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A cost-benefit framework for evaluating conditional cash-transfer programs

Abstract: Following the prototype of Mexico's *Progresa* program, a number of countries in Latin America and the Caribbean have initiated conditional cash transfer (CCT) programs. More recently, countries in Sub-Saharan Africa (SSA) have followed suit. However, no comprehensive framework to carry out a cost-benefit analysis (CBA) exists. This paper presents such a CBA framework for CCTs which enables design features such as targeting and conditionality to be separately evaluated. The framework is applied to an evaluation of a CCT program for orphans and vulnerable children in Kenya. The role of conditionality in SSA and the need for distribution weights is discussed.

Keywords: CBA conditional cash transfers; distributional weights; Kenya; OVC.

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1 Introduction

Using Mexico's *Progresa* program as a proto-type (now called *Oportunidades*), which has reduced the private economic costs of attending school by 50–70% and benefits over 4 million poor families, a number of countries in Latin America and the Caribbean have initiated conditional cash transfer (CCT) programs as anti-poverty interventions – see Brazil (Bolsa Alimentao/Bolsa Familia), Columbia (Familias en Acción), Ecuador (Bono de Desarrollo Humano), Honduras (PRAF), Jamaica (PATH) and Nicaragua (RPS).[1] More recently, countries in Sub-Saharan Africa (SSA) have followed suit, though often focusing on additional goals than reducing poverty, such as combating HIV/AIDS, see Baird, Chirwa, McIntosh and

1 For analyses of these programs see: for Mexico, Schultz (2004); for Brazil, Bourguignon, Ferreira and Leite (2003); for Columbia, Attanasio, Gomez, Murgueitio, Heredia and Vera-Hernandez (2004); for Ecuador, Schady and Arajuo (2008); for Honduras, Morris, Flores, Olinto and Medina (2004); for Jamaica, Rawlings and Rubio (2005); and for Nicaragua, Maluccio and Flores (2004).

Özler (2010) and Kohler and Thornton (2011) for Malawi, Akresh, de Walque and Kazianga (2012) for Burkina Faso and World Bank (2010) for Tanzania.[2] In 2005, there were at least 15 countries in Sub-Saharan Africa with education cash transfers.[3] The CCT momentum is so strong that CCTs have been tried also in developed countries, with the Family Rewards CCT program in New York City being the first of the kind, though as Riccio et al. (2010) point out, income support in the US (*via* TANF, EITC, UI and Food Stamps) have long been conditional on work efforts in various ways.

The basic idea behind a CCT is that of conditionality; one will only receive assistance (the cash subsidy) if one carries out some behavioral change that the policy maker wants to achieve. In the case of *Progresa* and the many similar programs, the main behavioral change required was for the parent to ensure that their children attended school, though often a health care component was also added (like requiring that the children have a medical check-up). By attending school the future earnings of the children would likely be enhanced and in this way the parent's poverty would not be inherited by their offspring; the cycle of poverty would be broken. At the same time, the cash assistance itself would have an impact on the current poverty level of the parents and thus the CCT program would entail a two pronged attack on poverty.

The conditionality component of a CCT comes at a cost. Someone must follow-up to ensure that the children of the cash recipients do indeed attend school (an 85% attendance record is required for *Progresa*). CCT programs therefore require larger administrative costs than the standard (unconditional) cash transfer program that just makes arrangement to dispense cash. Apart from conditionality, CCT programs also deal with the issue of targeting. Any type of governmental assistance has the possibility that persons other than the ones that are thought most needy receive the assistance. To ensure that only the targeted receive assistance further administrative costs have to be incurred. This means that CCT programs are in fact a package of interventions that could in principle be compartmentalized and considered separately, each with a separate administrative cost. The package involves providing cash, imposing conditions and undertaking targeting.

Most of the literature on CCT programs has investigated the impact of just one particular ingredient in these CCT programs. A simple way to see this is to consider the cost-effectiveness analysis (CEA) framework recently suggested by I. Dhaliwal et al. (unpublished manuscript). This looks at the cost per additional year of education. This ignores the fact that education has different types of

2 For CBA evaluation of non-CCT interventions for HIV/AIDS see Brent (2010a).

3 See Kakwani, Soares and Son (2005).

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benefits (the cash transfers reduce poverty both in the short- and the long-run) and there are income distributional considerations that need to be incorporated into the evaluation. Only a CBA can determine whether a project is worthwhile or not. A CEA can just indicate whether one project is more efficient at achieving a given objective than another. In reality both (all) projects could be worthwhile; or neither (none) could be worthwhile.[4] What is missing from the literature is a comprehensive framework to carry out a cost-benefit analysis (CBA) in which all the various ingredients in such programs can be assembled to obtain an overall evaluation.[5] Although many of the CCT studies are called "evaluations," their purview

4 I. Dhaliwal et al. (unpublished manuscript) state at a number places in their paper that they are well aware of the need to use CBA rather than CEA. For example they write: "Even in the case of cash transfers it is not necessarily true that the marginal value of $1 to a poor household is equal to the marginal value of $1 to a wealthier household." So they would seem to want to use unequal distributional weights in their evaluation. Yet they still recommend working within a CEA framework, where such weights play no role. They try to justify their non-use of CBA by pointing out that it is often difficult to value effects in monetary terms, which is true, but not a reason not to carry out a CBA. For some reason they think: (a) there is something wrong if one country values an outcome differently from some other country and so benefits are not standardized across countries, even though there is no reason why individual willingness to pay for outcomes would be the same, and (b) they want the preferences of the evaluator, and even the preferences of the reader of the evaluation, to count in the evaluation, see I. Dhaliwal et al. (unpublished manuscript), when neither of these preferences are usually a part of a social evaluation (where only those parties affected by the project itself are to count). They select CEA because the effect (a year of education) is the same in all education evaluations, and they intend in their paper to standardize the cost accounting, so the cost method would be the same in all countries. This would indeed achieve their purpose of making comparisons of education interventions across countries simple and transparent. But this comes at a great expense as it achieves the proverbial "throwing out of the baby with the bath water." Nearly everything that demonstrates that one project is more socially worthwhile than another is excluded from the evaluation. Moreover the endeavor to just focus on costs per effect in a CEA of a CCT program leads to a host of complications. I. Dhaliwal et al. (unpublished manuscript) devote a lot of space examining whether the cash transfers themselves are costs or not, and so whether they should be included in the CEA calculation. Clearly the cash transfers are costs as someone has to give up resources to pay for the transfers. However, these transfers are also benefits (as our general CBA framework in Section 2 recognizes). Since there is no place for benefits in a CEA evaluation they are excluded in I. Dhaliwal et al.'s (unpublished manuscript) evaluation framework. This biases the results. For example, as we shall highlight in our discussion section, the *Progresa* CCT program gives out transfers that are five times as large as the Kenyan OVC CCT program, so the *Progresa* program will need to show effects that are over five times larger in order to display any cost-effective advantage over the Kenyan program. Another reason why their evaluation outcomes are biased is because they use a 10% discount rate, which is much too high. They use this figure because they base their determination of the social discount rate on the social opportunity cost rate, which is the wrong concept. As explained in Brent (2006, ch. 11), the correct concept is the social time preference rate.

5 The closest to a complete application of CBA to a cash transfer program is Coady's (2000) evaluation of *Progresa*. The analysis is very comprehensive as it includes estimates of almost

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is usually limited to simply seeing whether the programs have been effective or not, which is a necessary, but not sufficient condition for an evaluation to take place.

Such a comprehensive CBA framework is especially necessary to uncover in light of some criticisms of CCTs in the SSA context which suggest that conditionality may not work, see for example, Kakwani et al. (2005) and Schubert and Slater (2006). The purpose of this paper is to provide the missing CBA framework in which it is possible to evaluate whether particular design features of CCTs, such as conditionality and targeting, have in fact been worthwhile. To illustrate the framework, we provide an application to Kenya's Orphans and Vulnerable Children (OVC) CCT program. Section 2 constructs the CBA framework. Section 3 covers the application. Section 4 extends the general framework to allow for externalities. Section 5 discusses two of the general issues involved with carrying out CBAs of CCT transfer programs and Section 6 concludes. The Appendix explains how the estimates of all the ingredients that make up the evaluation of the Kenyan OVC CCT program were obtained.

2 The CBA framework

A. *CBA of an output*: Consider the outcome to be a quantity Q_j, which is a good or service (road, school enrollment, dam). In the HIV/AIDS context j is going to be a condom, VCT, ARV, female education, MC or, in the next section, a cash transfer. For simplicity we consider just two goods, good 1 and the next best alternative good 2 (j=1, 2). The quantity Q_j generates benefits $B_j(Q_j)$ and costs $C_j(Q_j)$. Costs are from the outset expressed in monetary terms. For the benefits, quantities are converted to monetary terms by applying a price per unit of quantity P_j, i.e.,

every ingredient of a CCT CBA including the size of the cash transfers, private costs, administrative costs, distributional weights and education rates of returns, and all of this is broken down according to targeting and conditionality so different CCT designs can be separately evaluated. The only problem with the study is that it shies away from doing a CBA at the very final stage and reverts back to doing a CEA. Coady suggests that a CBA would not be likely to give a different evaluation result as to the relative desirability of secondary school cash transfers over primary school cash transfers than is obtained from a CEA. But this can only be known for sure by applying the full general CBA framework presented in this paper. Multiplying the cost-effectiveness ratio by the value of the education effect (the net present value of the extra stream of income that comes from the additional year of education) to incorporate the benefits of education is an insufficient adjustment to covert a CEA into a CBA, see Coady (2000, p. 72), as it ignores the cash transfers as benefits and does not allow for distributional weighting, see our equation (8).

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$B_j = \int P_j(Q_j)\, dQ_j$. We will assume that benefits go to the poor and attract a weight a_P and the costs go to the non-poor with a weight a_{NP}. In a social evaluation $a_P > a_{NP}$. Net benefits N_j in a social evaluation are the difference between weighted benefits and weighted costs. Social Welfare W is the difference between the two net-benefits and this needs to be positive to signify a socially worthwhile project:

$$W = N_1 - N_2 > 0, \tag{1}$$

where $$N_1 = a_P B_1 - a_{NP} C_1$$

and $$N_2 = a_P B_2 - a_{NP} C_2.$$

The basic CBA criterion is therefore,

$$W = [a_P B_1 - a_{NP} C_1] - [a_P B_2 - a_{NP} C_2] > 0. \tag{2}$$

Assumption A1: *When there is no explicit budget constraint and projects are independent, the next best alternative is to do nothing and* $N_2 = 0$,

$$W = a_P B_1 - a_{NP} C_1 > 0. \tag{3}$$

Assumption A2: *The traditional efficiency-only CBA criterion adopts equal, unity weights*. With $a_P = a_{NP} = 1$ in the basic criterion,

$$W = [B_1 - C_1] - [B_2 - C_2] > 0. \tag{4}$$

A special case of (4) is the cost-minimization framework.

Assumption A3: *If benefits are identical for each intervention,* $B_1 = B_2$,

$$W = C_2 - C_1 > 0. \tag{5}$$

The alternative with the lower cost is the most worthwhile.

B. *CBA of a conditional cash transfer*: We will throughout this section focus solely on the case where there is a single intervention, where (3) is the criterion, except that we can now drop the subscript 1 notation. To accommodate the context in which cash transfers usually take place, we will express all CBA variables in per recipient (household) terms. Lower case letters will be used, with b per recipient benefits and c per recipient costs. The starting point is this version of equation (3):

$$w = a_P b - a_{NP} c > 0. \tag{6}$$

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Based on Mexico's *Progresa*, the essential idea behind a CCT program is that a cash sum t is to be given conditional on the recipient's child (or children) attending school and/or a health clinic. In this paper we will concentrate just on the educational requirement.[6] As we shall see, an important part of a cash-transfer's design is how much of the t goes to the recipient t_P and how goes to the non-poor t_{NP} with $t=t_P+t_{NP}$. The school attendance is regarded as increasing his/her human capital. As such it is intended to provide a long-term gain to the household. The cash itself is a short-run benefit. The part accruing to the poor is to be spent on food and other essential consumption that a household in poverty often cannot afford and has the weight a_P. The part that goes to the non-poor has no special significance and this is why it attracts the non-poor distributional weight a_{NP}. Throughout it is assumed that $a_P>a_{NP}$.

So benefits can be split into two categories, S (short-run) and L (long-run): $b=b^S+b^L$. Since, $b^S=t$ in the context of cash transfers, this means, $b=t_P+t_{NP}+b^L$. We will assume that only the poor will be attracted by the transfer to attend school and experience b^L. On the cost side there is the transfer amount itself t and the administrative costs c^A in distributing the transfers to the recipients and otherwise ensuring that the long-run benefits are achieved (for example, by adding schools if there is no spare capacity). These costs are incurred by the taxpayers (the non-poor). As taxes have an excess burden Φ, the transfer amount and the administrative costs attract a premium entailed in the notion of the marginal cost of public funds MCF, where MCF$=1+\Phi$. Then there are the private costs c^{PR} that arise because the transfer recipients have to comply with the conditionality involved with attending schools (foregone child labor earnings and transport costs). Private costs are incurred by the poor. With these specifications of the benefits and costs and their distributional assignments, (6) becomes:[7]

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6 Considering the health conditionality in a CBA of a CCT does not add any new conceptual issues, for it is the sum of CBA ingredients for the two (health and education) combined that is to determine the desirability of the CCT. Focusing just on the educational component simplifies the exposition of this paper considerably. For methods to carry out CBAs of health expenditures see Brent (2003). Note that in the New York City CCT program analyzed by Riccio et al. (2010) there were as many as 22 different conditional incentives in the original version, including for the first time conditions related to the parents' employment behavior.

7 In this criterion, the government cost of financing the program (the sum of the transfers and the administrative costs) has the weight a_{NP}. In this formulation we identify the general taxpayer as being the same as the non-poor group. Now it is true that the poor may pay some taxes and thus contribute to the government's costs. But the non-poor generally pay the greater share. Moreover this is just a scaling issue. The weight given to the taxpayer, even though the taxes may consist of contributions by the poor as well as the non-poor, is given a weight of 1. This is the weight numeraire. It is the *relative* weight to the poor a_p that affects outcomes and this is generally >1.

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$$w=a_P\,(t_P+b^L)+a_{NP}\,t_{NP}-a_{NP}\,(t+c^A)(1+\Phi)-a_P\,c^{PR}>0. \quad (7)$$

Caldés and Maluccio (2005) and Caldés, Coady and Maluccio (2006) highlight the role of administrative costs in CCT programs. Their central concept was the cost-transfer ratio *ctr* given by c^A/t. When they make comparisons across programs they are basically using the cost-minimization criterion (5) to determine their evaluations. From the outset they recognize the weakness in using this criterion as some programs will generate different outcomes and hence benefits, when they incur varying levels of administrative costs. So we can extend their analysis by dividing every element in (7) by t to obtain:[8]

$$w=a_P\,(\theta+b^L/t)+a_{NP}\,(1-\theta)-a_{NP}\,(1+ctr)(1+\Phi)-a_P\,c^{PR}/t>0, \quad (8)$$

where θ is the share of transfers going to the poor and 1–θ is the share going to the non-poor, which constitutes *leakage*. This is the complete CBA criterion for a CCT program which represents the joint evaluation of the short- and long-term components.[9] This includes both conditionality and targeting. For targeting, one is willing to incur additional administrative costs to ensure that a larger share of the transfers go to the poor. Perfect targeting is the case when there is no leakage of transfers to the non-poor and $\theta=1$. Note that if there is no targeting, one can assume that one of two allocation rules may be thought to apply to CCT recipients:

(i) A CCT recipient could be randomly identified, which implies that the chances of the recipient being poor would be equal to the share of the total population N who are poor N_p, i.e., $\theta=N_p/N$. N_p would be given by the country's poverty headcount. So if 60% of the population is poor outside the program, then 60% of those in the program are likely to be poor if the process is purely random.[10]

8 Dividing w by the transfers will leave the CBA decision unaffected.

9 A reviewer has suggested that equation (8) be augmented by adding $a_{NP}\,b^L$ to the benefits (because the non-poor may be attracted by the transfers to attend school and experience the long-term benefits) and $-a_P c^{PR}/t$ be added to the costs (because the non-poor may incur private costs). Note that these refinements are not likely to be quantitatively significant seeing that (as we shall see in our application) private costs and long-term benefits are likely to be small and the distributional weight to the non-poor is only going to equal 1. So we omitted these refinements from our general criterion. However, readers of this article are free to include these additional terms if they think that these refinements would affect the outcomes of a particular CCT program that they are considering.

10 In SSA there are often more poor persons than non-poor persons. So one should expect with random targeting, $\theta>0.5$. This would then be a reason why targeting may not be so essential in CCT programs in this region.

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(ii) If a CCT recipient was not randomly selected, it is likely that income would determine who is selected for the program, just as it does in the rest of the economy. The share going to the poor in the CCT program would then be equal to the share of national income going to the poor: $\theta=Y_p/Y$, where Y_p is the income of the poor and Y, is national income. When *poor* is being defined as being in the bottom quintile, this would imply θ=0.2. Hence if the poor get 20% of the income outside the program, then the poor can be expected to receive 20% within the program.

Because criterion (8) includes both targeting and conditionality and in order to guide estimation of the ingredients, we can disaggregate the criterion so that the components are made explicit. We give the ingredients subscripts to denote that (8) can be estimated for different project design decisions. Define: 0 as the state where there is no targeting and no conditionality; 1 is the state where there is just targeting and 2 is the state where there is just conditionality. The ingredients of (8) can be decomposed as follows:[11]

$$\theta=\theta_0+\theta_1+\theta_2, \tag{9}$$

$$b^L/t=b_0^L/t+b_1^L/t+b_2^L/t, \tag{10}$$

$$ctr=ctr_0+ctr_1+ctr_2, \tag{11}$$

$$c^{PR}/t=c_0^{PR}/t+c_1^{PR}/t+c_2^{PR}/t. \tag{12}$$

We can now explain how to evaluate differences in CCT program design. We deal with these differences as changes dw.[12] First take the case of targeting without conditionality. There will be no additional long-term benefits and hence no extra private costs in complying with any conditions.

11 Equations (9)–(12) give all the logical possibilities. In practice, not every ingredient would appear in every equation. For example, it can be expected that there will be no c_1^{PR}/t in (12) because there are no private costs with targeting *per se*. Thus in the comparative statics exercise in equation (13) this term does not appear. Similarly, with conditionality on its own the share going to the poor would not be expected to change. So θ_2= 0 and there is no θ term in equation (14).

12 Note that because we have formulated the CBA criterion per unit of transfer, the amount of the transfer is fixed per person. The differential dw does not have a dt term in it. So when we carry out our comparative statics with all the CCT design features below, although it is true that, say, changing conditionality would probably result in fewer recipients taking up the transfers, and so total cash transfers would fall, our criteria per unit of cash transfer would be unchanged. Effectively in our analysis we are changing the design features holding total transfers constant, i.e., dt=0. Therefore t is a parameter in all the expressions (9)–(12).

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Assumption A4: *Assume targeting with no conditionality.* Let $db^L=dc^{PR}=0$. Take the total differential of (8) and write dθ as θ_1 and d*ctr* as ctr_1. This produces:

$$dw=(a_P-a_{NP})\,\theta_1-a_{NP}\,ctr_1\,(1+\Phi)>0. \tag{13}$$

Increasing targeting involves raising θ from θ_0 to θ_1. The CBA requires that the benefits of increasing the share that goes to the poor exceeds the additional MCF adjusted administrative costs involved in the targeting in the form of a higher *ctr*, i.e., ctr_1 instead of ctr_0. Note that in a traditional CBA, where efficiency is the only social objective and equal weights are employed, this sets $a_P=a_{NP}=1$. In this context we have the general result that targeting cannot satisfy (13) and is *never* worthwhile as only costs remain.

To isolate the decision to require conditionality, we assume that existing targeting is fixed, being random or perfect. In either case θ will not change.

Assumption A5: *Assume conditionality with no targeting.* If θ is fixed, it means $d\theta=0$ and $d(1-\theta)=0$. With $d[b^L/t]=b_2^L/t$, $dctr=ctr_2$ and $d[c^{PR}/t]=c_2^{PR}/t$, the total differential of (8) is:

$$dw=a_P\,b_2^L/t-a_{NP}\,ctr_2(1+\Phi)-a_P\,c_2^{PR}/t>0. \tag{14}$$

The conditionality CBA design decision requires that the additional long-term human capital benefits exceed the extra MCF adjusted administrative costs of monitoring compliance with the conditionality and the increased private costs involved.

The remaining case is where there is no targeting and conditionality. No conditionality means $db^L=dc^{PR}=0$ as with Assumption A4. But, because there is no targeting, there will no increased share going to the poor and hence no additional administrative costs to ensure this increased share as in equation (13). This means that θ and *ctr* will be at their baseline (lowest) levels. With $d\theta=\theta_0$ and $dctr=ctr_0$, the total differential of (8) becomes:

$$dw=(a_P-a_{NP})\,\theta_0-a_{NP}\,ctr_0\,(1+\Phi)>0. \tag{15}$$

The CBA takes the same form as (13) and so will also never be positive if equal weights are employed. For a simple CCT program, the distribution gain of the extra income to the beneficiaries as they are randomly allocated must exceed the basic MCF adjusted cash-transfer ratio in handing out the transfers whoever applies.

To summarize: for undertaking decisions regarding a project's design, the CBA criteria specified in equations (13)–(15) are the special cases of criterion (8) when it relates to one of w_0, w_1 or w_2.

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3 CBA application

Strong empirical evidence exists that the *Progresa* cash transfers generated sizable external effects on both ineligible and eligible households, see for example Bobonis and Finn (2009). Most of the ingredients in the CBA frameworks given in Section 2 are project specific. The exceptions will be the distribution weights and the MCF which are set at the country level, which in our application will be Kenya. For distribution weights it is their relative values that determine outcomes. We will normalize by setting a_{NP}=1. For a_P we will use the Squire and van der Tak (1975) formulation. When the inequality aversion parameter is equal to 1, the formula is:

$$a_P=\frac{\overline{\boldsymbol{y}}}{\boldsymbol{yP}}, \tag{16}$$

where $\overline{\boldsymbol{y}}$ is average per capita income and y^P is the income of a person who is designated poor. For the applications we can define poor as being in the lowest quintile of income earners. When quintiles are used there is an easy way of estimating the right-hand side of (16) by knowing the share of national income that accrues to the bottom quintile.[13] The share going to this group is their share relative to the average. Thus, if the lowest quintile get 5%, then a_P=20%/5%=4. For Kenya, 4.7% of income went to the bottom quintile, which fixes a_P at 4.3.

Auriol and Warlters (2012, table 3) developed general equilibrium estimates of the MCF for five taxes (domestic consumption, imported consumption, exports, labor and capital) in 38 African countries. The MCFs on the consumption taxes were higher than for the taxes on the inputs. The average estimate was 1.21. The average MCF for Kenya was close to the overall average at 1.18. We will therefore use Φ=0.18 as the excess burden estimate in our application.

The remaining missing piece of the CBA framework for evaluating cash-transfers is to explain how the long-run educational benefits can be estimated. The education CBA literature almost exclusively evaluates the benefits of schooling in terms of the rate of return r from an additional year of schooling. For an average recipient earning $\overline{\boldsymbol{y}}$, the monetary value of the additional schooling is $\boldsymbol{r}\overline{\boldsymbol{y}}$. Not every beneficiary will newly enroll their child/children in school, especially as most children already go to primary school. Let ε be the percentage of beneficiaries whose enrollments increase by 1 year. The long-run education benefits are thus: $b^L=\varepsilon(\boldsymbol{r}\overline{\boldsymbol{y}})$, from which we can obtain the net benefits per unit of transfer:

$$b^L/t=\varepsilon\boldsymbol{r}(\overline{\boldsymbol{y}}/t). \tag{17}$$

13 This way of applying the Squire and van der Tak formula is explained in Brent (2010b, p. 399).

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3.1 A CBA of the Kenyan OVC cash-transfer programs

The Kenyan program begin in 2004 as a pilot project (phase 1) targeting under 18 year old AIDS orphans (single or double) and vulnerable children (who are sick or at risk due to a chronically sick caregiver) serving 5500 households. By 2008–2009 (phase 4) there were 100,000 households and the full – scale program (2009–2015) which will be funded by the World Bank, UNICEF and the Kenyan government will target 300,000 households (with about 2.68 OVC per household).[14] Our analysis will be per household so will not depend on the precise household numbers involved. The monthly program benefits now are KSh 1500 (about $20). We will use estimates of the CBA ingredients as they are projected to be in the full-scale program. These estimates will be extremely tentative, as the final results of the monitoring exercise are not yet in. The estimates should be used for illustrative purposes only to see what applying our CBA framework to the Kenyan project would look like.

Apart from the fact that high HIV prevalence and not poverty was the main targeting characteristic, what makes the Kenyan project different from the *Progresa*-type CCTs is that there was community based targeting. Prioritized lists were first carried out by program organizers and then sent back to the community for validation to be approved in a public *baraza*. Because many more were eligible than funds available, other criteria were added, the chief one being the age of the head of the household. From the point of view of targeting poor OVC, and not necessarily the poorest of the poor, the targeting process was very successful with 98% of the beneficiaries being OVC.

Conditionality involved school attendance. Most of the time "hard" conditionality, where there would be penalties for non compliance, did not take place. Instead there was "soft" conditionality where attendance at school was strongly recommended. In the full-scale program 50% of the districts were subject to hard conditionality and the rest to the soft form. In our estimates of the administrative costs we use the World Bank's (2009) numbers which include a large share (29%) for conditionality, so it is logical to assume that hard conditionality is relevant for our CBA of the project. Given the strong prior expectation that conditionality will not work in the SSA context, we are going to give the Kenyan project evaluation the benefit of the doubt and assume that, in total, all the ingredients that make up ε will sum to 1, i.e., there will be full compliance. This ensures that the education benefits are at their highest levels. Note that there are other determinants of the long-run educational benefits given in (17) and thus we will be checking whether in a best-case scenario conditionality is worthwhile.

14 See Bryant (2009, table 1).

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Table 1 Estimates of the ingredients in a CBA of cash-transfers for OVC in Kenya.

Share of transfers going to the beneficiaries with targeting and conditionality	Θ	0.98
Share of transfers going to the beneficiaries with no targeting and conditionality	$d\theta=\theta_0$	0.07
Change in share of transfers going to the beneficiaries due to targeting	$d\theta=\theta_1$	0.91
Cash-transfer ratio if targeting and conditionality	ctr	0.40
Cash-transfer ratio if no targeting and conditionality	$dctr=ctr_0$	0.03
Change in cash-transfer ratio if targeting and no conditionality	$dctr=ctr_1$	0.08
Change in cash-transfer ratio if conditionality and no targeting	$dctr=ctr_2$	0.29
Long-run benefits from education with conditionality and targeting	b^L/t	0.072
Long-run benefits from education without targeting and conditionality	$d[b^L/t]=b^L{}_0/t$	0.0058
Change in long-run benefits due to targeting without conditionality	$d[b^L/t]=b^L{}_1/t$	0.0029
Change in long-run benefits due to conditionality without targeting	$d[b^L/t]=b^L{}_2/t$	0.0634
Private costs if targeting and conditionality	c^{PR}/t	0.189
Private costs if no targeting and conditionality	$d[c^{PR}/t]=c^{PR}{}_0/t$	0.05
Change in private costs if conditionality	$d[c^{PR}/t]=c^{PR}{}_2/t$	0.139

There is an important difference in the decision-making context for the equations in B than those in A in Section 2. Criterion (3) is in present value terms, while equation (8) is a recurring annual investment and hence no discounting is required. This difference must be borne in mind when considering the methods used to make the estimation of the project specific ingredients that are presented in Table 1 (the methods and data sources are explained in the Appendix). Also important is the fact that the CBA outcomes are in absolute number terms and these must be applied per dollar of transfer. This means that if the net-benefits are positive, say equal to three, then every $1 transferred has a three-fold social impact, i.e., worth $3.

For evaluating the Kenyan OVC cash-transfer program as it currently exists with targeting and conditionality, equation (8) is the CBA criterion. Using the numbers in Table 1 we obtain a 4.54 value for benefits and a 2.46 value for costs, producing an overall positive result of +2.08. The Kenyan OVC CCT program is highly worthwhile.[15] For decisions about the design of a cash-transfer program, equations (13) for targeting and (14) conditionality are the relevant ones.

15 Not surprisingly, as the main objective of CCT programs is to take recipients out of poverty, if one employed equal, unity weights, the net benefits of the overall Kenyan OVC program given by equation (8) would have been negative (equal to −0.79). The "switching value" (the value that just makes the evaluation negative) for the inequality aversion parameter applied to the overall evaluation is 0.57.

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For targeting, given the size of the difference in distribution weights (4.3–1) and the effectiveness of targeting at 0.91, the benefits of targeting are large at 3.00, far outweighing the MCF adjusted administrative costs of 0.09. A large part (i.e.,+2.91) of the success of the Kenyan program is therefore due to targeting. The targeting share of 0.91 given in Table 1 was based on random targeting as the no targeting alternative. If instead we had assumed income based targeting and we again assume that being poor means being in the bottom quintile, then θ_0 would have been equal to 0.2, which would have made θ_1=0.78 (i.e., 0.98–0.2). This would not have changed our result that targeting was the main reason why the OVC CCT program was worthwhile, as the net benefits from targeting would still have contributed +2.48 to the final outcome.

On the other hand, even with the high distribution weight on the poor and the best-case scenario for enrollments, the long-run education benefits per transfer are very small (at 0.06), making the weighted benefits of conditionality only 0.27. They are easily offset by the MCF adjusted administrative costs of −0.34 and weighted private costs of −0.60, making the impact of conditionality negative at −0.67. Finally, without targeting and conditionality, the net-benefits are small, but positive at +0.19. That is, applying (15) as the criterion produces benefits of 0.23 and costs of 0.04.

4 Extension

Strong empirical evidence exists that the *Progresa* cash transfers generated sizable external effects on both ineligible and eligible households. These external effects were for both health and the education components of CCTs, though we again will be concentrating just on the educational and anti-poverty consumption part.[16] In this section we will analyze how the general framework developed earlier can be extended to allow for various types of externalities (other than leakage effects which our framework already allows for).

We will denote by m the indirect, external effect, which makes the multiplier effect including the direct and indirect effect $1+m$. The issue now is what elements in the general CBA criterion given by equation (8) have to be adjusted and whether these elements need to be altered to the same degree.

We start with Angelucci and De Giorgi's (2009) finding that cash transfers to eligible households indirectly increase the consumption of ineligible households in the same village. This indirect effect works through insurance and credit

16 For a study that finds external health benefits of CCTs see Avitabile (2011).

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markets whereby gifts and loans received by those ineligible increase. In our framework we identify eligible as poor and ineligible as non-poor. The Angelucci and De Giorgi finding therefore means that the share of transfers going to the non-poor $a_{NP}(1–\theta)$ increases by the multiplier effect $1+m$. However, as Angelucci and De Giorgi point out, this increase does not just go to the ineligibles as this is a local economy effect. So the entire local economy is affected and this includes those eligible too. So the share going to the poor $a_P(\theta)$ will also need to be multiplied by $1+m$. By extension, the opportunity cost of going to school can also be thought to rise by the multiplier effect so the private cost component becomes $(a_P\, c^{PR}/t)(1+m)$.

The other cash transfers externality estimated in the literature relates to the education component. Let m_E be the education externality, which makes the education multiplier $1+m_E$. Bubonis and Finan (2009) found that there were large peer effects whereby enrollments of those eligible for cash transfers raised the enrollment raised of the ineligibles. This finding by itself would not seem to affect our general CBA criterion because we argued earlier that enrollment rates of the non-poor were already so high that cash transfer induced increments would be unlikely; only the poor group would acquire the long-term education benefits. Thus there was only a $a_P(b^L/t)$ term and no $a_{NP}(b^L/t)$ counterpart. So there were no non-poor education benefits to multiply.

However, there were education benefits for the poor group in the criterion. This is of relevance for two reasons. Firstly, in the Bubonis and Finan (2009) study, the ineligibles that had the rise in enrollments were in fact actually mainly poor. So the increased indirect enrollments by the ineligibles should really be classed as $a_P(b^L/t)$ and this needs to be multiplied in the criterion. Secondly, Lalive and Cattaneo (2009) estimated that the indirect education relation between those eligible and those ineligible was reciprocal. Not only did those eligible cause those ineligible to enroll in school, but also those ineligible inspired those eligible to increase their schooling. For both of these reasons the multiplied education benefits of the poor become $a_P(b^L/t)(1+m_E)$.

At this stage three of the four elements in criterion (8) would have multipliers attached to them due to the existence of education externalities. But the CCT literature has ignored the fact that it is not just CCT programs that generate expenditure multipliers. Any type of government funded program would also have produced multiplier effects on the local economy. In our analysis we basically dealt with the case of a single intervention, so the alternative to the CCT program was implicitly to do nothing. However, this does not mean that the reality that other government expenditures also having multipliers can be ignored. The CCT programs usually have to be financed out of government taxation. The tax dollars themselves would have had multiplier effects in an

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opportunity cost sense. That is, if the resources had been left in the private sector the private expenditures would have had multiplier effects. In other words, it is not only the benefits that have multipliers; the government costs also have multiplier effects.

In our framework the government costs are in the form of the per unit cash transfers plus the administrative costs $1+ctr$. The social value of these government costs including the MCF is $(1+ctr)(1+\Phi)$. Applying the multiplier to these social values produces a cost term $(1+ctr)(1+\Phi)(1+m)$. Applying multipliers to all four elements in equation (8) transforms the general criterion to take the following form:

$$w=a_P\,(\theta+b^L/t)(1+m_E)+a_{NP}(1-\theta)(1+m)-a_{NP}(1+ctr)\,(1+\Phi)(1+m)-(a_P\,c^{PR}/t)(1+m)>0.$$

If we divide every element in this expression by $1+m$, the macro version of the CBA criterion becomes:[17]

$$w=a_P\,(\theta+b^L/t)\,\mu+a_{NP}(1-\theta)-a_{NP}(1+ctr)\,(1+\Phi)-(a_P\,c^{PR}/t)>0. \tag{18}$$

where $\mu=(1+m_E)/(1+m)$.

The difference then between the general version of the criterion given by equation (8) and the macro version in equation (18) is that the long run education benefits term has to be adjusted by a μ variable that consists of the ratio of two multiplier effects, an education multiplier $1+m_E$ and the usual Keynesian expenditure multiplier $1+m$. Criterion (8) is just the simple case where $\mu=1$ in equation (18).

It is standard in CBA to ignore multiplier effects. The usual assumption is that the economy is at full employment without the project and so real national income will be unaffected by the government expenditure generating the project (other than the direct contribution of the project). Criterion (8) should then be used to evaluate a typical CCT program. However, if a CBA is being undertaken in a developing country, where underemployment is a widespread feature of the economy and if the size of the cash-transfers is large relative to initial incomes, which is true for Mexico's *Progresa*, but not the case for Kenya's OVC CCT program (see the Discussion Section below) then the macro CBA criterion would be more relevant. But note the refinement captured by the μ variable in criterion (18). To employ the general criterion (8), the evaluator does not have to assume that all indirect effects in multipliers are zero as is standard practice in CBA. In order for $\mu=1$ in equation (18), so

17 Again, dividing w by $1+m$ makes no difference to the CBA criterion seeing that if $w>0$ then $w/(1+m)$ will also be positive irrespective of the size of m (assuming that it is non-negative).

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that criterion (8) applies, it is sufficient that $m_E=m$. It is not necessary that both $m_E=0$ and $m=0$.

5 Discussion

There are two main general issues that are raised by our construction of the CBA framework for CCTs and its application to OVCs in Kenya. The first involves the role for conditionality in the SSA context and the second concerns the need to use distribution weights in CBA to evaluate CCTs.

5.1 The role for conditionality with CCTs in a SSA context

We saw that to evaluate a CCT, four interrelated decisions need to be made. The CCT could be evaluated with and without targeting and with and without conditionality. To what extent would conditionality be an important design feature for CCTs in SSA? To help answer this question we fill focus on one component of the long-term benefits part of the conditionality criterion (14) as it was specified by equation (17). To derive some perspective, we will contrast the results for Kenya's OVC CCT program with what would be obtained by estimating the conditionality benefits for Mexico's *Progresa* Program.

In our CBA framework the expression for weighted education benefits is $a_P b^L{}_2/t$ and this is to be estimated by the formula: $a_P \varepsilon_2 \boldsymbol{r}(\overline{\boldsymbol{y}}/t)$. In principle, there is no reason why a_P, ε_2 or r would be any lower in SSA than in any other developing county with large inequality. However, what is likely to be different in SSA is the size of average income relative to the size of the transfers $\overline{\boldsymbol{y}}/t$. As explained in the Appendix, for the Kenya OV CCT program the transfers were about the same size as average income, which sets $\overline{\boldsymbol{y}}/t=1$. Thus $\boldsymbol{r}(\overline{\boldsymbol{y}}/t)$ just reduces to r. In a developing country that does not have average income levels as low as in SSA, $\overline{\boldsymbol{y}}/t$ would likely be much higher than 1. So the returns from education would be multiplied by a larger amount. For example, in Mexico's *Progresa*, average transfers were at $255 over 10 times the size of those in Kenya.[18] But this sum was still only equivalent to 22% of monthly income. So $(\overline{\boldsymbol{y}}/t)=1/(t/\overline{\boldsymbol{y}})=1/0.22=4.55$. The r would be multiplied by 4.55 and not just 1 as in Kenya.

18 See Coady and Parker (2004).

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5.2 The need to use distribution weights in CBA to evaluate CCTs

It is fair to say that the use of distributional weights in CBA is controversial.[19] Although there is no choice but to use distribution weights, there is no real agreement as to what set of weights to use, other than the traditional, yet predominant view, that equal unity weights be employed. This is not the place to go through all the arguments pro and con for any particular set of weights as this is covered extensively in the CBA literature.[20] What is new in the CCT context is that if one wants to adopt equal weights then one cannot really evaluate a cash-transfer program in the sense that a CBA will always find most of the design features of such programs to be contributing negatively to social welfare, as we now explain.

In the context of equal weights, the strength of cash-transfer programs from a CBA methodological perspective becomes its weakness. For physical outputs, which is the predominate type of program with which CBA is concerned, there is the thorny issue of how to put a monetary value on the outcome. This measurement problem does not arise with cash transfers as the monetary value of a dollar transferred is equal to $1 when the weight is unity. On the other hand, the cost of $1 transferred is also going to be $1 with equal weights. So at best the cash transfer is going to break even. But in addition there will be administrative costs involved (and private costs and tax excess burdens) that will always be positive, which will render the social value of the cash transfers negative. This is what is demonstrated in equations (13), which applies CBA to targeting and (15), which applies CBA to a simple cash-transfer program where there is no targeting and no conditionality.

The only design feature of a cash-transfer program that is not necessarily going to be prejudged to be adverse with equal weights is one where conditionality is involved. Conditionality leads to long-term education benefits that are going to be added to the short-term cash benefits. Of course, this puts a lot of pressure on the long-term benefits to be strongly positive. If, as we found in our application of the CBA framework to Kenya's OVC CCT program, that the education benefits are not going to be large, then it is hard to see how with equal weights any CCT education program in SSA will be found by a CBA to be socially worthwhile.

19 For studies that have used non-unity distribution weights in the context of evaluating cash-transfers and have also employed the weighting formula specified in equation (15), and its variants, see Coady and Skoufias (2004) and Skoufias and Coady (2007).

20 For an early survey of schools on distribution weights, see Brent (1984). For further discussion and applications, see Brent (1998) and Brent (2006). For applications to health care evaluations, see Brent (2003) where distribution weights are examined in the context of CEA as well as for CBA. The most recent survey is in Brent (2010c).

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6 Conclusion

The main contribution of this paper is to provide a comprehensive CBA framework in which to piece together the diverse set of ingredients that make up the evaluation of a CCT program. We have shown that CBAs of CCTs are four evaluations in one: with and without targeting and with and without conditionality. Since no comprehensive CBA criterion to evaluate a CCT exists in the literature, we should not be surprised that there are no comprehensive evaluations of CCT programs available. To illustrate the CBA framework, we applied it to an evaluation of the Kenyan OVT program. The weakness of this application is going to be that, in the absence of a comprehensive evaluation available in the literature, the data for the variables had to come from a number of disparate sources. As can be seen in the Appendix, a number of heroic assumptions had to be made, without any guarantee that the numbers precisely correspond to the theoretical construct. The expectation is that with a comprehensive CBA evaluation framework for CCTs now outlined, a consistent and systematic CBA will be forthcoming in the literature.

Nonetheless, our application of the general CBA framework to Kenya's OVC CCT program did reach some interesting conclusions. The program overall was highly worthwhile. Targeting contributed strongly to this outcome, while conditionality even in a best case scenario was not helpful. The targeting result may not have external validity for other CCT programs in SSA because targeting may not be as effective. But, conditionality is highly unlikely to be worthwhile in SSA. This is because of the fact that, following equation (17), the main ingredients of the benefits are going to be $\varepsilon \boldsymbol{r}$, the product of two small fractions. Given that many SSA countries are low income developing countries, there will not be a large income effect $\overline{\boldsymbol{y}}/t$ to generate large benefits from the low $\varepsilon \boldsymbol{r}$.

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Appendix

The figures in Table 1 have been constructed such that they satisfy equations (9)–(12).

Share of the transfers going to the beneficiaries: θ

Hurrell, Ward and Merttens (2008, p. 42), report that 98% of the recipient households identified contained an OVC which makes θ=0.98. Without targeting, we

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will assume that being a recipient is going to be a random process (as explained in the text) as so one can expect that an OVC would be equally likely to receive transfers as any other Kenyan. With a population of 34 million Kenyans and 2.4 million OVC, the share with random targeting would mean θ_0=0.07. With targeting and conditionality the share is 0.98, which makes the difference 0.98–0.07 the share due to targeting, i.e., θ_1=0.91. (Note that in the main CBA framework it is assumed that conditionality will not affect the share going to the poor so θ_2=0, which makes $\theta=\theta_0+\theta_1$ which we have used here.)

Cash transfer ratio per unit of transfer: *ctr/t*

The World Bank (2009, p. 18), gives the administrative costs as a share of transfers to be 40% in the pre-pilot phase and this means *ctr/t*=0.40. The Annex 5, p. 64, lists project costs for the OVC project. The size of the cash benefits for OVC were $36 million, the costs for management information, monitoring and evaluation were $3 million, the costs for strengthening the capacity of the Ministry of Gender to coordinate social protection interventions in Kenya were $10 million and the transactions costs for cash transfers were $1 million. We interpret the latter transactions costs figure to be the transactions costs without targeting and conditionality. As a share of transfers it is 1/36, or ctr_0=0.03. The $3 million figure includes sums explicitly for targeting. Since monitoring and evaluation is basically going to be judged on the basis of its ability to target effectively, all of this total will be treated as the transactions costs for targeting. Its share is 3/36 or ctr_1=0.08. The share due to conditionality is then derived as a residual. If the total share is 0.4 of $36 million, or $14.4 million, and $1 million and $3 million are accounted for by the other categories, this implies that the transactions costs for conditionality are $10.4 million. This basically corresponds to the $10 million figure to be charged for capacity building, which makes sense from the point of view that a major reason why the existing administration needs enhancing would be because monitoring for conditionality is going to be imposed. The share for conditionality is therefore 10.4/36 or ctr_2=0.29.

Long-run education benefits per unit of transfer: b^L/t

Equation (17) determines b^L/t by $\varepsilon \boldsymbol{r}(\overline{\boldsymbol{y}}/t)$. Of these determinants, we will assume that only ε varies by targeting and conditionality. Define ε_1 as the percent newly enrolled without targeting, ε_1 as the percent where there is targeting, and ε_3 is the percentage enrolled with conditionality. Kakwani et al.

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(2005, table 9-3), estimates that in Kenya, with universal cash-transfers (no targeting), 0.08% would be the increase in school attendance, and it would be 0.12% if the poor were targeted. This sets ε_0=0.08 and ε_1=0.04. As explained in the text, we are going to consider the best case scenario for conditionality, which means that there would be one person enrolled for every beneficiary, fixing ε=1. Because $\varepsilon_0+\varepsilon_1+\varepsilon_2=\varepsilon$, we deduce ε_2=0.88. Hurrell et al. (2008, table 3.6), gives the mean monthly real consumption expenditure of recipients as 1550 KSH. If there is no saving, this will also be mean income. As the transfer is almost exactly the same amount, we have $\bar{y}/t=1$. Lastly, r=0.072 for primary schooling allowing for female human capital externality in Kenya, see Manda, Mwabu and Kimenyi (2004). Using (17): b_0^L/t=0.0058, b_1^L/t=0.0029, and b_2^L/t=0.0634 and b^L/t=0.072.

Private costs of complying with conditionality: c^{PR}/t

Private costs in terms of transport costs to collect the transfers themselves have been estimated to be 5% of the transfer value by Musembi (2010), so c_0^{PR}/t=0.05. There are assumed to be no private costs involved with targeting. The main private costs are therefore involved with complying with conditionality, i.e., c_2^{PR}/t. There are two main private costs, one in attending school and the other in foregone child labor. The monthly average amount per child spent on education among beneficiaries was KSh 155 (Hurrell et al., 2008, table 4.4). According to Manda (2003), the majority of children earned <KSh 900 per month. Musembi (2010) estimates that the OVC program reduced paid child labor by 3%. Foregone child earnings were therefore KSh 27. Musembi also estimated that unpaid labor for domestic work was reduced by 16 h a month, when typically a child would work for 124 h a month. The reduction in unpaid work was therefore also 3%. If we value unpaid work equal to paid work, there would be an additional KSh 27 of foregone earnings from unpaid work. The end result is c_2^{PR}=KSh 209, making c_2^{PR}/t=0.139. This means that c^{PR}=0.05+0.139=0.189 (we have assumed c_1^{PR}/t=0 in the main CBA framework).

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