in Cambodia. It contains 15,000 representative households with 74,719 individuals. Unless otherwise noted, our calculations will use sample weights to make the data representative for the entire population in Cambodia.

The survey is conducted at the household level, but it also contains some characteristics for individuals, including age, gender, relationship to household head, marital status, working status, wages, health status, and educational attainment. At the household level, the survey provides information about sources of household income, household expenditure, business and agricultural activities, ownership of consumer durables, wealth, and housing conditions. The information about sources of income and expenditure being available only at the household level does limit our ability to provide detailed analysis of intra-household sharing. For example, we are unable to identify how the income and the expenditures are actually divided among the family members.

Methodology

We aim to meet two objectives in our paper. First, we apply micro-static simulation techniques with the CSES 2004 data to quantify the potential impact of cash transfers provided to various groups on poverty rates among school-age children and poverty rates for the total population. We simulate different scenarios and alternatives to look for the most effective scheme and targeted group in terms of poverty reduction and welfare improvement, given different fixed budget levels. Second, we apply a probit model to estimate the determinants of school attendance for children aged between 6 and 17 years old. We will

estimate these determinants for different groups, particularly seeking to know the marginal effect of household income on the household's decision for child education after controlling for underlying factors. From these estimates, we simulate how cash transfer programs provided to each targeted group will impact school attendance as measured by the percentage increase in the estimated school attendance rate after the cash transfer program is in place. For the ex-ante approach where there is not an actual program to be evaluated, the potential program impact on school attendance is evaluated on the basis of a household model. Examples of this approach on school attendance can be seen in Bourguignon et al. (2003) and Kakwani et al. (2006). In contrast, for ex-post impact evaluation when a program exists, the actual impact of the program intervention can be evaluated. This is accomplished by comparing the outcomes for the benefit recipients to non-recipients, after controlling for selection issues if truly random samples are not available. The selection is done to ensure that the two groups share similar characteristics. This approach can be found in studies of conditional cash transfer programs (for example, see Attanasio et al. 2005; de Brauw and Hoddinott 2010; Schultz 2004).

Poverty Incidence Measurement

The analysis will focus on three aspects of poverty: poverty incidence as measured by the poverty headcount ratio, poverty depth as measured by the poverty gap index, and poverty severity as measured by the poverty severity index. These three poverty measures are widely known as Foster-Greer-Thorbecke (1984) poverty measures. The poverty headcount ratio represents the percentage of the population whose per-capita household expenditures are below the official poverty line. The poverty gap index represents how far, on average, a poor person falls below the poverty line, proportionally. The poverty severity index, measured by the mean of squared proportionate poverty gaps, puts more weight on extreme poverty.

Official poverty lines in Cambodia in 2004 are divided regionally into Phnom Penh, other urban areas, and rural areas. They are obtained by applying inflation adjustments to the base poverty line from 1993/1994. The base-year poverty line is a combination of the food poverty line, which was calculated from the cost of a 155-food-item basket just sufficient to meet a minimum food requirement of 2100 calories per person per day, and a non-food allowance, which was defined as the estimated value of non-food consumption for the people whose per capita household consumption per day was just at the food poverty line. The cost of food and non-food consumption was estimated separately for the three regions to obtain three regional base-year poverty lines. To get the 2004 poverty lines, both the base-year food poverty line and non-food allowance in each region was updated with price indices to adjust

for inflation. The 2004 poverty lines are KHR 2,351, KHR 1,952, and KHR 1,753 per day in Phnom Penh, other urban areas, and rural areas, respectively.

To measure poverty rates, we will consider two measures of household expenditure, the officially-used per capita expenditure and an adult equivalent expenditure. The adult equivalent concept has now become widely used in many empirical studies. As indicated by Deaton (1997), measuring poverty with per capita expenditure, which is calculated by dividing household expenditure by the number of household members, assumes that everyone in household is the same, having the same needs and enjoying the same amount of consumption. An adult equivalent scale takes into consideration that children spend less than adults and also that due to economies of scale, a large household can reduce total expenditures by living together and sharing household goods. Following Banks and Johnson (1994) and Deaton and Paxson (1997), adult equivalent expenditure is defined as:

$$Adult\ Equivalent\ Expenditure = \frac{Total\ Household\ Expenditure}{(Adults + \alpha * Children)^{\theta}} \quad (1)$$

where *Adults* and *Children* represent their respective numbers in the household, and α and θ lie between zero and one. α shows the fraction of adult spending required by children, while θ accounts for the economies of scale. When $\alpha = 1$ and $\theta = 1$, the adult equivalent will be the per capita expenditure. For an alternative, we use $\alpha = 0.5$ and $\theta = 0.75$, following Giang and Pfau (2009).

Targeted Groups

This paper considers the following targeted groups of beneficiaries:

(1) All school-age children: This is the universal targeting program that provides a cash transfer to every child between 6 and 17 years old.
(2) School-age children in the rural areas.
(3) Poor school-age children, which includes any school-age child residing in a household with per capita expenditures below the official poverty line.
(4) School-age children living in the 10 poorest provinces in Cambodia, namely Banteay Meanchey, Kampong Speu, Kampong Thum, Krong Kaeb, Mondul Kiri, Preah Vihear, Ratanakiri, Siem Reab, Steung Traeng, and Svay Reang.
(5) School-age children living in a widowed parent household.
(6) School-age children living in the 10 provinces with the lowest school attendance rate in Cambodia, namely Banteay Meanchey, Kampong Cham, Kampong Thum, Kaoh Kong, Krong Kaeb, Mondul Kiri, Preah Vihear, Rattanak Kiri, Siem Reab, and Stueng Traing.

Simulating the Impact of Cash Transfers on Poverty

We will estimate how the poverty headcount ratio, poverty gap and poverty severity indices of school-age children and the whole population would have changed, in percentage terms, if a cash transfer scheme had been introduced in the past in Cambodia. A higher percentage reduction of poverty is considered to be more effective and thus desirable. We will also compute the leakage rate of benefits to see how much of the benefit would go to the non-poor.

We assume that the benefits for children will contribute to the household's total expenditures and then be distributed equally among the household members. This assumption is needed because of the survey limitation that we can not identify the actual expenditures of each household member. Furthermore, with ex-ante simulation, we assume that the behaviors among population would not be changed in ways to be qualified for benefits or to substitute benefits for income-generating activities. The results will show only the direct and immediate effect on poverty rates if the cash transfer program existed in 2004, and they do not incorporate any potential indirect or long-term impacts, such as improved health status, enhanced household productivity, the so-called multiplier effect on local economy, and reduced child labor as mentioned by UNICEF (2009).

Simulating the Impact on School Attendance

Before being able to simulate the impact of cash transfers on school attendance, we need to assess the schooling determinants from the model of household demand for schooling, with a particular interest in knowing the role of household expenditures. Household expenditures are widely used to proxy family permanent income as expenditures are well represented in household survey data for developing countries (for example, see Chaudhuri 2009; Kanji 2011). We will limit our study to demand factors for education, excluding supply factors, since there is no readily available information about the supply of schooling from the survey. For example, we do not know how many schools are in a village or a district, or how long it takes for children to reach school, etc. Also, similar to Kakwani et al. (2006), we will not incorporate the children's labor market characteristics, since we do not have enough information from the survey about the children's work, such as whether or not children study and work at the same time and how much income they earn.

To study the determinants of school attendance, we estimate a probit regression model separately by gender and poverty status to assess whether the determinants are different for these various groups. Following Kakwani et al. (2006), we derive a reduced formed equation from the maximization of the household's utility function subject to the expenditure constraints as follows:

$$y_i^* = X\beta + e = \overline{Child}_i\alpha + \overline{Head}_i\beta + \overline{HH}_i\delta + \ln(PCE_i)\theta + e_i \quad (2)$$

where e_i is assumed to follow a standard normal distribution. We observe y_i, rather than the latent variable y_i^*, and y_i is defined as follows:

$$\begin{cases} y_i = 1 & \text{if} \quad y_i^* > 0 \\ y_i = 0 & \text{otherwise} \end{cases}$$

The probit model is

$$\Pr(y_i = 1 | X) = \Phi(X\beta) = \Phi(\overline{Child}_i\alpha + \overline{Head}_i\beta + \overline{HH}_i\delta + \ln(PCE_i)\theta) \quad (3)$$

where $\Phi(.)$ is the cumulative standard normal distribution function. With the estimated probit equation, the marginal effects of each explanatory variable on schooling can then be calculated.

The reduced form equation for children's school attendance is derived as a function of a set of vectors describing child characteristics, characteristics of the household head, and characteristics of household itself, in addition to per-capita household expenditure. The vector of child characteristics $(\overline{Child}_i)$ consists of gender, age and age squared, and whether the child is an offspring or a grandchild of the head. The vector of characteristics of household head $(\overline{Head}_i)$ contains gender, age and age squared, highest educational attainment, and occupational sector of the head. The vector of household characteristics $(\overline{HH}_i)$ includes sector (urban or rural) and the age distribution of household members by group (0-5, 6-17, and 18 onwards). Finally, the main variable of interest is the logarithm of per capita expenditure, as it is what will be affected by a cash transfer.

We will estimate the coefficients of this probit model, and for various targeted groups, we will simulate how cash transfer programs targeting those groups affect the probability of school attendance for each recipient with the equation:

$$\Delta\hat{P}_i = \Phi(\overline{Child}_i\hat{\alpha} + \overline{Head}_i\hat{\beta} + \overline{HH}_i\hat{\delta} + \ln(PCE_i + CT_i)\hat{\theta}) - \Phi(\overline{Child}_i\hat{\alpha} + \overline{Head}_i\hat{\beta} + \overline{HH}_i\hat{\delta} + \ln(PCE_i)\hat{\theta}) \quad (4)$$

Where CT_i is the amount of the transfer provided to child *i*. From the estimated increase in probability of school attendance, we can estimate the number of children starting to attend school after the program:

$$\sum_i (weight_i * \Delta\hat{P}_i) \quad (5)$$

Where $weight_i$ is the sample weight given to child *i*. Eventually, we can divide the additional number of school attendees after the program by the total number of current school attendees to obtain the percentage increase in school attendance.

Results

Overview of Poverty and School Attendance of Children in Cambodia

The poverty rate for school-age children was 41.08 percent, and 76.44 percent of school-age children were attending school. Figures 1 provides the estimates of poverty and school attendance in 2004 for school-age children by age and by province, and Table 1 classifies these rates by gender, sector, geographical regions, type of family, poverty and schooling status.

// Figure 1 About Here //

Figure 1 shows that poverty rates exhibited a decreasing trend by age, ranging from 44.6 percent to 35.4 percent. Younger children were more likely to live in poverty. The school attendance rates, on the other hand, display an inverse U-shaped pattern, rising continuously from 47 percent for 6-year-old children to the peak at 93 percent for 11-year-old children and then falling steadily afterward. The first half of the inverse U-shaped pattern interestingly implies a late start for school attendance. In Cambodia, children whose age is 6 are entitled to register and start schooling. However, less than 50 percent of this age group was actually attending school. School attendance rates suddenly jumped for children at age 7 and age 8. The latter half of the pattern indicates a continual decrease in school attendance rates for higher age groups. Among 17-year-olds, less than half were attending school, perhaps because of higher opportunity costs for older children to stay in school.

// Table 1 About Here //

Between male and female school-age children, Table 1 shows no statistical difference in poverty rates, but school attendance rates for female children were around 4 percentage points lower. For family type as well, poverty rates among the subgroups were not significantly different, while school attendance rates did show a rather big difference as children living with a single or widowed parent were less likely to attend school.

For rural and urban areas, there is a big gap in poverty and school attendance rates. The poverty headcount ratio in urban areas was approximately 21 percent, whereas in the rural areas, where more than 85 percent of the children resided, it was around 44 percent. More than 90 percent of poor children lived in the rural areas, and the school attendance rate in the rural areas was about 8 percentage points lower than in urban areas.

Geographically stratified, the plateau areas have the highest poverty incidence (at 58 percent) and the lowest school attendance rates (at 70 percent), followed by Tonle Sap. These two regions were home to more than 40 percent of children. Among the five regions, the lowest poverty incidence (at less than 7 percent) and the highest school attendance rate (at

more than 87 percent) are found in the capital city, Phnom Penh, where less than 7 percent of children resided. Figure 1 also categorizes poverty and school attendance rates by provinces, ranked in descending order by school attendance rates. We find that provinces with high school attendance rates generally had low poverty rates. As well, 7 out of 10 provinces which had the lowest school attendance rates were also classified as part of the 10 poorest provinces in terms of child poverty.

Table 1 also shows a large gap for school attendance between poor and non-poor children. Less than 70 percent of the poor children and more than 80 percent of the non-poor children were attending school. The poverty rate among children who were not attending school was 53 percent, which is considerably higher than for those who were attending (37 percent). This might suggest that some children were not attending school because their families could not afford their education, though the direct cost of education in Cambodia is free throughout the 12-year education. The relationship between family incomes and expenditures on child education is discussed further in Mauldin and Mimura (2001).

Simulating the Impact of a Cash Transfer Program on Poverty Rates

This section provides the simulated results for the impact of cash transfer programs on poverty. First, Table 2 surveys the potential impact of cash transfer programs provided to each targeted group. It shows how a benefit level of 50 percent of the official poverty line provided to all eligible school-age children aged 6 to 17 affects the poverty rates of direct recipients, all school-age children, and the total population, respectively. These estimated results are not directly comparable, since the costs and number of recipients differ between each targeted group as shown in the table. Subsequent tables will correct for this initial deficiency.

// Table 2 About Here //

From Table 2, we see that the estimated total benefits paid would vary from KHR 124.2 Billion (0.58 percent of GDP in 2004) when the program was targeted to children living with a widowed parent, to KHR 1,258.7 Billion (5.87 percent of GDP in 2004) when the program was provided universally. The estimates show that in every targeted group, the benefit spent by direct recipients would be less than half of the estimated benefit paid, suggesting a high leakage rate in all proposed programs. This result, again, relates to the assumption that the benefit would be pooled within the household and then distributed equally among all members in the household. Evidence for the leakage of benefits to non-recipients is also found in studies of existing programs (see for example Chaudhuri 2009; Ploeg 2009).

The results also show the size of the potential poverty reduction (poverty headcount ratio, poverty gap index, and poverty severity index) among direct recipients, all school-age

children, and the total population. A 50 percent benefit would generate a more than 30 percent decrease in the poverty headcount ratio, a more than 45 percent decrease in the poverty gap index, and a more than 55 percent decrease in the poverty severity index among direct recipients, though the impact size varies across targeted groups. In terms of poverty among all school-age children, the decrease in the poverty headcount ratio would range from 4.16 percent when children living with a widowed parent were targeted, to 39.62 percent when poor children or all children were targeted. Also, in terms of poverty among the total population, the decrease in the poverty headcount ratio would range from 2.96 percent when targeting children living with a widowed parent to 31.5 percent when targeting poor or all children. The low magnitude of the impact for some targeted groups is largely resulting from the fewer recipients and lower total cost.

Following Giang and Pfau (2009), the bottom part of Table 2 shows the poverty reduction efficiency for different targeted groups, which is defined as the proportion of total benefits paid that goes toward reducing the poverty gap. Naturally, among various targeted groups, targeting the poor group would produce the highest effectiveness in poverty reduction, followed by targeting the group of children in the 10 poorest provinces. The poverty reduction efficiency for the poor group is 35.6 percent for direct recipients and school-age children and 79.59 percent for total population, meaning that 35.6 percent of benefits contribute to reducing child poverty and 79.59 percent of benefits contribute to reducing total poverty.

// Figure 2 About Here //

Figures 2 and 3 extend the analysis in Table 2 by varying the benefit levels and ending eligibility ages for the poor group. In Figure 2, we vary the benefit level up to 200 percent of the poverty line and fix the ending eligible age at 17. The top panel shows that the cost of benefits paid proportionately increases with the benefit level. Looking at the poverty reduction efficiency, we can see a roughly linear decreasing trend, indicating that the effectiveness in reducing poverty would decrease mainly proportionately as the benefit level increases. In other words, a larger proportion of benefits leaks to the non-poor as the benefit level increases and the previously poor people are increasingly pushed out of poverty. The bottom panel shows the decrease in the poverty headcount ratio and poverty gap index among school-age children and the total population. Both poverty measures decrease as benefits grow, but at a decreasing rate. In other words, the marginal reduction in poverty would diminish as benefits grow, providing an interesting implication that considerable poverty reduction can be achieved even with relatively small benefit levels. In Figure 3, meanwhile, we fix the benefit level to 50 percent while varying the ending eligible age from 6 to 17 years old. The top panel of Figure 3 illustrates an increase in total benefits paid and a relatively small decrease in

poverty reduction efficiency as the ending eligible age increases. From the lower panel, we can see that as the ending eligible age increases, poverty rates would mainly decrease linearly, implying that there would not be a big difference in marginal poverty reduction over different ending eligible ages.

// Figure 3 About Here //

Next, we attempt to determine the appropriate targeted group and program parameters when the cash transfer program budget is limited to 1 percent of GDP in 2004. This allows for a more direct comparison among programs with varying targeted groups, eligible ages, and benefit levels. This information is provided in Table 3, and the poverty estimates use official per-capita expenditure and official poverty lines.

// Table 3 About Here //

Table 3 considers programs costing approximately 1 percent of GDP. The findings in Table 3 suggest that providing cash transfers to poor school-age children would produce the best poverty reduction result. Among the listed options, providing a cash transfer amounting to 26 percent of the poverty line to all poor children aged 6 to 15 would achieve the highest reduction of poverty for all three measures for both children and the total population. As well, this scheme would produce the biggest impact for social welfare. This program would result in a reduction in the poverty headcount ratio among children and the total population of 18 percent and 14 percent, respectively, while the poverty gap and poverty severity indices would decrease by around 31 percent and 40 percent, respectively, among children, and around 25 percent and 33 percent, respectively, among the total population.

However, there are high administrative costs and hurdles to overcome when targeting poor children, since it is generally hard to identify the poor. Also, in a developing country like Cambodia, which has not had a good governance system, a big bias in identifying the poor is likely to be inevitable. Thus, this cost and benefit of directly targeting the poor group has to be cautiously considered. If it is too hard and costly to identify and target the poor group directly, we can consider the other six targeted groups. Among these, targeting those in rural areas would provide the most effective reduction in the poverty headcount ratio. A cash transfer benefit of 24 percent of the poverty line for each child aged 6 to 10 in the rural areas would reduce the poverty headcount ratio among children by 8.3 percent and among the total population by 6.6 percent. However, when we focus on the poverty gap and poverty severity, the results suggest that targeting all children living in the 10 poorest provinces would be the best choice. Providing each child aged 6 to 13 in the 10 poorest provinces with a benefit of 42 percent would achieve the highest reduction in the poverty gap and poverty severity and the

largest increase in utility. As seen, the best groups to target depend on poverty measures that policy makers want to prioritize.

Experiences in other countries also show a clear positive impact on poverty. Fiszbein et al. (2009) estimate the impacts of existing conditional cash transfer programs and find that these programs provide a significant reduction in national poverty rates. For example, in Ecuador, the reductions in the poverty gap and poverty severity indices are 14 percent and 19 percent, respectively, for a per-capita expenditure transfer of 8.3 percent. The estimates for the reductions in poverty gap and severity indices in Jamaica are 9 and 13 percent, respectively, with a 10.7 percent transfer. In Mexico, the program's impact is about 19 percent for the reduction in the poverty gap index and 29 percent for the poverty severity index, when a per-capita expenditure transfer of 33.4 percent is provided.

// Table 4 About Here //

Next, Table 4 expands the results of Table 3 by including a wider range of total expenditure levels and both equivalence scales to check the robustness of the targeting group findings. We vary the total expenditure on the cash transfer programs from 0.25 percent to 1.5 percent of GDP in 2004. To avoid showing too many details, we mention only the best outcomes for various measures. This corresponds to showing only the numbers and targeted groups that are in bold face in Table 3.

In Table 4, when we use official per capita expenditures, the results show consistency and support to our earlier findings across expenditure levels. That is, under a limited budget, for various benefit expenditure levels, the poor group would be the best group to target. Leaving the poor group aside, we see the rural group often appears as the best targeted group to reduce the poverty headcount ratio, and the group of 10 poorest provinces always appears as the best group to reduce the poverty gap and poverty severity indices and also to increase the social welfare.

As for the adult equivalence expenditure scale, one interesting finding from Table 4 is that apart from the poor group, the group of children in the 10 poorest provinces always appears as the best targeted group for optimal reduction of all various poverty measures including the poverty headcount ratio. Moreover, using the adult equivalent expenditure scale generally results in even larger poverty reductions than using the official per capita expenditure. These differences provide an important message for policy makers; that is, accuracy in poverty measurements plays a crucial role in providing proper direction for policy implementation and in evaluating the impacts of social programs. If households do enjoy economies of scale and if children require less expenditure than adults, then the official per capita expenditure scale may not provide the most meaningful results.

Simulating the Impact of a Cash Transfer Program on School Attendance

Determinants of School Attendance for School-age Children

// Table 5 About Here //

We first estimate the probit model for school-age children to study the factors that determine their school attendance. Table 5 presents variable definitions and summary statistics, and Table 6 presents the results in the form of marginal effects on school attendance for children aged 6 to 17 years. These results are provided for all children together, and for four subgroups including male non-poor children, female non-poor children, male poor children, and female poor children, as it is reasonable to expect that the determinants of school attendance may differ between these groups. Generally, male children enjoy greater opportunities to attend school, and poor children are more constrained financially and have a higher relative opportunity cost for attending school than non-poor children. Our decision to make these separations is also supported by a Chow Test, which reveals that these separations are appropriate at the 5 percent significance level. The separate estimation is also important when we simulate the impact of cash transfers on school attendance, as we are able to identify appropriate coefficients for each group, rather than assuming that each group shares the same coefficients and, thus, the same school determinants.

// Table 6 About Here //

From Table 6, all the variables explaining the child characteristics are statistically significant at the 1 percent significance level for all groups except the male poor group. Older children are less likely to attend school, but the offspring of the household head are more likely. In the overall regression, we also find that female children are less likely to attend school. Regarding the household head's characteristics, most variables are not statistically significant in explaining children's school attendance in Cambodia. Only the head's education level has a consistent impact on school attendance for every group; this effect is positive, and it is larger for poor children. The variables explaining the household characteristics tend to be statistically significant more often than not. The estimates show that children in urban areas are more likely to attend school than children in the rural areas. Also, the number of other children in the household negatively affects the school attendance, whereas the number of adults in the household positively affects the school attendance. Lastly, the variable of our main interest, the logarithm of per capita expenditure, has a statistically significant impact for every group. Household expenditures do play an important role in determining children's

school attendance. The size of the effect tends to be slightly larger for females, and the impact of expenditures is about 3 times bigger for poor children.

Most Effective Group and Potential Impact on School Attendance

// Table 7 About Here //

Table 7 provides the estimates of the increase in school attendance rates after the introduction of various cash transfers for programs costing one percent of GDP. The impacts on school attendance are modest, accounting for a less than 1 percent increase in school attendance in all cases. This suggests that an unconditional cash transfer program cannot be expected to produce a large increase school attendance. The targeted group that would achieve the highest increase in school attendance is the poor group. In the best case, offering a benefit of 22 percent of the poverty line to poor children aged 6-17 would increase the school attendance rate by 0.77 percent. If we do not consider the poor group directly, then targeting the children in the 10 poorest provinces is recommended as the best targeted group to achieve the highest increase in school attendance. A benefit of 30 percent of the poverty line for children aged 6-17 in these provinces would increase school attendance by 0.49 percent.

Comparing with existing conditional cash transfer programs in other countries, our estimates can be considered as the lower bounds of impacts if conditionality is to be incorporated in the actual program. For example, in Columbia, a study by Attanasio et al. (2005), uses propensity score matching and a differences-in-differences estimator to compare the outcomes of changes in enrolment rates in villages under the *Familias en Accion* program with comparison villages. They find that the program increases attendance rates for children aged 14-17 by about 5 percentage points in both rural and urban areas, while impacts for children aged 8-13 is 2.7 percent points in rural areas and not significant in urban areas. In Honduras, results from a randomized design program suggest that the demand side intervention of the *Programa de Asignación Familiar* increases school enrolment rates by about 1-2 percentage points. No impact is found with the supply side intervention (Glewwe and Olinto 2004). In Ecuador, the impact on school enrolment rates from the *Bono de Desarrollo Humano* program, a conditional cash transfer program for children aged 6-17, is approximately 10 percentage points, as estimated by Schady and Araujo (2008) using an instrumental variable estimator. Schultz (2004) uses randomized assignment to evaluate the impact of Mexico's *Progresa* in rural areas and finds that the program helped increase school attendance rates by about 3 percentage points for children who completed grades 1 through 5. The impact is significant for grade 6 (11 percentage points) but not significant for grades 7 through 9. These conditional cash transfer programs show positive impacts on school attendance, though the magnitude of the impacts is diverse among countries potentially

because of varying transfer amounts and baseline school enrolment rates. Conditionality may induce a higher impact on school attendance in Cambodia than we find with these estimates for an unconditional cash transfer program.

// Table 8 About Here //

In Table 8, we expand the results of Table 7 by including a wide range of expenditure levels and showing only the schemes producing the best results. The groups of poor children and children living in the 10 poorest provinces mostly appear as the best groups to achieve the maximum increase in school attendance. Moreover, over various expenditure levels, the most effective program to promote school attendance mostly occurs with the highest ending eligible age. This provides clear evidence that providing the cash transfer program to more children with a lower benefit would be a more desirable way to promote school attendance for a given program cost, and also that cash transfers will play a bigger role in boosting school attendance for older children.

Conclusion

In developing countries, economic growth is considered a main driver for poverty reduction. However, it is often the case that the benefits from growth are not shared evenly among people. Such unequal distribution puts pressure on equality within the society and further induces the vulnerability of the poor. In such a context, social assistance can play a crucial role in redistribution and poverty reduction. One prominent form of social assistance is a cash transfer program. Using the Cambodia Socio-economic Survey 2004, this paper employed a micro-static simulation technique to study and simulate the potential impacts of cash transfer programs for children on poverty rates and school attendance. We sought to determine the targeted group and program parameters that would provide the highest poverty reduction and school attendance promotion in Cambodia.

The estimates suggest that there would be a considerable reduction of poverty rates among the children who are recipients of the cash transfer program, and the poverty reduction efficiency would be high if the program could directly target the poor group. Even with a limited budget, poverty rates can be reduced significantly if the poor group can be targeted directly, but it is generally administratively costly and hard to target the poor. Alternatively, to achieve lower administrative costs, targeting rural children or the children in the 10 poorest provinces would also have strong impacts on poverty measures. In terms of school attendance, our findings suggest a very modest outcome, implying that a voluntary increase in demand for school attendance without conditionality for the cash transfer would be small. This suggests

that conditions such as a requirement for school attendance should accompany the cash transfer program.

We find that the simulation results for poverty and school attendance suggest the same targeted groups as the best groups. However, the level of benefits and age range to be offered are different. For poor children, providing 26 percent of the poverty line with an ending eligible age of 15 would achieve the highest poverty reduction, while providing a benefit of 22 percent with an ending eligible age of 17 would achieve the highest increase in school attendance. This outcome also applies to the group of children in the 10 poorest provinces and some other targeted groups. While a benefit of 42 percent of the poverty line provided to children in the 10 poorest provinces with an ending eligible age of 13 would reduce the poverty gap and poverty severity the most, a benefit of 30 percent of the poverty line with an ending eligible age of 17 would increase school attendance the most. Policy makers should have a clear-cut priority when introducing a cash transfer program.

As for other policy implications, firstly, with the diminishing marginal reduction of poverty, substantial poverty reduction can be achieved with a relatively small benefit level and relatively wide coverage group. Secondly, the accuracy of poverty measurements used is crucial in providing proper direction for policy implementation and in evaluating the impacts of social programs. Moreover, by looking at each targeted group, we find that for a given cost, the highest school attendance rate can be achieved through the combination of higher eligible ages and lower benefits. A policy implication follows that providing the cash transfer program to as many school-age children as possible will ensure the highest increase in school attendance, even though the benefit level is less.

A number of issues in relation to child cash transfers, poverty reduction, and school enrolment can be addressed in future research. To the extent that these cash transfers will impact behavior, it is necessary to build further models to incorporate behavioral feedback from new policies. Managing these cash transfers at a reasonable level of administrative costs is important to consider. White (2009) argues that undertaking adequate qualitative field work before moving to the quantitative analysis enables evaluators to better design ex-ante impact studies and do sensible quantitative analyses. Such additional analysis for subsequent research can help to determine potential behavioral responses, as well as to help determine appropriate conditions for benefit receipt.

References

Attanasio, O., Fitzsimons, E., & Gomez, A. (2005). *The impact of a conditional education subsidy on school enrolment in Colombia* (Report Summary Familias 01). London: The Institute for Fiscal Studies.

Banks, J., & Johnson, P. (1994). Equivalent scale relativities revisited. *The Economic Journal, 104*(425), 883–890.

Barrientos, A., & Dejong, J. (2004). *Child poverty and cash transfers.* (Childhood Poverty Research and Policy Center Report 4).

Bourguignon, F., Ferreira, F., & Leite, P. (2003). Conditional cash transfers, schooling and child labor: Micro-simulating Bolsa Escola*. The World Bank Economic Review, 17*(2), 229-254.

Chaudhuri, A. (2009). Spillover impacts of a reproductive health program on elderly women in rural Bangladesh. *Journal of Family and Economic Issues, 30*, 113-125.

Coe, D. T., Lee, I. H., Abdelati, W. F., Eastman, D., Hagemann, R., Ishikawa, S., ... Yelten, S. (2006). *Cambodia: Rebuilding for a challenging future*. Washington, DC: International Monetary Fund.

de Brauw, A., & Hoddinott, J. (2010). Must conditional cash transfer programs be conditioned to be effective? The impact of conditioning transfers on school enrollment in Mexico. *Journal of Development Economics.* doi:10.1016/j.jdeveco.2010.08.014.

Deaton, A. (1997). *The analysis of household surveys: A microeconometric approach to development policy.* Maryland: Johns Hopkins University Press.

Deaton, A., & Paxson, C. (1997). *Poverty among children and the elderly in developing countries*. Princeton: Princeton University

Fiszbein, A., Schady, N., Ferreira, F. H. G., Grosh, M., Kelleher, N., Olinto, P., & Skoufias, E. (2009). *Conditional cash transfers: Reducing present and future poverty* (World Bank Policy Research Report). Washington, DC: World Bank.

Foster, J., Greer, J., & Thorbecke, E. (1984). A class of decomposable poverty measures. *Econometrica, 52*(3), 761-766.

Giang, T. L., & Pfau, W. D. (2009). Ageing, poverty and the role of a social pension in Vietnam. *Development and Change, 40*(2), 333-360.

Glewwe, P., & Olinto, P. (2004). *Evaluating of the impact of conditional cash transfers on schooling: An experimental analysis of Honduras's PRAF program* (Final Report for USAID).

Gordon, D., Nandy, S., Pantazis, C., Pemberton, S. and Townsend, P. (2003). *Child poverty in the developing world*. Bristol: Policy Press.

Kakwani, N., Soares, F. V., & Son, H. H. (2006). Conditional cash transfers in African countries. *Development Policy Review, 24*(5), 553-569.

Kanji, S. (2011). Labor force participation, regional location, and economic well-being of single mothers in Russia. *Journal of Family and Economic Issues, 32*, 62-72.

Lanjouw, P., Milanovic, B., & Paternostro, S. (1998). *Poverty and economic transition: How do changes in economies of scale affect poverty rates of different households?* (World Bank Policy Research Working Paper 2009). Washington, DC: The World Bank.

Mauldin, T., & Mimura, Y. (2001). Parental expenditures on children's education. *Journal of Family and Economic Issues, 22*(3), 221-241.

Ploeg, M. V. (2009). Do benefits of U.S. food assistance programs for children spillover to older children in the same household? *Journal of Family and Economic Issues, 30*, 412-427.

Royal Government of Cambodia (2006). *A poverty profile of Cambodia 2004.* Cambodia: Ministry of Planning.

Schady, N., & Araujo, M. C. (2008). Cash transfers, conditions, and school enrollment in Ecuador. *Economia, 8*(2), 43-70.

Schultz, T. P. (2004). School subsidies for the poor: Evaluating the Mexican Progresa poverty program. *Journal of Development Economics, 74*, 199-250.

Son, H. H., & Florentino, J. (2008). *Ex-ante impact evaluation of conditional cash transfer program on school attendance and poverty: the case of Philippines* (Asian Development Bank Working Paper Series 142). Philippines: Asian Development Bank.

UNICEF (2000). *Poverty reduction begins with children.* New York: UNICEF.

UNICEF (2006). *The state of the world's children 2006.* New York: UNICEF.

UNICEF (2009). *Child poverty: A role for cash transfers? West and South Africa* (Regional Thematic Report 3). Senegal: UNICEF.

Wang, H., & Moll, H. (2010). Education financing of rural households in China. *Journal of Family and Economic Issues, 31*, 353-360.

White, H. (2009). *Theory-based impact evaluation: Principles and practice* (Working Paper Series 3). New Delhi: International Initiative for Impact Evaluation.

World Bank (2006a). *Cambodia: halving poverty by 2015, Poverty Assessment 2006.* Washington DC: The World Bank.

World Bank (2006b). *Managing risk and vulnerability in Cambodia: An assessment and strategy for social protection*. Washington DC: The World Bank.

Table 1 Poverty measures, school attendance rates, and demographic characteristics of school-age children, 2004

Indicators	Proportion of children (%)	Poverty among children			School attendance rate (%)
		Poverty headcount ratio (%)	Poverty gap index (%)	Poverty severity index (%)	
All	100	41.08	11.24	4.33	76.44
Sex					
Male	51.15	41.03	11.25	4.33	78.28*
Female	48.85	41.13	11.22	4.34	74.52*
Type of family					
Both parents	81.70	40.86	11.14	4.29	77.62*
Single parent	11.70	43.55	12.45	4.92	70.20*
Widowed parent	9.46	42.94	12.56	5.06	68.89*
Sector					
Rural	85.70	44.48*	12.16	4.67	75.28*
Urban	14.30	20.72*	5.71	2.29	83.11*
Regions					
Phnom Penh	6.71	6.72*	1.79	0.82	87.65*
Plain	43.03	38.26*	9.33	3.34	78.06*
Tonle Sap	31.04	48.73*	14.53	5.88	73.49*
Coastal	8.33	32.44*	7.27	2.50	77.30*
Plateau/Mountain	10.88	58.20*	18.22	7.43	70.16*
Poverty status					
Poor	41.08	N/A	N/A	N/A	69.36*
Non-poor	58.92	N/A	N/A	N/A	81.38*
Schooling					
Attending	76.94	37.33*	9.70	3.60	N/A
Not attending	23.06	53.58*	16.37	6.78	N/A

Source: Authors' calculations using CSES 2004
Notes: * significant differences among subgroup categories at 5 percent level

Table 2 Estimated impacts on different targeted groups for a cash transfer benefit equal to 50 percent of the official poverty line

Indicators	ALL	RUR	FEM	POO	PRO	WID	LOW
Total benefit paid (KHR billion)	1258.7	1052.4	662.9	485.6	364.1	124.2	432.5
(as per cent of GDP)	5.87	4.91	3.09	2.27	1.70	0.58	2.02
% spent by recipients	43.97	44.40	30.81	45.57	44.20	47.08	44.39
% spent by school-age children	43.97	44.40	45.01	45.57	44.20	48.72	44.39
% spent by non-school-age children	56.03	55.60	54.99	54.43	55.80	51.28	55.61
Direct recipients							
Change in poverty headcount ratio (%)	-39.62	-39.51	-31.30	-39.62	-30.98	-40.71	-33.5
Change in poverty gap index (%)	-57.15	-57.31	-45.87	-57.15	-53.23	-58.88	-54.36
Change in poverty severity index (%)	-67.49	-67.69	-55.92	-67.49	-65.4	-68.66	-65.77
School-age children							
Change in poverty headcount ratio (%)	-39.62	-36.66	-22.85	-39.62	-12.11	-4.16	-14.16
Change in poverty gap index (%)	-57.15	-52.72	-34.51	-57.15	-23.6	-6.43	-24.87
Change in poverty severity index (%)	-67.49	-61.5	-43.09	-67.49	-30.74	-7.83	-31.15
Total population							
Change in poverty headcount ratio (%)	-31.50	-29.15	-17.72	-31.50	-9.67	-2.96	-11.45
Change in poverty gap index (%)	-47.40	-43.77	-27.54	-47.40	-19.81	-4.92	-20.81
Change in poverty severity index (%)	-57.54	-52.49	-35.13	-57.54	-26.64	-6.31	-26.94
Poverty reduction efficiency (percentage of total cost that reduces poverty gap)							
Direct recipients	-13.73	-15.16	-10.22	-35.60	-19.61	-15.10	-17.39
School-age children	-13.73	-15.16	-15.75	-35.60	-19.61	-15.67	-17.39
Total population	-30.7	-33.91	-33.87	-79.59	-44.36	-32.33	-39.23

Source: Authors' calculations using CSES 2004

Note: 'ALL': All school-age children (or universal); 'RUR': School-age children living in rural areas; 'FEM': Female school-age children; 'POO': School-age children living in poor households; 'PRO': school-age children living in the 10 poorest provinces; 'WID': School-age children living with a widowed parent; and 'LOW': School-age children living in the 10 provinces with the lowest school attendance rate

Table 3 Selection of cash transfer programs costing approximately 1 percent of GDP in 2004 (KHR 214.833 million or USD 53.32 million)

Category	Ending eligible age	Benefit level as % of poverty line	Change in poverty headcount ratio for children (%)	Change in poverty headcount ratio for population (%)	Change in poverty gap index for children (%)	Change in poverty gap index for population (%)	Change in poverty severity index for children (%)	Change in poverty severity index for population (%)	Change in utility for school-age children (%)	Change in utility for population (%)
POO	17	22	-17.54	-14.15	-29.02	-23.78	-37.46	-31.40	0.6448	0.4482
POO	15	26	-18.48	-14.65	-31.23	-25.21	-40.12	-33.13	0.6978	0.4777
ALL	10	20	-7.59	-6.02	-13.81	-11.05	-19.03	-15.48	0.4606	0.3187
ALL	9	26	-7.34	-5.85	-13.86	-11.15	-19.17	-15.71	0.4622	0.3222
ALL	8	36	-7.60	-6.07	-13.88	-11.26	-19.14	-15.84	0.4674	0.3290
RUR	11	20	-8.24	-6.52	-15.13	-12.06	-20.24	-16.43	0.5020	0.3448
RUR	10	24	-8.29	-6.60	-14.98	-12.02	-20.17	-16.47	0.4949	0.3425
FEM	16	18	-7.42	-5.92	-13.09	-10.35	-17.78	-14.29	0.4522	0.3095
FEM	14	22	-7.85	-6.24	-13.61	-10.72	-18.47	-14.79	0.4683	0.3191
FEM	11	34	-7.97	-6.29	-13.61	-10.77	-18.15	-14.59	0.4610	0.3152
FEM	10	42	-7.89	-6.21	-13.69	-10.94	-18.25	-14.80	0.4634	0.3199
PRO	17	30	-6.82	-5.59	-15.38	-12.80	-21.47	-18.38	0.4814	0.3432
PRO	13	42	-7.32	-5.78	-16.74	-13.52	-23.21	-19.32	0.5156	0.3578
PRO	7	180	-7.69	-6.13	-15.16	-12.35	-19.60	-16.26	0.4875	0.3430
WID	17	92	-7.20	-5.31	-9.01	-7.18	-10.14	-8.51	0.4249	0.2776
WID	15	115	-7.27	-5.13	-8.90	-6.93	-9.82	-8.04	0.4342	0.2753
WID	14	130	-7.18	-5.05	-8.88	-6.89	-9.75	-7.92	0.4358	0.2743
LOW	17	26	-6.92	-5.71	-14.39	-11.93	-19.53	-16.64	0.4749	0.3368
LOW	11	48	-7.32	-5.83	-15.62	-12.53	-20.95	-17.28	0.5021	0.3462
LOW	10	58	-7.18	-5.94	-15.77	-12.74	-21.17	-17.53	0.5056	0.3509

Source: Authors' calculations using CSES 2004

Note: Category abbreviations are described in the notes for Table 2

Change in utility is used as a proxy for change in social welfare, computed as the sum of changes in logarithms of expenditures before and after the cash transfer program. This measure accounts for the diminishing returns from expenditures

Table 4 The most effective cash transfer programs under various conditions

Total cost as % of GDP in 2004	Category	Ending eligible age	Benefit level as % of poverty line	Change in poverty headcount ratio for children (%)	Change in poverty headcount ratio for population (%)	Change in poverty gap index for children (%)	Change in poverty gap index for population (%)	Change in poverty severity index for children (%)	Change in poverty severity index for population (%)	Change in utility for school-age children (%)	Change in utility for population (%)
Per capita expenditure used to measure poverty											
0.25%	POO	9	18	-5.28	-4.22	-9.8	-7.88	-13.77	-11.27	0.2158	0.1476
	FEM	8	22	-2.67	-2.1						
	PRO	10	20			-5.38	-4.32	-8.44	-6.9	0.164	0.1132
0.50%	POO	13	16	-10.1	-8.03	-17.55	-13.97	-23.62	-19.19	0.3856	0.2608
	RUR	10	12	-4.65							
	RUR	7	34		-3.71						
	PRO	12	26			-9.58	-7.67	-14.33	-11.77	0.2924	0.2016
1.00%	POO	15	26	-18.48	-14.65	-31.23	-25.21	-40.12	-33.13	0.6978	0.4777
	RUR	10	24	-8.29	-6.6						
	PRO	13	42			-16.74	-13.52	-23.21	-19.32	0.5156	0.3578
1.25%	POO	16	30		-18.23						
	POO	15	32			-37.41	-30.26	-47.1	-39.02	0.8446	0.5787
	POO	14	34	-23.16							
	RUR	14	16		-8.19						
	RUR	13	18	-10.37							
	PRO	12	60			-20.11	-16.21	-26.95	-22.45	0.6288	0.4351
1.50%	POO	16	36		-21.62		-35.02		-44.43		
	POO	15	38			-43.17		-53.34		0.9868	0.6768
	POO	13	44	-27.74							
	FEM	11	52	-12.63	-9.83						
	PRO	13	62			-22.95	-18.62	-30.05	-25.25	0.7299	0.5077

Table 4 continued

Total cost as % of GDP in 2004	Category	Ending eligible age	Benefit level as % of poverty line	Change in poverty headcount ratio for children (%)	Change in poverty headcount ratio for population (%)	Change in poverty gap index for children (%)	Change in poverty gap index for population (%)	Change in poverty severity index for children (%)	Change in poverty severity index for population (%)	Change in utility for school-age children (%)	Change in utility for population (%)
Adult equivalent per capita expenditure											
0.25%	POO	9	18			-22.72		-25.37		0.1991	0.1373
	POO	8	24	-19.03			-17.36		-20.03		
	POO	7	36		-13.61						
	PRO	10	20			-18.34	-13.5	-20.57	-15.48	0.1513	0.1053
	PRO	7	52	-13.12	-9.52						
0.50%	POO	13	16	-33.29	-24.48	-40.54	-30.55	-45.84	-35.04	0.3557	0.2425
	PRO	17	16				-22.54	-30.91	-25.28		
	PRO	13	22			-29.19					
	PRO	11	30	-21.24						0.2658	0.1846
	PRO	10	36		-15.5						
1.00%	POO	17	22			-63.37	-49.77	-69.63	-55.91		
	POO	15	26							0.6436	0.4441
	POO	13	30	-57.19	-42.79						
	PRO	17	30			-42.77	-34.27	-42.36	-35.5		
	PRO	16	32	-36.81	-27.7						
	PRO	13	42							0.4755	0.3326
1.25%	POO	16	30		-49.72	-71.38	-55.73	-76.52	-60.93		
	POO	15	32	-65.18						0.7789	0.538
	PRO	17	38	-40.96	-31.64	-46.72	-37.93	-45.63	-38.72		
	PRO	15	44								0.4052
	PRO	12	60							0.5799	
1.50%	POO	17	34	-73.46	-55.89	-79.13	-63.01	-84.71	-69		
	POO	15	38							0.9101	0.6293
	PRO	17	46	-44.18	-34.69	-49.71	-40.75	-47.65	-40.85		0.4715
	PRO	11	84							0.6734	

Source: Authors' calculations using CSES 2004

Table 5 Variable names, definitions, and summary statistics

Variable	Definition	Mean	Standard deviation
Characteristics of children			
attend	1 if attending school, 0 otherwise	0.7734335	0.4186186
sex	1 if female, 0 otherwise	0.4900355	0.4999113
age	Age of child	11.56887	3.341723
age2	(age – mean_age)^2	11.16664	10.36319
Characteristics of head			
offspring	1 if child or grandchild of the head, 0 otherwise	0.964153	0.1859124
head_age	Age of the head	44.59086	10.4573
head_age2	(head_age – mean_head_age)^2	109.3506	178.2419
head_sex	1 if head is female, 0 otherwise	0.1683415	0.3741772
hprimary	1 if head's education is up to the primary level, 0 otherwise	0.4641108	0.4987208
hpostprimary	1 if head's education is higher than primary level, 0 otherwise	0.2723780	0.4451927
hnoschooling	1 if the head has no education, 0 otherwise	0.2635112	0.4407729
h_agr	1 if head's occupation is in agriculture sector, 0 otherwise	0.6480746	0.4775809
h_ind	1 if head's occupation is in industry sector, 0 otherwise	0.0636717	0.2441723
h_ser	1 if head's occupation is in service sector, 0 otherwise	0.2421044	0.4283662
h_unemployed	1 if the head is unemployed, 0 otherwise	0.0461493	0.2099041
Characteristics of household			
sector	1 if urban, 0 if rural	0.1889461	0.3914741
nchild5	Number of other children whose age is 5 or below	0.5479226	0.7468101
nchild17	Number of other school-age children	1.806198	1.237025
nadult	Number of adults in the household	2.73252	1.242577
lpcexp	Logarithms of per capita expenditure	7.74329	0.7197881

Source: Authors' calculations using CSES 2004
Note: The estimates do not use the sample weights, and number of observations is 23,684

Table 6 Marginal effects for Probit models

Variables	Overall	Male nonpoor	Female nonpoor	Male poor	Female poor
attend					
sex	-0.0387***				
	(0.00525)				
age	-0.00838***	-0.00310***	-0.0144***	-0.00208	-0.0150***
	(0.000775)	(0.00110)	(0.00135)	(0.00199)	(0.00216)
age2	-0.0136***	-0.0100***	-0.0121***	-0.0159***	-0.0186***
	(0.000250)	(0.000358)	(0.000426)	(0.000638)	(0.000700)
offspring	0.138***	0.0996***	0.177***	0.0686	0.140***
	(0.0189)	(0.0290)	(0.0312)	(0.0443)	(0.0495)
head_age	-0.000817**	-8.32e-05	-0.000376	-0.00121	-0.00254***
	(0.000348)	(0.000497)	(0.000599)	(0.000886)	(0.000949)
head_age2	2.66e-05	-1.04e-05	-6.58e-06	6.94e-05	0.000109**
	(1.88e-05)	(2.56e-05)	(3.21e-05)	(4.83e-05)	(5.35e-05)
head_sex	-0.00520	-0.00317	-0.0132	0.00178	-0.00732
	(0.00767)	(0.0109)	(0.0136)	(0.0192)	(0.0211)
hprimary	0.0796***	0.0626***	0.0568***	0.103***	0.0995***
	(0.00611)	(0.00941)	(0.0114)	(0.0143)	(0.0155)
hpostprimary	0.139***	0.102***	0.115***	0.191***	0.178***
	(0.00614)	(0.00937)	(0.0118)	(0.0137)	(0.0167)
hnoschooling	ref	ref	ref	ref	ref
h_agr	0.00287	0.0114	-0.0146	0.00862	0.00127
	(0.0137)	(0.0181)	(0.0228)	(0.0374)	(0.0402)
h_ind	0.00797	0.00750	0.0182	0.00640	-0.00878
	(0.0166)	(0.0214)	(0.0266)	(0.0456)	(0.0515)
h_ser	0.0401***	0.0494***	0.0165	0.0344	0.0528
	(0.0134)	(0.0169)	(0.0230)	(0.0385)	(0.0421)
h_unemployed	ref	ref	ref	ref	ref
sector	0.0128*	0.0307***	0.0250**	-0.0376	-0.0204
	(0.00761)	(0.00948)	(0.0119)	(0.0233)	(0.0247)
nchild5	-0.0200***	-0.0159***	-0.0257***	-0.0101	-0.0264***
	(0.00376)	(0.00604)	(0.00690)	(0.00863)	(0.00955)
nchild17	-0.00528**	-0.00173	-0.00662	-0.0131**	0.00340
	(0.00230)	(0.00339)	(0.00410)	(0.00565)	(0.00601)
nadult	0.0129***	0.0104***	0.0165***	0.0100	0.0147**
	(0.00248)	(0.00362)	(0.00421)	(0.00638)	(0.00680)
lpcexp	0.0803***	0.0405***	0.0560***	0.122***	0.150***
	(0.00516)	(0.00881)	(0.00983)	(0.0239)	(0.0246)
Observations	23684	7238	6928	4840	4678
Log likelihood	-10350	-2595	-2823	-2430	-2429

Source: Authors' estimates using CSES 2004
Note: The estimates do not use the sample weights
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7 Selection of cash transfer programs costing approximately 1 percent of GDP in 2004 and their impacts on school attendance

Category	Ending eligible age	Benefit level as % of poverty line	Average increase in school attendance (%)
POO	17	22	**0.77**
POO	15	26	0.72
ALL	10	20	0.29
ALL	9	26	0.27
ALL	8	36	0.26
RUR	11	20	0.32
RUR	10	24	0.31
FEM	16	18	0.30
FEM	14	22	0.27
FEM	11	34	0.24
FEM	10	42	0.24
PRO	17	30	**0.49**
PRO	13	42	0.39
PRO	7	180	0.26
WID	17	92	0.38
WID	15	115	0.33
WID	14	130	0.30
LOW	17	26	0.48
LOW	11	48	0.34
LOW	10	58	0.33

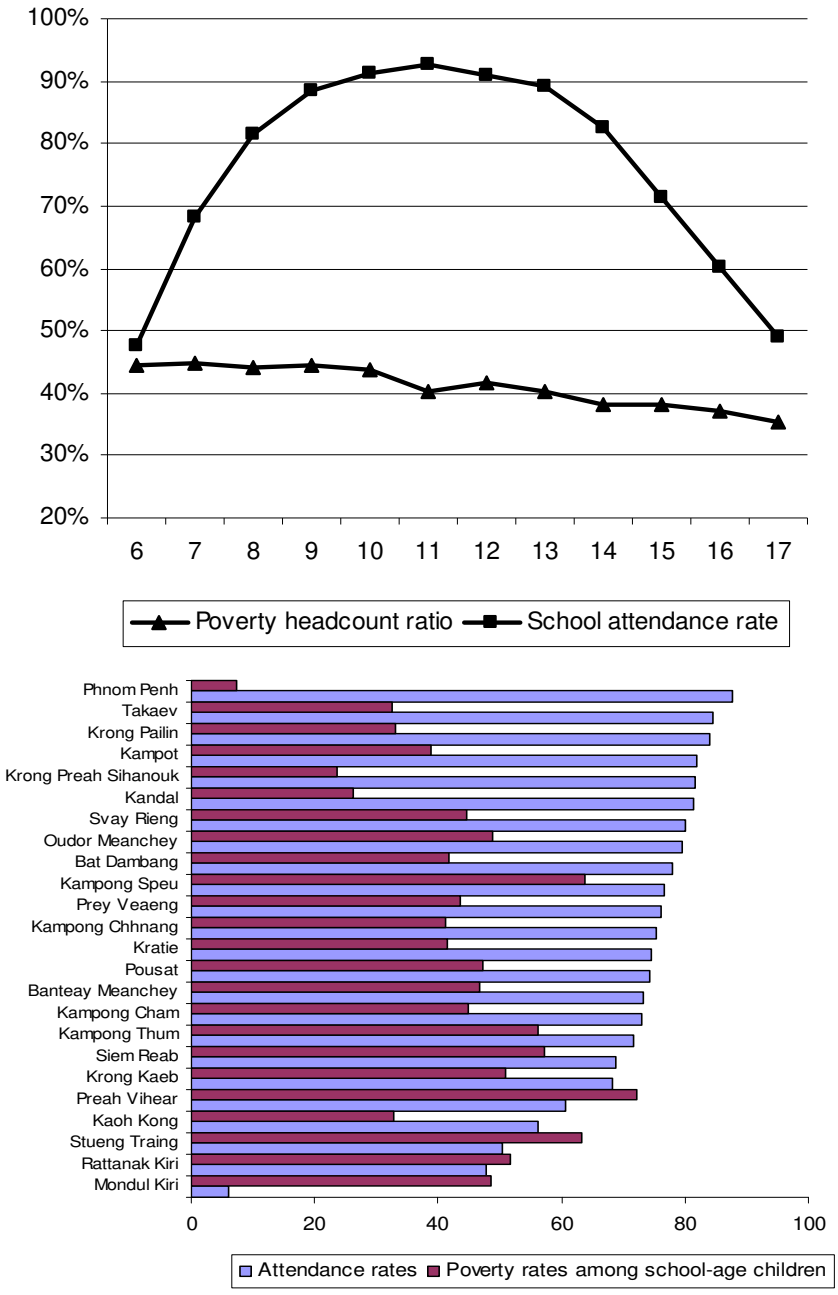
Source: Authors' calculations using CSES 2004

Table 8 The most effective cash transfer programs under various conditions

Total cost as % of GDP in 2004	Category	Ending eligible age	Benefit level as % of poverty line	Increase in school attendance rate (%)
0.25%	POO	9	18	0.16
	WID	17	26	0.13
0.50%	POO	13	16	0.34
	PRO	17	16	0.28
1.00%	POO	17	22	0.77
	PRO	17	30	0.49
1.25%	POO	17	28	0.95
	PRO	17	38	0.61
1.50%	POO	17	34	1.13
	PRO	17	46	0.72

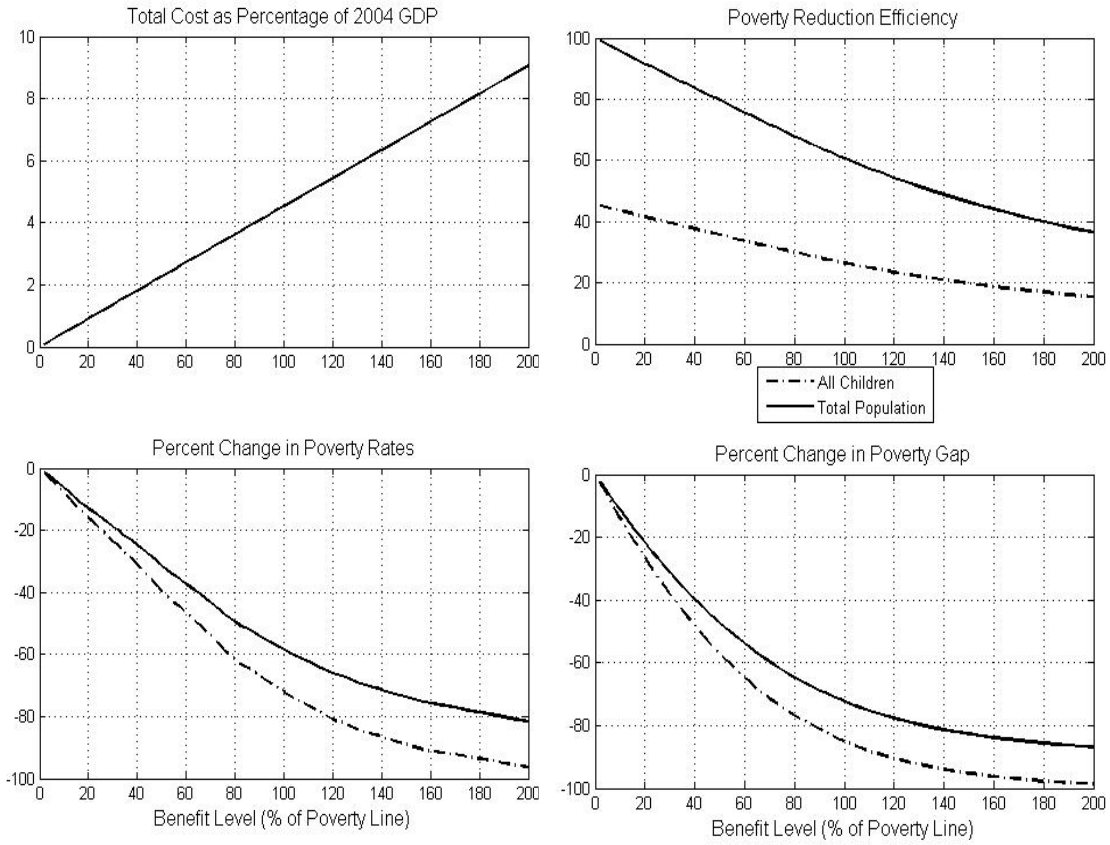
Source: Authors' calculations using CSES 2004

Figure 1 Poverty and school attendance rates by age and province



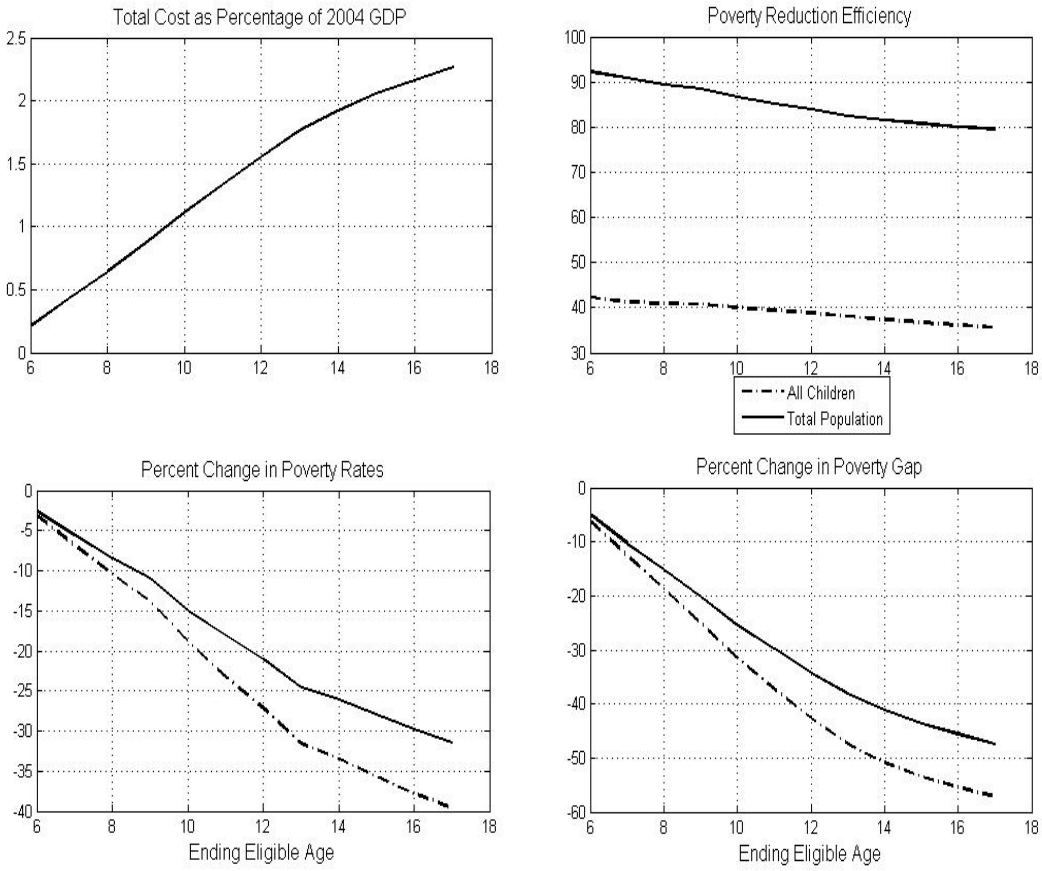
Source: Authors' calculations using CSES 2004
Notes: The authors' estimate of the average school attendance rate for the 10 provinces with the lowest enrollment is 69.78%, and that for the rest is 80.02%

Figure 2 Estimated impacts on "Poor" school-age children as benefit level varies



Source: Authors' calculations using CSES 2004

Figure 3 Estimated impacts on "Poor" children of a benefit equal to 50 percent of poverty line as the ending eligible age varies



Source: Authors' calculations using CSES 2004