Reaching OVC through cash transfers in Sub-Saharan Africa: Simulation results from alternative targeting schemes
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Abstract

We use national household budget surveys from Malawi, Mozambique, Uganda and Zambia to simulate the coverage, costs, poverty impacts and school enrollment of four alternative cash transfer targeting schemes. Each of these schemes is currently being used in countries in Eastern & Southern Africa. Our primary objective is to see which of the alternative schemes reaches the largest number of orphans and ultra-poor children. Our main policy conclusion is that while all schemes reach significant numbers of orphans, a scheme that explicitly targets poor households with children reaches the most number of overall ultra-poor children, and about 50 percent of orphans in the poorest decile. A scheme that explicitly targets orphans includes many households in the third decile while excluding households with children in the bottom two deciles. Thus the distribution of transfers under a child-centered targeting strategy clearly favors the poorest of the poor and also reaches the poorest orphans. To the extent that vulnerability is directly correlated with extreme poverty, CTs that target ultra poor households with children will have the greatest impact on OVC in the region. Such a scheme will also have the most impact on increasing school enrollment, with increases in enrollment of up to 5 and 6 percentage points among poor children in Malawi and Uganda respectively.
1. Introduction

Social cash transfers (CTs), small predictable sums of money to poor and vulnerable families, are a relatively new social protection instrument in East and Southern Africa (ESA). However this instrument is rapidly gaining popularity as an effective intervention to enhance the participation of the poor in economic development, and to combat inequality, social exclusion and chronic poverty. In the HIV and AIDS policy dialogue in particular, the ‘protective’ dimension of programming in the 4 Ps increasingly calls for the use of social cash transfers to support families that care for orphans and other children affected by AIDS (UNICEF AND UNAIDS 2004). Advocacy among AIDS scholars for such programs is driven by the fact that AIDS is the number one cause of prime-age mortality in sub-Saharan Africa (SSA), and the region hosts approximately 25-30 million orphans, one third of whom have lost a parent to the disease. AIDS related prime-age adult mortality has seen life expectancy rates decline dramatically in the region, and has severely weakened family support systems already stretched thin by extreme chronic poverty. In this context, CTs are increasingly being called for as an AIDS mitigation measure, to help families cope with increasing dependency ratios and the associated burden of care, and to protect the health and human capital development of orphans and other vulnerable children (OVC).

In ESA the largest cash transfer program for children is South Africa's national child support grant (CSG) which reaches over 9 million children up to age 14 and which is being expanded to cover children up to age 18 over the next 4 years. However several countries have smaller programs, either demonstrations (e.g Kenya, Malawi, Zambia), or established programs but with low coverage (e.g Mozambique). Lesotho is currently designing a CT targeted to OVC, while Botswana and Namibia both have either in-kind or cash assistance programs for families that care for orphans. Several other countries are currently considering implementing CTs on a trial basis including Rwanda, Tanzania, and Uganda. These types of programs are thus very much part of the social policy dialogue in ESA, and in March 2006 13 countries in the region, under the auspices of the African Union, signed the Livingstone (Zambia) Call for Action, which essentially pledged countries to develop national social protection strategies, and to specifically design and implement social cash transfers within the next 3 years. A follow-up to the original Livingstone Meeting, known as Livingstone 2 and involving the entire continent, is currently underway with national and regional meetings on social protection, and an African Union Ministerial Meeting planned for October 2008 which
will bring together African Ministers of Social Development to discuss and adopt a framework for Social Development, including Social Protection, for the continent.

As momentum gathers around CTs, a host of technical questions arise on program design parameters such as targeting, transfer levels, and overall costs and affordability. An important policy question from the OVC angle is how to scale-up such programs to reach children most in need of assistance. A recent study (Schubert 2007) analyzed the demographic composition of participant households under the Zambia and Malawi pilots, which are confined to a single district within each country, and concluded that these two programs reach a significant number of AIDS affected households, including OVC, though such households are not explicitly targeted. On the other hand, the CT demonstration in Kenya targets OVC households directly, while in Mozambique the CT program targets the elderly and anyone who is disabled or chronically sick living in a poor household; all these programs are thought to capture a significant number of AIDS affected households, including OVC, but none of these programs operate at scale. Both for these countries and others in design phase such as Lesotho, Rwanda and Uganda, the policy question of interest is to determine which of these alternative targeting schemes would capture the most vulnerable children if taken to scale.

This paper simulates the coverage and related impact on poverty and schooling of OVC of national cash transfer schemes in four ESA countries, using nationally representative household budget and expenditure surveys. We compare the efficiency of alternative CT targeting strategies in terms of coverage amongst the poorest deciles; assess the poverty impacts of alternative targeting schemes; and conduct empirical estimation of the effects of the alternative targeting strategies on the school enrollment of OVC in eligible households. This paper is methodologically very similar to Kakwani, Soares & Son (2006), who also use microsimulations to predict the ‘impact’ of CTs on poverty and school enrollment. However our paper differs in several respects to that one. First, our focus is on comparing specific targeting schemes which are actually in existence in ESA, while Kakwani et al focus on a generic set of programs including universal ones; in that sense our results are of greater practical relevance to the current debates on program design in the region. Second, given the strong OVC and AIDS mitigation undercurrent in the CT dialogue, we explicitly consider the performance of these specific schemes in reaching orphans and other ultra-poor children, since these groups are typically cited as the main target population for such programs. Finally, our modeling of school enrollment focuses on the relevant behavioral parameter in the target population—the poorest 30 percent of households—which provides a much more accurate assessment of the ability of CTs to affect schooling than that reported in Kakwani et al.
2. Methodology

Nationally representative household expenditure surveys from 4 ESA countries, Malawi, Mozambique, Uganda and Zambia, are employed to compare the efficiency of alternative CT targeting strategies. The modeled strategies represent somewhat stylized versions of the actual targeting strategies employed in existing demonstration programs in the region. Analysis of each strategy in each country yields results relative to the baseline assumption of having no program; comparison of the results across strategies allows inference to be drawn regarding each strategy’s performance against specific policy objectives. The policy objective of interest here is to maximize the benefit from CT programs that accrues to OVC, as measured by coverage in the poorest deciles, changes in the consumption of households that contain OVC, and school enrolment of OVC. For the purposes of this study, orphans are defined in the survey as children who do not live with one or both parents, while vulnerable children are those from poorest deciles, with the poorer the decile the more vulnerable the child.

2.1 Identification of recipient households

The five strategies under analysis target all households in the lower three deciles of the national consumption distribution that meet, respectively, the following criteria:

1. Labor-constrained households, which have no able-bodied members between the ages of 15 and 60, inclusive, or have a dependency ratio greater than three.

2. Households with age-vulnerable or disabled adults. Age-vulnerable households have a female member above the age of 55 or a male member above the age of 60, or a disabled or chronically ill adult.

3. Households with children. “Vulnerable children” are defined in this study as the poorest children, hence this scheme effectively targets poor households with children less than 18 years of age.

4. Households with orphans.

5. The poorest households, employed as a benchmark that represents perfect targeting for policies with the sole objective of poverty alleviation.

As mentioned earlier, the first 4 schemes represent stylized versions of existing CT programs in the region. Scheme 1 is currently used in Malawi and in one small pilot area in Zambia; scheme 2 is used in the Programa Segurança Alimentar CT in Mozambique; scheme 3 is similar to the OVC-CT program in Kenya; scheme 4 is similar to the OVC program in Botswana. Essential characteristics of 4 of the 5 schemes are presented in Table A1 in the annex. All schemes
attempt to focus transfers on the ultra-poor, usually the poorest 10 or 20 percent of households, through community based targeting mechanisms.

The typical CT makes transfers to households, not to individuals. In this analysis, recipient households are identified by their ranking in terms of *per capita* consumption conditional on eligibility for benefit under each targeting strategy. Transfers are assigned first to the poorest households that meet the eligibility criteria, moving up through the consumption ranking until all eligible households have been assigned or a presumed program budget constraint is met. In this process, household weights are used to determine the number of households from the population represented by each household in the sample. Our method thus assumes perfect targeting, and limits leakage to households within the bottom 3 deciles—we do not allow transfers to otherwise eligible households in the 4th quintile or higher even if there is space in the program budget to do so.

### 2.2 Program parameters

Ideally, CT programs strike a balance between providing sufficient resources to pursue a policy objective and avoiding distortion of consumption patterns. In each country analysis, the transfer value is set at approximately 30 percent of median consumption among households in the lowest quintile of the consumption distribution. This is calculated as the product of the weighted median per capita consumption and weighted median household size in the lowest quintile of the individual consumption distribution. Figure 1, taken from UNICEF-ESARO (2008), shows transfer levels in selected CT programs in Latin America and Africa as a percentage of the national poverty line. These range from about 30 percent in Colombia down to about 10 percent in some of the Africa programs. These latter programs however tend to focus transfers on the poorest 10-20 percent of the population whose consumption is less than half of the respective national poverty lines. Hence transfers likely represent around 20-40 percent of the average consumption per person in these programs, which explains our use of a transfer level set at 30 percent of median consumption of the poorest quintile in each country.
Figure 1: Value of transfers in selected cash transfer programs

The national budget constraint is set at 0.5 percent of each country’s GDP, an amount that is considered to be politically feasible in Africa at this time, and that is often used in dialogue with governments as an indicative fiscal envelope for such programs; similar large scale programs in Brazil and Mexico also cost around this amount. Anticipation of the budget constraint is reflected in the modeled targeting strategies by limiting eligibility to households with per capita consumption that falls below the 30th percentile of the national consumption distribution, i.e., households in the lowest three deciles of per capita consumption. The national budget constraint includes administrative costs, which are valued at twenty percent of total transfers in each country.

2.3 Efficiency of alternative targeting strategies

Upon identification of recipient households, the number of individuals who would benefit from a CT program is estimated using household or population weights, as appropriate. These results are used to estimate changes in the poverty headcount ratio (H), poverty gap ratio (PG), and squared poverty gap ratio (SPG) that would result from a specific targeting strategy. These measures are calculated by the following formulas. The headcount poverty ratio measures the proportion of the population living below the poverty line:

\[ H = \frac{\sum h_i}{\sum i} \]  \hspace{1cm} (1)
where \( i \) represents individuals in the population and \( h \) is an indicator that the individual’s per capita consumption is below the poverty line. Summations for all three measures are over \( i \), or across the population represented by the household sample. In practice, these measures are derived using population weights calculated as the product of household size and sample household weight. The poverty gap ratio, which measures the proportional difference between per capita consumption and the poverty line for those in poverty, is calculated by:

\[
PG = \sum h_i \left( \frac{povline - pc_i}{povline} \right)
\]  

(2)

where \( povline \) is the poverty line in each country and \( pc \) is per capita consumption for the individual \( i \). Finally, the squared poverty gap ratio is:

\[
SPG = PG^2 = \sum h_i \left( \frac{povline - pc_i}{povline} \right)^2
\]  

(3)

which places greater emphasis on the welfare of individuals in the poorest households, by adding emphasis in the calculation to larger gaps in the difference between their per capita consumption and the poverty line. A decrease in any of the three measures represents an improvement in poverty.

Because it is assumed that the poorest households that meet eligibility criteria are the first to enter under each targeting strategy, the efficiency of alternative targeting strategies is also assessed by profiling the recipient population in terms of numbers of households, individuals and OVC, and where they fall within the national consumption distribution. Of particular interest in this analysis is the extent to which OVC receive transfers under targeting strategies that do not explicitly target OVC, as in strategies that target labor-constrained households, households with age-vulnerable or disabled adults, or households based solely on poverty criteria. The extent of benefit to OVC is measured by the total number of participating OVC; the highest consumption decile of participating OVC; and the proportion of OVC recipients by consumption decile. Targeting strategies that reach higher numbers of OVC and that demonstrate efficiency by reaching OVC in the poorest households are preferred under a policy objective of maximizing benefit to OVC.
2.4 Consumption and schooling

The relationship between enrollment and consumption is estimated for children aged 6-17 years using a reduced-form model that reflects the results of household decisions regarding investment in children’s education (Deaton 1997). Intrahousehold resource allocation decisions are not modeled explicitly. The study employs a probit specification of the following model using both child-level and household characteristics:

\[ enroll_i = \alpha_0 + \beta \ln(p_{ch}) + \chi_i \gamma + \kappa_h \lambda + \varepsilon_i, \]  

(4)

where \( enroll \) is a dichotomous indicator of enrollment status; \( \ln(p_{ch}) \) is the log of per capita consumption; \( \chi_i \) is a vector of child-specific characteristics with coefficients \( \gamma \); and \( \kappa_h \) is a vector of household characteristics with coefficients \( \lambda \). The included individual characteristics are age, sex, and orphan status. The included household characteristics are education of the household head, the log of household size, whether the household exists in an urban or rural location, and time required to travel to school.\(^1\)

This estimation strategy does not support causal analysis, but rather provides estimates of the association between consumption and enrollment, and between orphan status and enrollment.\(^2\) In a full behavioral model of the household economy, schooling, leisure and consumption are jointly chosen, and so would be modeled separately. Unobserved preferences and abilities would also determine all these outcomes, requiring more advanced econometric techniques such as instrumental variables or household fixed effects to control for such heterogeneity. The analysis undertaken here is in the spirit of the conditional demand literature in that schooling is estimated conditional on a given level of household consumption. Changes in the level of consumption are then simulated through the various CT schemes, and new schooling rates are predicted. These predictions will be over-estimates of the ‘true’ impact of the transfer on schooling if there is positive correlation between total expenditures or income and tastes for schooling (through for example unobserved ability to generate income). Note that the estimation sample is limited to children who live in households in the lowest three deciles of per capita consumption. This sample restriction promotes an estimate of the association between consumption and enrollment that reflects consumption patterns among the general target group for CT programs modeled in this analysis, which may be different than consumption patterns across the population. In particular, consumption is more likely to be a binding constraint on

\[^1\text{Travel time is not measured similarly across survey instruments, and in the case of Uganda, distance in kilometers is reported rather than travel time. In all cases the cluster mean value of either distance or travel time is used in the analysis.}\]

\[^2\text{Interactions between consumption and orphan status were explored, but were found not to be jointly significant.}\]
enrollment decisions for poorer households than for wealthier households. Using the full sample would likely attenuate the estimated relationship and result in underestimation of the impact of CTs on enrollment among beneficiaries.

2.5 Cash transfers and schooling

The impact of alternative targeting strategies is estimated by comparing the predicted probability of enrollment among children in participating households with and without the cash transfer. Participating households under each targeting strategy are identified as previously described, i.e., by their ranking on per capita consumption conditional on eligibility under each set of targeting criteria. Participating children are those children observed in the estimation sample who are members of participating households. CT impact is projected only for recipient children thus identified, which varies by targeting strategy.

Under each targeting strategy, baseline estimates of the probability of enrollment are predicted using observed per capita consumption data and the results obtained by estimation of equation (4):

$$\Pr[enroll_{i} = 1] = \Phi(\tilde{\alpha} + \tilde{\beta}[\ln(pc_{i})] + \chi_i \tilde{\gamma} + \kappa_i \tilde{\lambda})$$  \hspace{2cm} (5)

where the theoretical coefficients in (4) are replaced by the corresponding estimates obtained from probit estimation and the probability of enrollment is estimated using the probit operator $\Phi$. The predicted probability of enrollment with the cash transfer also is estimated from equation (5), replacing the term $pc_{i}$ with $pc_{i}' = pc_{i} + T/hhs$. The latter expression represents the new value of per capita consumption after a transfer of value $T$ to a household with $hhs$. Differences in the population-weighted means of estimated enrollment probabilities among recipient children at baseline and with a cash transfer are then compared across alternative targeting strategies.

These analyses employ certain assumptions that are important for interpretation of the results. First is the assumption of perfect targeting within each stated targeting strategy. This assumption yields best-case estimates of the schooling impact of alternative CT designs, but may not reflect results obtained in practice. A second key assumption is that households maintain constant consumption patterns upon receipt of a cash transfer, including the allocation of household resources to individual members. This requires not that intrahousehold allocation of resources is equivalent across all children, e.g. orphans and non-orphans in the same household, but that relative allocations are maintained after receipt of a transfer. A third
assumption requires also that participating households in the simulation of enrollment impacts, equation (5), are homogeneous in their propensity to consume additional income. While the assumption of uniform propensity to consume may seem unreasonable across a general population, recall that CT programs target the poorest households in a consumption distribution that already can be characterized as poor on average. Hence, it is plausible to assume that the participating households’ propensity to consume is unity, i.e., that small increments of additional income will be consumed in full. To the extent this is true, the assumption of uniform propensity to consume across households will be met.
3. Data and summary statistics

3.1 Data

Household income and expenditure surveys from Malawi, Mozambique, Uganda and Zambia are used for empirical analysis of the association between consumption and schooling, and estimation of the poverty and schooling impacts of cash transfers. Specifically, they are the Second Integrated Household Survey (IHS) from Malawi (2004); the Inquerito aos Agregados Familiares 2002-03 (IAF) from Mozambique; the Uganda National Household Survey (2005-06) and the Living Conditions Monitoring Survey IV (LCMS) from Zambia (2004). These surveys are similar in structure; they are cross-sectional in nature and support nationally representative analysis.

The policy variable of interest in these analyses is per capita consumption, calculated as the household’s aggregate consumption divided by household size. Although receipt of a cash transfer represents an increase in income, use of the consumption variable helps to avoid problems associated with underreporting of income and measurement of household production. The household consumption aggregates employed are those calculated by the national statistics offices that manage the surveys. Consumption aggregates are adjusted for local prices, so that the purchasing power of equal consumption levels is equivalent across sample clusters. Per capita consumption is used to rank eligible households for identification of participation under alternative CT targeting schemes and as an independent variable in the enrollment analyses.

Individual characteristics – age, sex, disability, and enrollment status for children – are identified from the household roster when the roster contained these variables, or from the health and education sections of the household questionnaires. In the enrollment analysis, age is specified by two splines for ages 6-13 and 14-17. A household is considered to host an adult with a disability if any person aged 18 or above was reported as having any disability. Children are identified as being enrolled if they are reported as currently attending school.

Household characteristics included in the enrollment analysis are education of the household head, the log of household size, whether the household exists in an urban or rural location, and time required for travel to school, except in Uganda where distance in kilometers is available only. The household head’s education is specified as a construct with three categories: whether the person has no formal education or some primary education; has completed primary
education; or has completed secondary education. The cost of travel to school is imputed as a cluster-level mean of travel time, specified as a continuous variable when possible, or as a categorical variable using the modal response.

### 3.2 Descriptive analysis

Descriptive statistics for the data supporting the poverty and schooling analyses are presented in Table 1. Though one cannot compare poverty lines and, hence, poverty rates between countries directly, due to differences that may exist in the consumption basket used to calculate poverty lines, these data offer some useful comparisons across country and may have some predictive value regarding the comparative results of the analysis. GDP is much higher in Uganda at USD 10.6 billion than in the other three countries. Malawi’s GDP is USD 1.9 billion; Mozambique’s is USD 4.1 billion and Zambia’s is USD 5.4 billion. Inflating GDP figures with country-specific consumer price indices and using 2007 foreign exchange rates, the resultant CT budgets for each country, set as a percentage (0.5%) of GDP, would be approximately 12.1, 28.8, 39.8, and 53.0 USD million (2007) for Malawi, Mozambique, Zambia and Uganda respectively.
Table 1: Summary statistics, by country, for poverty and schooling analyses.

<table>
<thead>
<tr>
<th></th>
<th>Malawi</th>
<th>Mozambique</th>
<th>Zambia</th>
<th>Uganda</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Poverty analysis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population (million)</td>
<td>12.2</td>
<td>18.3</td>
<td>10.8</td>
<td>30</td>
</tr>
<tr>
<td>GDP (USD billion)</td>
<td>1.90</td>
<td>4.09</td>
<td>5.44</td>
<td>10.6</td>
</tr>
<tr>
<td>Poverty line, monthly (USD)</td>
<td>9.71</td>
<td>10.07</td>
<td>26.13</td>
<td>13.8</td>
</tr>
<tr>
<td>Per capita consumption, monthly (USD)</td>
<td>15.04</td>
<td>14.94</td>
<td>32.88</td>
<td>23.57</td>
</tr>
<tr>
<td><strong>Baseline poverty indicators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poverty headcount ratio</td>
<td>0.524</td>
<td>0.541</td>
<td>0.701</td>
<td>0.351</td>
</tr>
<tr>
<td>Poverty gap ratio</td>
<td>0.178</td>
<td>0.205</td>
<td>0.376</td>
<td>0.105</td>
</tr>
<tr>
<td>Squared poverty gap ratio</td>
<td>0.080</td>
<td>0.103</td>
<td>0.245</td>
<td>0.044</td>
</tr>
<tr>
<td>Household size (mean)</td>
<td>4.5</td>
<td>4.8</td>
<td>5.2</td>
<td>5.3</td>
</tr>
<tr>
<td>Households in sample</td>
<td>11,280</td>
<td>8,700</td>
<td>19,236</td>
<td>7,421</td>
</tr>
<tr>
<td><strong>Schooling analysis (children aged 6-17 in bottom 3 deciles)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent enrolled</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 6-13</td>
<td>79.4</td>
<td>62.3</td>
<td>59.2</td>
<td>79.8</td>
</tr>
<tr>
<td>Age 14-17</td>
<td>68.7</td>
<td>56.6</td>
<td>68.0</td>
<td>72.9</td>
</tr>
<tr>
<td>Age</td>
<td>10.7</td>
<td>10.8</td>
<td>11.1</td>
<td>10.9</td>
</tr>
<tr>
<td>Female (percent)</td>
<td>50.2</td>
<td>48.1</td>
<td>48.9</td>
<td>48.9</td>
</tr>
<tr>
<td>Household size</td>
<td>7.1</td>
<td>7.1</td>
<td>7.8</td>
<td>7.7</td>
</tr>
<tr>
<td>Household head's education (percent)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None or some primary</td>
<td>90.1</td>
<td>68.6</td>
<td>71.5</td>
<td>75.6</td>
</tr>
<tr>
<td>Completed primary</td>
<td>8.9</td>
<td>17.3</td>
<td>21.4</td>
<td>19.3</td>
</tr>
<tr>
<td>Completed secondary</td>
<td>0.6</td>
<td>6.1</td>
<td>7.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Percent urban</td>
<td>4.5</td>
<td>31.6</td>
<td>17.3</td>
<td>6.1</td>
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<tr>
<td>Observations</td>
<td>5,830</td>
<td>4,734</td>
<td>11,908</td>
<td>4,649</td>
</tr>
</tbody>
</table>

Notes: Gross domestic product values obtained from the IMF (2007). Summary statistics for the poverty analysis are computed using population weights that were derived from household weights and household size. Summary statistics for the schooling analysis are computed as weighted means for children aged 6-17 years. Monetary data are given in USD 2007. Time required to travel to school is omitted from this table due to differences in the specification of this variable -- continuous or categorical -- across individual surveys.

Examination of the baseline poverty indicators supports a general conclusion that larger numbers of individuals will be predicted to receive transfers under CT programs in Zambia and Uganda than in the other two countries in this study, and that the lowest numbers will occur in Malawi. Zambia has the highest poverty headcount ratio (H = 0.70) and the highest squared poverty gap ratio (SPG = 0.25): not only does a larger proportion of the population live below the poverty line in Zambia, but the gap between per capita consumption and the poverty line is greater in Zambia for the poorest households. Malawi and Mozambique have similar H and SPG, while all poverty indicators are lowest in Uganda and Uganda also has the largest population at 30 million. These basic features suggest that Uganda and Zambia will likely have the largest coverage for any given program, and Malawi will have the smallest given its small population size and GDP.
Descriptive statistics for the schooling analysis, presented in the lower panel of Table 1, are for the sub-sample of children living in households in the target group defined by the lowest three consumption deciles. Of these children, more are of secondary school age (14-17) while among primary school age (6-13), more are likely to be enrolled in school in Uganda (73 percent and 80 percent) than in the other countries. In Zambia, the proportion of children of secondary school age who are enrolled (68%) is higher than the proportion of children of primary school age (59%). Mean age and household size and gender ratios are similar across countries. One might expect that greater increases in school enrollment will be realized in samples with lower baseline enrollment rates, but simulations based on empirical analysis do not bear this out; rather, the highest enrollment increases are estimated in Uganda, which has the highest mean enrollment rates.

Other household characteristics of these children – education of the household head and household setting – have potential predictive value for the results of the schooling simulations. If households headed by individuals with more education have stronger preferences for education, one would expect their income-elasticity of schooling to be lower. Likewise, if households set in rural areas have higher opportunity costs of their children attending school due to travel time and the alternative uses of children’s time, e.g. food production, such households would be expected to have a higher income elasticity of schooling. The proportion of children living in a household headed by an individual with no education or some primary education is highest in Malawi (90%). In Zambia, the proportion of children living in a household headed by an individual who has completed secondary education is highest (7%). In Mozambique, 69 percent of children in the sample live in households headed by someone with no or some primary education, while 32 percent of children in the target households live in urban areas. In sum, based on the descriptive statistics alone, one might expect a stronger enrollment response to cash transfers in Malawi than in Zambia, with the enrollment response in Mozambique falling in between. This is consistent with the simulation results discussed below.
4. Results

4.1 Total costs

Table 2 presents results for the total cost of each program if implemented under the parameters described earlier. Table 2 demonstrate that a CT program that targets labor-constrained households will reach individuals in the third decile of the consumption distribution without exhausting the budget, i.e., under perfect targeting assumptions all eligible households in the target group would be reached and program resources would be left over. While the program budget constraint would be approached in Malawi (95 percent) and Mozambique (94 percent), a much lower proportion of the budget would be used in Uganda (80 percent) and Zambia (29 percent).

<table>
<thead>
<tr>
<th></th>
<th>Highest Decile Reached</th>
<th>Mean increase in per capita consumption among recipients (%)</th>
<th>Total Cost (USD)</th>
<th>Total Cost as Percent of Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Malawi</strong> (budget: $12.1 million)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>labor-constrained HHs</td>
<td>3</td>
<td>41.2</td>
<td>11,524,837</td>
<td>95</td>
</tr>
<tr>
<td>HHs w/elderly or disabled</td>
<td>2</td>
<td>34.9</td>
<td>12,084,516</td>
<td>100</td>
</tr>
<tr>
<td>HHs w/children</td>
<td>1</td>
<td>47.7</td>
<td>12,071,317</td>
<td>100</td>
</tr>
<tr>
<td>HHs with orphans</td>
<td>2</td>
<td>40.1</td>
<td>12,084,535</td>
<td>100</td>
</tr>
<tr>
<td>poorest households</td>
<td>1</td>
<td>48.0</td>
<td>12,072,154</td>
<td>100</td>
</tr>
<tr>
<td><strong>Mozambique</strong> (budget: $28.8 million)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>labor-constrained HHs</td>
<td>3</td>
<td>35.7</td>
<td>27,110,732</td>
<td>94</td>
</tr>
<tr>
<td>HHs w/elderly or disabled</td>
<td>2</td>
<td>43.6</td>
<td>28,780,488</td>
<td>100</td>
</tr>
<tr>
<td>HHs w/children</td>
<td>1</td>
<td>58.8</td>
<td>28,699,892</td>
<td>100</td>
</tr>
<tr>
<td>HHs with orphans</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>poorest households</td>
<td>1</td>
<td>60.9</td>
<td>28,788,674</td>
<td>100</td>
</tr>
<tr>
<td><strong>Zambia</strong> (budget: $39.8 million)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>labor-constrained HHs</td>
<td>3</td>
<td>50.0</td>
<td>11,497,877</td>
<td>29</td>
</tr>
<tr>
<td>HHs w/elderly or disabled</td>
<td>3</td>
<td>45.7</td>
<td>29,259,454</td>
<td>73</td>
</tr>
<tr>
<td>HHs w/children</td>
<td>2</td>
<td>66.4</td>
<td>39,806,512</td>
<td>100</td>
</tr>
<tr>
<td>HHs with orphans</td>
<td>3</td>
<td>41.1</td>
<td>22,042,706</td>
<td>55</td>
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<tr>
<td>poorest households</td>
<td>2</td>
<td>74.7</td>
<td>39,836,816</td>
<td>100</td>
</tr>
<tr>
<td><strong>Uganda</strong> (budget $52.8 million)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>labor-constrained HHs</td>
<td>3</td>
<td>38.4</td>
<td>42,038,392</td>
<td>80</td>
</tr>
<tr>
<td>HHs w/elderly or disabled</td>
<td>3</td>
<td>38.6</td>
<td>52,887,784</td>
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<tr>
<td>HHs w/children</td>
<td>1</td>
<td>48.3</td>
<td>52,779,932</td>
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<td>33.8</td>
<td>52,834,124</td>
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<td>poorest households</td>
<td>1</td>
<td>50.4</td>
<td>52,751,096</td>
<td>100</td>
</tr>
</tbody>
</table>

Notes: Results presented are from analysis of the full household sample, using population weights.
Targeting cash transfers to OVC in sub-Saharan Africa

percent), indicating that if a government is willing to expend the specified budget for CT programs more coverage might be reached under alternative targeting schemes, unless the government was willing to distribute transfers to households in the 4th decile of per capita consumption.

Targeting age- and disability-vulnerable households would exhaust the budget in Malawi, Mozambique and Uganda but not in Zambia, presumably due to the very different demographic profile of the poor in Zambia. The same is the case for an orphan targeting strategy—in Zambia targeting orphans in the poorest 3 deciles would only expend 55 percent of the program budget (0.5 percent of GDP). On the other hand, CT programs that target households with children would both exhaust the budget and reach poorer households on average. Recipients under child-centered targeting would both exhaust the budget and reach only individuals living in the lowest decile of consumption in Malawi, Mozambique and Uganda; in Zambia, a small proportion of individuals in the second consumption decile would be reached as well (results not shown).

In all four countries, the proportional gain in per capita consumption is higher for strategies that target children explicitly, as compared to strategies that target labor-constrained, age- and disability-vulnerable or orphan households. In Malawi the range of proportional increase in per capita consumption across targeting strategies is 35-48 percent, in Mozambique 36-61 percent, in Uganda 34-50 percent and in Zambia 50-75 percent. In all cases, the greatest proportional increase in per capita consumption is obtained through a strategy that explicitly targets the poorest households, and these results are almost identical to a strategy that explicitly targets children. On the other hand, explicitly targeting orphans results to the lowest gain in per capita consumption among recipients in Uganda and Zambia, while in Malawi the gain among orphan households is the same as the gain among labor constraints households.
4.2 Coverage

Counts of recipients by type, presented in Table 3, demonstrate that strategies which explicitly target households with children tend to reach more individuals and more children than other targeting strategies. Targeting of labor-constrained households reaches the fewest households and the fewest individuals, not surprising since such households tend to focus benefits on elderly households. In Malawi, all programs tend to reach the same number of households, but a child or strict poverty focused program reaches more individuals and children.

Strategies that target households with age-vulnerable or disabled adults reach nearly as many individuals as strategies that target children in Malawi and Mozambique, but do not reach children or the ultra-poor with similar efficiency. For example, in Mozambique the age-targeted scheme actually reaches more households (148,828) than the child targeted one (149,409), but reaches only 637,255 children versus 1,009,127 in the latter.
<table>
<thead>
<tr>
<th>Country</th>
<th>Ultra-Poor Children as % of total</th>
<th>Ultra-Poor Orphans as % of total</th>
<th>Children</th>
<th>Orphans as % of total</th>
<th>Orphans as % of total</th>
<th>Notes: HH Size is household size. Numbers of recipients are calculated from the full household sample, using population weights. Orphans cannot be identified from the Mozambique IAF.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malawi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HH Size is household size. Numbers of recipients are calculated from the full household sample, using population weights. Orphans cannot be identified from the Mozambique IAF.</td>
</tr>
<tr>
<td>labor-constrained HHs</td>
<td>0.6224 5.08 314,014 118,652 205,883 58,617 65.6 18.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHs with elderly or disabled</td>
<td>0.63,482 6.71 421,404 235,716 226,615 39,579 53.8 9.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHs with children</td>
<td>0.63,235 7.03 440,313 440,313 286,279 50,586 65.0 11.5</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>HHs with orphans</td>
<td>0.63,450 6.84 425,749 342,052 276,720 152,861 65.0 35.9</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>poorest households</td>
<td>0.63,459 7.01 440,145 440,145 285,455 50,586 65.0 11.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mozambique</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>labor-constrained HHs</td>
<td>1.141,136 6.06 854,144 369,352 503,066 58.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHs with elderly or disabled</td>
<td>1.149,828 6.80 988,668 637,255 530,230 53.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHs with children</td>
<td>1.149,409 6.81 1,009,127 1,009,127 608,562 60.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHs with orphans</td>
<td>1.149,871 6.63 990,553 990,553 588,452 59.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>poorest households</td>
<td>1.149,871 6.63 990,553 990,553 588,452 59.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zambia</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>labor-constrained HHs</td>
<td>0.60,345 6.52 378,588 138,334 170,820 42,757 45.1 11.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHs with elderly or disabled</td>
<td>0.153,564 6.59 993,257 375,408 418,401 112,120 42.1 11.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHs with children</td>
<td>0.208,918 6.76 1,389,992 1,021,885 675,581 111,898 48.6 8.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>HHs with orphans</td>
<td>0.215,688 7.13 816,336 263,042 412,567 241,358</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>poorest households</td>
<td>0.209,077 6.36 1,309,219 1,079,562 602,378 96,526 46.0 7.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uganda</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>labor-constrained HHs</td>
<td>0.173,042 5.26 940,484 352,576 665,192 170,453 70.7 18.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHs with elderly or disabled</td>
<td>0.217,701 5.85 1,271,875 577,616 679,340 175,458 53.4 13.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHs with children</td>
<td>0.217,257 6.64 1,448,851 1,448,851 954,572 150,237 65.9 10.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHs with orphans</td>
<td>0.217,480 6.73 1,472,188 758,934 975,614 536,064</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>poorest households</td>
<td>0.217,138 6.45 1,409,427 1,409,427 913,035 138,812 64.8 9.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Most interesting is the scheme that targets poor households with orphans for it highlights the dilemma faced by governments in an environment where the social protection agenda is driven by vulnerability to HIV and AIDS. Evaluations of pilot CTs have used the proportion of beneficiaries who are OVC or who are orphans as a metric of the benefit conferred on these populations of interest, or on AIDS affected households. Simulations in this study find that this measure is roughly comparable across targeting strategies. In Malawi, children represent 65 percent of recipients under all strategies except one that targets age- or disability-households (54%). A similar pattern is in Mozambique (54-60 percent), Zambia (42-51 percent) and Uganda (53-71 percent). Naturally orphans represent the largest proportion of recipients under the orphan-targeted scheme (36, 30 and 36 percent respectively in Malawi, Zambia and Uganda), with the labor constraints scheme a distant second. While the orphan strategy reaches the most number of orphans, it reaches the fewer children in total relative to the child targeted scheme, and reaches fewer people in the poorest consumption decile as well. Because orphans are not concentrated in the poorest decile, policymakers face a trade-off in the type of vulnerability to focus on: income vulnerability versus orphanhood.

From the perspective of a policy objective to reach the most vulnerable children, more informative than simple counts of recipients is the proportion of children in households in the lowest three consumption deciles that would be reached under alternative targeting strategies. Table 4 shows the proportion of children and orphans that would be reached in each of the three poorest consumption deciles under alternative targeting strategies. These results indicate that a strategy which targets households with children is most efficient at reaching children in the poorest households—the highest proportion of children in the lower deciles of consumption are reached under such a targeting strategy focused on poor households with children. In contrast, an orphan strategy reaches all orphans in the lowest decile, but misses many other children in that decile. For example, such a strategy reaches about 28 percent of the poorest children (those in the bottom decile) in Malawi, Zambia and Uganda, compared to 39, 100 and 53 percent respectively under the child focused strategy. In contrast, the child focused strategy in Zambia also reaches 100 percent of orphans in the poorest decile because, as mentioned earlier, in Zambia there are very few orphans in the poorest decile. In Malawi and Uganda however, this scheme reaches 46 and 50 percent of orphans in the lowest decile respectively.
Figures 2-4 further illustrate the policy trade-off faced by governments in Eastern & Southern Africa as they seek to protect the most vulnerable children through targeted CTs. The last two bars in each cluster show the percent of all children and percent of all orphans reached in all 3 of the bottom deciles in contrast to Table 4 which shows the percent reached in each decile by itself. In general, more children of any kind are reached by either the child or orphan centered scheme in the 3 countries shown (Malawi, Zambia and Uganda), particularly children in the poorest consumption decile. In all 3 countries, the orphan scheme reaches all orphans in the bottom decile, but fewer children in that decile illustrating the potential trade-off in vulnerability targeting. But the trade-off becomes less clear when all children in the bottom 3 deciles are considered. In Malawi for example, if the bottom 3 deciles are taken together, then the ‘coverage’ of the orphan scheme among all children is about the same as the child focused scheme, but the coverage of orphans is significantly higher. The same is the case in Uganda: the coverage among all children in the bottom 3 deciles is the about the same in either scheme, but the coverage of orphans is higher in the orphan focused scheme.

It is only when one focuses on the ultra-poorest children, those in the bottom decile, that the distinction between the two schemes (child focused versus orphan focused) becomes clear. If policy makers give greater weight to this group, and if targeting is possible, then the scheme that favors children over orphans will reach the same more children in the poorest decile and about the same number of orphans in that decile as well, relative to an orphan targeted scheme.

**Figure 2: Percent of children and orphaned reached in Malawi**
4.3 Poverty analysis

Estimates of the three poverty indicators – the poverty headcount ratio (H), the poverty gap ratio (PG), and the squared poverty gap ratio (SPG) – at baseline and that result from simulation of alternative targeting schemes are shown in the upper panel of Table 5. The lower panel lists the percentage improvement – decreases in the ratios – from baseline associated with each targeting strategy. With assistance to OVC as the policy objective, and since vulnerability is identified by the lowest levels of consumption (i.e. general household income poverty), the SPG is the most pertinent indicator of differences between targeting strategies.
Table 5: Absolute value and percentage change in poverty indicators due to alternative cash transfer targeting schemes

<table>
<thead>
<tr>
<th>Targeting Strategy</th>
<th>Malawi</th>
<th></th>
<th>Mozambique</th>
<th></th>
<th>Zambia</th>
<th></th>
<th>Uganda</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H</td>
<td>PG</td>
<td>SPG</td>
<td>H</td>
<td>PG</td>
<td>SPG</td>
<td>H</td>
<td>PG</td>
</tr>
<tr>
<td>baseline</td>
<td>0.524</td>
<td>0.178</td>
<td>0.080</td>
<td>0.541</td>
<td>0.205</td>
<td>0.103</td>
<td>0.701</td>
<td>0.376</td>
</tr>
<tr>
<td>labor-constrained HHs</td>
<td>0.523</td>
<td>0.173</td>
<td>0.076</td>
<td>0.540</td>
<td>0.199</td>
<td>0.097</td>
<td>0.701</td>
<td>0.374</td>
</tr>
<tr>
<td>HHs w/elderly or disabled</td>
<td>0.524</td>
<td>0.173</td>
<td>0.075</td>
<td>0.541</td>
<td>0.198</td>
<td>0.095</td>
<td>0.701</td>
<td>0.371</td>
</tr>
<tr>
<td>HHs w/children</td>
<td>0.524</td>
<td>0.173</td>
<td>0.073</td>
<td>0.541</td>
<td>0.198</td>
<td>0.094</td>
<td>0.701</td>
<td>0.369</td>
</tr>
<tr>
<td>HHs w/orphans</td>
<td>0.524</td>
<td>0.173</td>
<td>0.075</td>
<td>0.541</td>
<td>0.198</td>
<td>0.094</td>
<td>0.701</td>
<td>0.372</td>
</tr>
<tr>
<td>poorest households</td>
<td>0.524</td>
<td>0.173</td>
<td>0.073</td>
<td>0.541</td>
<td>0.198</td>
<td>0.094</td>
<td>0.701</td>
<td>0.369</td>
</tr>
<tr>
<td>Percentage decrease from baseline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>labor-constrained HHs</td>
<td>0.19</td>
<td>2.81</td>
<td>5.00</td>
<td>0.18</td>
<td>2.93</td>
<td>5.83</td>
<td>0.00</td>
<td>0.53</td>
</tr>
<tr>
<td>HHs w/elderly or disabled</td>
<td>0.00</td>
<td>2.81</td>
<td>6.25</td>
<td>0.00</td>
<td>3.41</td>
<td>7.77</td>
<td>0.00</td>
<td>1.33</td>
</tr>
<tr>
<td>HHs w/orphans</td>
<td>0.00</td>
<td>2.81</td>
<td>6.25</td>
<td>0.00</td>
<td>3.41</td>
<td>7.77</td>
<td>0.00</td>
<td>1.33</td>
</tr>
<tr>
<td>HHs w/children</td>
<td>0.00</td>
<td>2.81</td>
<td>8.75</td>
<td>0.00</td>
<td>3.41</td>
<td>8.74</td>
<td>0.00</td>
<td>1.86</td>
</tr>
<tr>
<td>poorest households</td>
<td>0.00</td>
<td>2.81</td>
<td>8.75</td>
<td>0.00</td>
<td>3.41</td>
<td>8.74</td>
<td>0.00</td>
<td>1.86</td>
</tr>
</tbody>
</table>

Notes: Values for Headcount (H), poverty gap (PG) and squared poverty gap (SPG) are obtained from micro-simulations as described in the text. Percentage decreases in the lower panel are computed using values in the upper panel of the table.
In all countries the largest improvements in SPG are achieved by strategies that target households with children or the poorest households. Strategies that target labor-constrained households have the smallest effect. For example, in Mozambique targeting households with children or prioritizing the poorest households is projected to decrease the SPG by nearly nine percent, from 0.103 to 0.094; a strategy that targets labor-constrained households would decrease the SPG by only 5.8 percent. The associated results in Malawi are estimated at 8.75 percent and five percent, respectively. Although the respective proportional differences in SPG in Zambia are smaller in magnitude when each strategy is compared to baseline (4.9 and 1.2 percent), the magnitude of the proportional difference obtained by a strategy that explicitly targets children is four times the magnitude of the proportional decrease that would be obtained through a strategy focused on household labor constraints. The overall percentage changes in SPG are largest in Uganda, but this is purely because of the very low base (0.044) in that country. But even in Uganda, the strategy of targeting households with children improves the SPG by roughly double and triple compared to the strategy that targets age vulnerability or labor-constraints respectively.

Figure 5: Poverty impacts of alternative targeting schemes in Malawi
The performance of a strategy of explicitly targeting orphans varies across countries, though it is never better (in terms of the SPG) than targeting children in general. In Zambia, targeting orphans actually performs worse than targeting age vulnerability in terms of improvements in both the PG and SPG. This further illustrates the targeting dilemma in Eastern & Southern Africa. An orphan driven social protection intervention that distributes cash to households with orphans will not reach the poorest households.

Since the general target group for CTs simulated in this analysis is limited to households within the lowest three consumption deciles and the poverty rate in all countries except Uganda is well above 30 percent, one would expect the poverty headcount ratio not to be affected by implementation of a CT in these three countries. In Malawi and Mozambique, however, the poverty headcount ratio does decrease with strategies that target labor-constrained households, if only by 0.2 percent. The economic profile of beneficiaries shown in Table 2 suggests that in these two countries these targeting strategies confer benefits on households that enable them to rise above the poverty line at the margin even though the target group is limited to the lowest three deciles of the consumption distribution. Several factors appear to be at work.
The program budget is not exhausted by programs that target labor-constrained households, so all eligible households within the target group under that strategy obtain transfers (i.e all households in the bottom three deciles). The difference between the baseline H in Zambia (70%) and the cut-off for eligibility (30%) is substantially higher than in Malawi and Mozambique; this contributes to the differences in SPG between Malawi and Mozambique, on the one hand, and Zambia on the other. The relatively low baseline SPG in Malawi and Mozambique suggests that eligible households in the target group in these countries are much nearer the poverty line relative to those in Zambia; the relatively low baseline SPG in Uganda is due to that country’s much lower overall poverty rate. In summary, the size of the transfer though small is sufficient to push certain households in the third consumption decile above the poverty line under certain targeting schemes in Malawi, Mozambique and Uganda, but not in Zambia.

4.4 Schooling analysis

The association between school enrollment and household per capita consumption was estimated using a reduced form probit regression and samples of children aged 6-17 who live in households in the lowest three deciles of the consumption distribution. These results are presented in Table 6. The results indicate the estimation models perform generally as expected, with some exceptions. Coefficient estimates on the log of per capita consumption are statistically significant for Malawi, Mozambique and Uganda but not Zambia; the magnitude of the estimates range from 0.67 (Uganda) to 0.17 for Mozambique.
Table 6: Coefficient and standard error estimates from probit models of enrollment for children aged 6-17 in households in the lowest three deciles of the consumption distribution, by country

<table>
<thead>
<tr>
<th></th>
<th>Malawi</th>
<th>Mozambique</th>
<th>Zambia</th>
<th>Uganda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log(per capita consumption)</td>
<td>0.417</td>
<td>0.168</td>
<td>0.037</td>
<td>0.569</td>
</tr>
<tr>
<td></td>
<td>(0.105)</td>
<td>(0.075)</td>
<td>(0.027)</td>
<td>(0.148)</td>
</tr>
<tr>
<td>Age 6-14, spline</td>
<td>0.133</td>
<td>0.131</td>
<td>0.213</td>
<td>0.135</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.010)</td>
<td>(0.007)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Age 15-17, spline</td>
<td>-0.34</td>
<td>-0.29</td>
<td>-0.231</td>
<td>-0.48</td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
<td>(0.021)</td>
<td>(0.014)</td>
<td>(0.036)</td>
</tr>
<tr>
<td>Female</td>
<td>0.017</td>
<td>-0.134</td>
<td>0.024</td>
<td>-0.018</td>
</tr>
<tr>
<td></td>
<td>(0.041)</td>
<td>(0.041)</td>
<td>(0.025)</td>
<td>(0.045)</td>
</tr>
<tr>
<td>Maternal orphan</td>
<td>-0.227</td>
<td>0.08</td>
<td>0.08</td>
<td>-0.034</td>
</tr>
<tr>
<td></td>
<td>(0.101)</td>
<td>(0.102)</td>
<td>(0.134)</td>
<td></td>
</tr>
<tr>
<td>Paternal orphan</td>
<td>0.006</td>
<td>0.174</td>
<td>-0.107</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.068)</td>
<td>(0.053)</td>
<td>(0.084)</td>
<td></td>
</tr>
<tr>
<td>Double orphan</td>
<td>-0.055</td>
<td>-0.043</td>
<td>-2.901</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.093)</td>
<td>(0.087)</td>
<td>(0.177)</td>
<td></td>
</tr>
<tr>
<td>HH head completed primary</td>
<td>0.548</td>
<td>0.247</td>
<td>0.186</td>
<td>0.168</td>
</tr>
<tr>
<td></td>
<td>(0.092)</td>
<td>(0.069)</td>
<td>(0.044)</td>
<td>(0.075)</td>
</tr>
<tr>
<td>HH head completed secondary</td>
<td>1.052</td>
<td>0.208</td>
<td>0.45</td>
<td>0.208</td>
</tr>
<tr>
<td></td>
<td>(0.499)</td>
<td>(0.108)</td>
<td>(0.066)</td>
<td>(0.127)</td>
</tr>
<tr>
<td>Log(household size)</td>
<td>0.291</td>
<td>0.085</td>
<td>0.364</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>(0.090)</td>
<td>(0.069)</td>
<td>(0.050)</td>
<td>(0.076)</td>
</tr>
<tr>
<td>urban</td>
<td>0.336</td>
<td>0.129</td>
<td>0.14</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(0.146)</td>
<td>(0.090)</td>
<td>(0.049)</td>
<td>(0.088)</td>
</tr>
<tr>
<td>Observations</td>
<td>5,804</td>
<td>4,734</td>
<td>10,391</td>
<td>4,542</td>
</tr>
</tbody>
</table>

Notes: Coefficient estimates in bold are statistically significant at 0.05. Robust standard error estimates are presented in parentheses. Estimates on time to travel to school (available from author) are omitted from the table.

In all study countries, the probability of enrollment increases with age among primary-school aged children, likely due to delays in starting school. In contrast, the probability of enrollment decreases with age among secondary-school aged children, possibly due to increased probabilities of dropping out as perceived returns to education may decrease with grade and the opportunity costs of school attendance increase with age, as well as structural constraints such as the fewer places in secondary schools. Estimates on distance-to-school variables, not reported in Table 6, were negative in all models, but statistically significant for Mozambique and Uganda. A gender gap for education is observed only in Mozambique, where girls are less likely to be enrolled in school than boys. Maternal orphans are less likely to be enrolled in Malawi; paternal orphans in Zambia. Orphan status could not be determined for the Mozambique sample. Children in households headed by individuals with more education are more likely to be enrolled in school than those living in households in which heads have not completed primary school. Household size tends to be positively
associated with the probability of enrollment, perhaps because larger households offer greater availability of substitutes for the child’s input to household production. Children in urban households are more likely to be enrolled in school, perhaps again because the opportunity cost of children’s school attendance to other household production is lower in urban areas than in rural.

Simulations of the impact of CTs on school enrollment are presented in Table 7. Within country, variation in the estimated increase in enrollment is due to differences in targeting strategies. Simulations were conducted using sub-samples defined by children in recipient households. Based on samples from Malawi, the expected increase in school enrollment is 3.5 to 5 percentage points for all children aged 6-17, depending on the targeting strategy. The estimated increase is higher among secondary-school aged children (3.8-5.3 percentage points) than for primary-school aged children (3.4-4.9). For Mozambique, the expected increase is lower by half, indicating an increase of 1.5-2.6 percentage points in enrollment among all children, 1.6-2.6 among primary-school aged children, and 1.5-2.6 among secondary-school aged children. The estimated impacts are largest in Uganda, where they range from 3.9 to 6.1 percentage points in primary and 3.4 to 5.8 points in secondary. These simulated results compare favorably to impact estimates on enrollment in conditional cash transfer programs in Mexico (7 point increase at secondary level) and Bangladesh (8 point increase at primary level), as well as the unconditional South African Child Support Grant scheme (7 points) (EPRI, 2008).
Table 7: Predicted probability of school enrollment and change in probability by age, country and targeting scheme

<table>
<thead>
<tr>
<th>Country</th>
<th>Labor-constrained HHs</th>
<th>HHs w/elderly</th>
<th>HHs w/children</th>
<th>HHs w/orphans</th>
<th>Poorest households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malawi</td>
<td>0.757 0.752 0.715</td>
<td>0.761 0.780 0.730</td>
<td>0.683 0.680 0.651</td>
<td>0.765 0.765 0.772</td>
<td>0.777 0.787 0.772</td>
</tr>
<tr>
<td></td>
<td>0.761 0.780 0.730</td>
<td>0.697 0.718 0.728</td>
<td>0.697 0.697 0.697</td>
<td>0.697 0.697 0.697</td>
<td>0.697 0.697 0.697</td>
</tr>
<tr>
<td>Mozambique</td>
<td>0.646 0.606 0.584</td>
<td>0.652 0.628 0.600</td>
<td>0.616 0.550 0.539</td>
<td>0.662 0.625 0.610</td>
<td>0.662 0.625 0.610</td>
</tr>
<tr>
<td></td>
<td>0.662 0.668 0.662</td>
<td>0.631 0.570 0.565</td>
<td>0.631 0.570 0.565</td>
<td>0.631 0.570 0.565</td>
<td>0.631 0.570 0.565</td>
</tr>
<tr>
<td>Zambia</td>
<td>0.645 0.641 0.664</td>
<td>0.619 0.620 0.642</td>
<td>0.719 0.690 0.711</td>
<td>0.649 0.620 0.668</td>
<td>0.649 0.620 0.668</td>
</tr>
<tr>
<td></td>
<td>0.649 0.623 0.649</td>
<td>0.722 0.693 0.714</td>
<td>0.722 0.693 0.714</td>
<td>0.722 0.693 0.714</td>
<td>0.722 0.693 0.714</td>
</tr>
<tr>
<td>Uganda</td>
<td>0.807 0.755 0.758</td>
<td>0.805 0.762 0.769</td>
<td>0.826 0.735 0.729</td>
<td>0.848 0.814 0.813</td>
<td>0.848 0.814 0.813</td>
</tr>
<tr>
<td></td>
<td>0.848 0.847 0.848</td>
<td>0.860 0.792 0.792</td>
<td>0.860 0.792 0.792</td>
<td>0.860 0.792 0.792</td>
<td>0.860 0.792 0.792</td>
</tr>
</tbody>
</table>

The change in column (7) is the difference between columns (4) and (1); the change in column (8) is the difference between columns (5) and (2); the change in column (9) is the difference between columns (6) and (3).
In all countries, comparison of the estimated impact across targeting strategies indicates that targeting households with children or the poorest households produces greater impact on school enrollment than other targeting strategies. Targeting the poorest households regardless of household structure yields the highest increases among the recipient population; targeting households with children is a close second-best. In Mozambique and Uganda either of these two targeting strategies is estimated to produce increases in enrollment approximately one-third greater than strategies that target labor-constrained or age- or disability-vulnerable households. In Malawi, targeting households with children or the poorest households would yield enrollment increases about one-fifth greater than a strategy that targets labor-constrained households and over a fourth greater than a strategy targeting age- or disability-vulnerable households. This of course is because the labor-constrained targeting scheme reaches fewer children than the other ones.

What is noteworthy in Table 7 is that the orphan targeted scheme yields lower improvements in school enrollment compared to either the child focused or pure poverty focused scheme. This is for two reasons. First, the pure poverty focused scheme captures more of the poorest children due to the demographic composition of the ultra-poor, and it is precisely among this group that economic constraints are most binding. The flip side to this is that the orphan scheme reaches more orphans but in relatively better off households, where actual school attendance rates are higher, leading a lower potential for impact.
5. Conclusions and policy implications

This analysis investigates the extent to which different targeting schemes currently under trial in ESA would reach OVC if they went to scale. The pilot studies in question employ different targeting strategies. Programs in Malawi and Zambia target labor-constrained households. In Mozambique, the CT targets age- or disability-vulnerable households. A third strategy places special emphasis on the presence of children in the household, similar to the pilot program in Kenya though Kenyan data were unavailable for the analysis and a fourth strategy in place in Botswana is to target families with orphans. Finally, a strategy that targets households based purely on consumption rankings was included for comparison. All of these programs include an aim to provide resources to the “poorest of the poor” except for Botswana where the program is not poverty targeted. Small scale research on several pilots have evaluated well and some of these evaluations document that a substantial proportion of recipients are AIDS affected. The primary question is whether this would be true in the national context, or whether evaluation results are a function of the selection of the location for the pilot programs; there may also be demographic differences across countries which imply that results from one area cannot be generalized to another.

This paper finds that the proportion of recipients who are orphans is fairly consistent across targeting strategies that do not explicitly target orphans, though a strategy that targets age- or disability-vulnerable households is slightly less effective in this regard. Orphan targeted schemes implemented according to the parameters set out in this paper would have about a third of all recipients (i.e all recipient household members) as orphans.

However a key question that arises in this analysis is whether the proportion of recipients who are orphans is a sufficient metric to assess the efficiency with which any particular targeting strategy reaches orphans. The results suggest that this is not the case: substantial variation exists across targeting strategies in the economic profiles, counts and the proportion of ultra-poor orphans that are reached by CTs, as well as the projected impact on enrollment rates among program participants. The economic profile of recipient households indicates that targeting households with children in the poorest households concentrates resources in the lowest consumption deciles, while the benefits of other strategies are more diffuse, reaching households in higher consumption deciles and not always making full use of the available budget. On the other hand, an orphan focused strategy reaches the most number of orphans, but includes households into the third consumption decile while
excluding many of the poorest children. This highlights the key dilemma faced by policy makers in a context where social protection is driven by the HIV and AIDS mitigation agenda. There is a trade-off between pure poverty targeting, or targeting poor households with children, and targeting households with orphans. This trade-off is particularly important when we focus on the ultra-poorest households, those in the bottom consumption decile.

*We maintain that from the perspective of AIDS mitigation and vulnerability due to extreme poverty, the most relevant indicator of targeting efficiency is the coverage of orphans and children in the lowest consumption decile; on this score the most efficient scheme is one that targets poor households with children. In all countries, such a scheme reaches the most number of children in the poorest decile and covers about 50 percent of orphans in the poorest deciles.* The win-win of targeting poor households with children is best exemplified in Zambia, where the proposed strategy of targeting poor households with children reaches 100 percent of all children and 100 percent of orphans in the bottom consumption decile.

*Results of the enrollment simulations clearly show that targeting households with children or the poorest households achieve higher increases in enrollment in all of the study countries than strategies that target labor-constrained or age- or disability-vulnerable or orphan households.* That the highest proportional increases in school enrollment are projected under a poverty-based targeting strategy is consistent with the notion that household budgets are binding constraints on children’s enrollment; also at work here is the fact that the poorest households nearly always contain school-aged children.

There is substantial variation in the projected enrollment effects of CTs, from roughly six percentage points in Uganda to less than one in Zambia. Since the only variable that changes in the simulations is consumption, these differences is due to differences in the income-elasticity of demand for education across countries. Heads of households in the Zambian sample exhibit higher education on average than in the Ugandan sample. If individuals with more education value education more highly then it is reasonable to assume that their income-elasticity of demand for education is lower, thus yielding a lower response to increases in income. Income-elasticity of demand for education may also be higher when the cost of education is higher. *It is telling however that despite universal free primary schooling in countries like Malawi and Uganda, income constraints due to either out-of-pocket or opportunity costs still remain a barrier to access, highlighting the need for complementary demand side interventions such as CTs to enable the remaining 20 percent of children to attend school.*
In summary, explicit targeting of households with children is projected to reach higher proportions of children in the lowest consumption deciles, which implies greater targeting efficiency under a set of policy objectives that places emphasize on the welfare of vulnerable children where vulnerability is assumed to be strongly correlated with extreme poverty. Such a strategy also would reach larger numbers of orphans, yield higher proportional increases in per capita consumption, and produce larger increases in school enrollment than strategies that target labor-constrained, age- or disability-vulnerable or orphan households. A strategy that targets the poorest households regardless of household structure performs slightly better in terms of increases in per capita consumption and enrollment, but does not reach as many OVC as targeting households with children.

The main policy implication of this work is that, while the numbers of participating children may be reasonably comparable between certain targeting strategies, the distribution of benefits under a child-centered targeting strategy clearly favors the poorest of the poor and also reaches the poorest orphans. To the extent that vulnerability is directly correlated with extreme poverty, CTs that target ultra poor households with children will have the greatest impact on OVC in the region.
6. References


### Annex 1. Description of 4 Cash Transfer Demonstrations in ESA

<table>
<thead>
<tr>
<th>Program</th>
<th>Mozambique</th>
<th>Kenya</th>
<th>Zambia</th>
<th>Malawi</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Source of Funding</strong></td>
<td>Government</td>
<td>UNICEF, DFID and Government</td>
<td>Government and GTZ</td>
<td>UNICEF and Government</td>
</tr>
<tr>
<td><strong>Executing Agencies</strong></td>
<td>The National Institute for Social Action (INAS) under the Ministry of Women and Social Action.</td>
<td>Ministry of Home Affairs and the National AIDS Control Council</td>
<td>Ministry of Community Development and Social Services</td>
<td>Department of Poverty and Disaster Management Affair, implemented by Mchinji District Assembly.</td>
</tr>
<tr>
<td><strong>Objective</strong></td>
<td>Support entitlements to food by raising the household income</td>
<td>Provide households caring for orphans with financial support.</td>
<td>Reduce extreme poverty, hunger and starvation in the most destitute and incapacitated (non-viable) 10% of households in the region</td>
<td>Empower the poor to contribute to social and economic growth</td>
</tr>
<tr>
<td><strong>Target Group</strong></td>
<td>Eligibility determined by age, means testing (monthly income below USD 30) and health status (disability, chronically sick)</td>
<td>Households caring for OVC.</td>
<td>Elderly-headed households that care for orphans and other vulnerable children (OVC)</td>
<td>Ultra poor and work constrained households</td>
</tr>
<tr>
<td><strong>Geographic distribution</strong></td>
<td>Urban and peri-urban areas with planned expansion to rural areas</td>
<td>17 districts chosen on the background of the highest prevalence OVC</td>
<td>Pilot limited to in the Kalomo District</td>
<td>Pilot initiated in the Mchinji District and expanding to 5 other districts in 2008.</td>
</tr>
<tr>
<td><strong>Number of people reached</strong></td>
<td>75,000</td>
<td>12,500 OVC</td>
<td>3,500 households</td>
<td>4200 households</td>
</tr>
<tr>
<td><strong>Value of Transfer (USD)</strong></td>
<td>USD 4 per month for one person households to a maximum of USD 12 per month for 5+ households</td>
<td>Ksh 1,500 per family per month.</td>
<td>USD 10 per month for households without children; USD 12 for households with children</td>
<td>1 person hh 4 USD, 2 person hh 7 USD, 3 person hh 10 USD, 4+ person hh 13 USD</td>
</tr>
</tbody>
</table>

Source: UNICEF-ESARO (2008)
For more information, please contact:

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