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Rates of return to antipoverty transfers in Uganda

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Abstract

A growing literature measures the impact of antipoverty transfer programmes on variables of interest among participants in low- and middle-income countries. To date, few studies provide information on net benefits or rates of return from these programmes. This paper constructs estimates of rates of return to an antipoverty transfer programme in Uganda using appropriate welfare weights. Survey and experimental methods empirically validate the range of welfare weights applied. We find that rates of return estimates applying appropriate prioritarian welfare weights are significantly higher than utilitarian rates of return.

Key words: preference for redistribution, welfare weights, cash transfers, rates of return, Uganda

JEL codes: D61, D63, I38

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1. Introduction

It is estimated that antipoverty transfer programmes reach nearly one billion individuals in low- and middle-income countries (Barrientos, 2013). A growing literature evaluates antipoverty transfers programmes, especially income transfers tied to human development conditions. Overall, they find significant and positive effects on poverty alleviation and development indicators (Bastagli et al., 2016). However, few studies provide information on net-of-cost benefits and only a handful of studies estimate rates of return from these programmes (Alderman, Behrman, & Tasneem, 2017; Brent, 2012; Coady & Harris, 2004; Glewwe & Kassouf, 2012; Mideros et al., 2016). To the extent that estimated rates of return explicitly account for social welfare, a utilitarian approach is the default. This paper constructs estimates of prioritarian rates of return for an antipoverty transfer programme in Uganda. A prioritarian approach to social welfare bestows a higher value on benefits to the worse off (Adler, 2013; Fleurbaey, Luchini, Muller, & Schokkaer, 2013). We find that applying appropriate welfare weights to the assessment of the benefits from antipoverty transfers results in significantly higher rates of return than those estimated under utilitarian assumptions.

Antipoverty transfer programmes are expected to reduce present and future poverty in at least two ways (Barrientos, 2013; Fiszbein & Schady, 2009). Firstly, the receipt of income transfer raises the disposable income of participant households and therefore alleviates consumption deficits. Secondly and under favourable conditions, regular and reliable transfers raise permanent household leading to an increase in human capital investment raising the productivity of participant households. Favourable conditions are inclusive growth and basic service provision. Raising human capital generates higher future income streams associated with higher labour productivity (Schultz, 2000). These benefits are secured at the cost of raising antipoverty budgets and distributing them to the relevant beneficiaries.

The high incidence of impact evaluations of antipoverty transfers relative to other development interventions has become a feature in the recent period. The vast majority of impact evaluations of antipoverty programmes estimate mean effects from programme participation on particular variables of interest (Ravallion, 2005). Although the cost of delivering antipoverty transfers can be significant, few papers assess net-of-cost benefits (Caldés, Coady, & Maluccio, 2006). Focusing on mean effects many studies do not take account of distributional concerns when

quantifying the effects of the programmes (Barrett & Carter, 2010; Deaton, 2010). Impact evaluation studies typically adopt, by default, a utilitarian perspective. The simple aggregation of outcomes experienced by programme participants assumes they are equally important from a welfare point of view.

A prioritarian perspective proposes that benefits to the poorest are more valuable to societies than benefits to the better off. The adoption and implementation of domestic antipoverty policies is consistent with a prioritarian perspective. Improvements in consumption, income, and productive capacity among low-income groups have a higher value to society than similar benefits to the better off. The analysis in the paper applies prioritarian welfare weights to estimate rates of return for an antipoverty transfer programme in Uganda, the Social Assistance Grants for Empowerment (SAGE). Using survey and experimental data for Uganda the paper identifies preferences for redistribution, and a range of welfare weights consistent with these preferences. It then compares utilitarian and prioritarian estimates of rates of return associated with programme participation. We find that the estimates of the rates of return based on prioritarian welfare weights are significantly higher than those estimated under utilitarian assumptions.

The paper contributes to the literature in several ways. First, it provides strong evidence on the need to explicitly address distributional concerns when estimating the welfare impact of antipoverty transfers. Second, it provides survey and experimental information on preferences for redistribution for Uganda, grounding welfare weights empirically. To our knowledge this is the first paper constructing such estimates for Uganda, and more generally sub-Saharan Africa. Thirdly, the paper shows that applying appropriate welfare weights leads to significant changes in the assessment of the benefits of the programme and therefore on associated rates of return. Fourthly, the paper provides additional evidence on the positive impact of programme participation on the consumption and human capital of poor households in Uganda.

The rest of the paper is organised as follows. Section 1 gives a brief overview of the SAGE programmes in Uganda and references available estimates of programme benefits and rates of return. Section 2 discusses the relevance of welfare weights to assessing the value of antipoverty policies. It justifies adopting prioritarian welfare weights. Section 3 discusses alternative strategies for estimating preferences for redistribution. Section 4 reports on estimates of preferences for redistribution in Uganda and explains their implications for welfare weights.

Section 5 presents rates of return associated with participation in the SAGE programme under utilitarian and prioritarian welfare weights. A final section summarises the main conclusions.

2. The SAGE programme, outcomes and rates of return

Uganda has joined several other countries in East Africa in introducing a pilot antipoverty transfer programme. The SAGE programme is the flagship of the Expansion of Social Protection initiative. It provides two types of social transfers: (i) the Senior Citizen Grant (SCG), an old age social pension for people aged 65 and over; and (ii) the Vulnerable Family Grant (VFG), a cash transfer targeted at vulnerable households. Recently, the Government of Uganda has unveiled plans to scale up the SCG to an additional 40 districts by 2019/2020 and to discontinue the VFG. SAGE was approved by Cabinet in July 2010 and began to be implemented in 2011 in six districts. It was scaled up to 14 districts by 2015, reaching around 15 percent of households in these districts. Implementation is under the responsibility of the Ministry of Gender, Labour and Social Development.

Beneficiaries of the SCG are selected on age. All people aged 65 and over are entitled to receive the grant in the relevant districts, except in the Karamoja district where entitlement is extended to people aged 60 and over as a recognition of severe levels of deprivation in that district. For the country as a whole, 3.2 percent of the population are aged 65 and over; while 14 percent of households have at least one elderly member.

The VFG was designed to reach poor and vulnerable households with limited work capacity and high dependency ratios. Eligibility is based on a household score computed from demographic, orphanhood, and disability characteristics.[1] Households are ranked according to their scores, with eligibility for the transfer offered to the 15 percent most vulnerable in each district.

In 2011, monthly SAGE transfers were UGX 23,000 (approximately USD10). The level of the transfer was set to ensure the average household in the lowest decile of consumption equalled the consumption of households in the 11th percentile at the time of the design of the programme. SCG transfers are paid to the pensioners while VFG transfers are normally paid to adult women in the participant households.

[1] The eligibility criteria can be found in the SAGE evaluation report (Oxford Policy Management, 2017).

Overall administrative cost to payments ratio for the VFG was estimated to be around 32 percent over the 2014/15-2012/22 period (Merttens et al., 2016). This ratio was expected to decline as the number of households in the programmes increases with scale up. Targeting costs were 65 percent of total administrative costs of the programme. As a proportion of beneficiary payments the targeting costs are expected to decrease to 23%. The overall administrative cost to payments ratio for the SCG is around 9% over the 2014/15-2021/22 period (Merttens et al., 2016). As a proportion of benefit payments, the direct targeting costs are estimated to plunge to 0.2% after a scale-up. Based on these figures we expect the administrative program costs for a national implementation to be at 7.1% of the program payments.

A recent evaluation of SAGE (Merttens et al., 2016) concluded programme participation was associated with positive effects on household welfare. Beneficiary households reported higher consumption expenditures, particularly food expenditures, and lower food insecurity and hunger. The impact evaluation study confirmed households used the transfers for health and education related expenditures and for investment in productive assets.

Rates of return associated with the SAGE have been estimated as part of a research project on Building a case for increased investments in Social Protection in Uganda (Dietrich et al., 2017).[2] The study computed direct consumption benefits for participant households and indirect consumption benefits from human capital accumulation as a result of the transfers. Estimates of schooling and health status (measured as child underweight) correlates were used to simulate for eligible households the effect of the transfer on child schooling and health status[3] and in turn the effects of improved schooling and health status on household consumption.[4] This work relied on data from the Uganda National Panel Survey (UNPS), a nationally representative panel household survey that aims at producing estimates in key policy areas (Uganda Bureau of Statistics, 2010). In particular the analysis relied on survey data from 2009/10, 2010/11, 2012/3 and 2013/4.

[3] In this paper we do not consider effects on adult health. This might result in a significant underestimation of the indirect program effects.

[4] Consumption data is used throughout as income data was only available for a small proportion of the labour force.

Eligibility for the SCG was straightforward as the sole criterion is age and district residence. For the VFG household eligibility was assessed in each period using their vulnerability scores. VFG benefits were then assigned to the 15 percent most vulnerable households at district level. The costs of the programme were computed from cost projections for a national scale up of the programmes. The calculation of the benefits and costs of the programmes were iterated for ten years, yielding estimates of the programme rates of return (Dietrich et al , 2017). In the analysis below, we used the resulting rates of return as the utilitarian benchmark.

3. Why are welfare weights needed to evaluate antipoverty transfers?

The growing literature evaluating the outcomes of antipoverty transfer programmes has to date focused on developing reliable and precise methods to identify the changes associated with programme participation, on the participants themselves and on their local economy (Angrist & Pischke, 2008; Blundell & Costa Dias, 2008; Ravallion, 2005). However, scarce attention has been paid to assessing net-of-cost benefits in welfare terms (Alderman et al., 2017; D. Coady, 2003; Glewwe & Kassouf, 2012; Mideros et al , 2016). We have a growing evidence base on outcomes associated with programme participation, including meta-studies such as Baird et al. (2013) and Bastagli et al. (2016), but we lack basic information on what is the value of these changes to society.

In failing to make an explicit welfare assessment of their findings, impact evaluations of transfer programmes uncritically embed welfare assessments, often based on utilitarian assumptions. Welfare weights are implicit in the aggregation of outcomes across individuals/households. For example, the FGT class of poverty functions (Foster et al, 1984), as in (1) below, commonly used to assess the poverty reduction effectiveness of antipoverty transfers embeds a variety of welfare weights.

$$P(xi; z, \alpha) = \frac{1}{N}\sum_{i=1}^{N}\left(1 - {xi}/{z}\right)^{\alpha} \Gamma[xi \leq z] \qquad (1)$$

Here z is a poverty line and Γ is an indicator variable returning the value 1 when units are in poverty, 0 otherwise. Where α = 0, all units below the poverty line have a weight of 1 with 0 otherwise; for α = 1 social weights are the poverty gap for the relevant unit and 0 otherwise; and for α = 2 social weights are the poverty gap squared 0 otherwise; and so on. Applying α = 0

implicitly embeds a utilitarian valuation of social welfare. As α approached infinity, a Rawlsian maximin valuation of social welfare is implicit. The valuation of social welfare implicit in the FGT class of poverty functions attaches no social value to welfare gains of units above the poverty line.[5]

Specifying welfare weights explicitly ensures that social preferences become transparent and contestable (Adler, 2013; Cowell & Gardiner, 1999; Creedy, 2007).[6] A Bergson-Samuelson social welfare function will help us to characterise welfare weights for the utilitarian and the prioritarian assessment of social welfare. An additive, individualistic, and impartial social welfare function[7] can be written as:

$$W = W(V_1(y_1), V_2(y_2), \ldots, V_{\mathrm{n}}(y_{\mathrm{n}})) = \sum_{i=1}^{n} W(V_{\mathrm{i}}(\mathrm{i})) \qquad (2)$$

Here, y_i is a measure of welfare for unit i, assuming a population n. $V_i(.)$ is the indirect utility function of unit i, and W(.) is social welfare. The impact of an infinitesimal change in y_i, associated with an antipoverty transfer for example, on social welfare can be written as:

$$dW = \sum_{i=1}^{N} \frac{\partial W(.)}{\partial y_i} dy_i = \sum_{i=1}^{N} \frac{\partial W(.)}{\partial V_i} \frac{\partial V_i}{\partial y_i} dy_i = \sum_{i=1}^{n} \beta_i dy_i \qquad (3)$$

β_i is the welfare weight of unit i. It represents the change in social welfare associated with an infinitesimal small change in individual i's welfare (Bangman, 2006). In this specification the welfare weights are

$$\beta_i = \frac{\partial W(.)}{\partial V_i} \frac{\partial V_i}{\partial y_i} \quad , \qquad (4)$$

highlighting two components, the individual valuation of a small change in welfare $\partial V_i / \partial y_i$ and society's valuation of the change in welfare $\partial W / \partial V_i$. Aversion to risk implies $\partial^2 V_i / \partial y_i^2 \leq 0$

[5] In the context of a cost benefit assessment of antipoverty transfer programmes, applying the FGT class of poverty functions ignores unintended benefits to non-poor households (Barrientos & Sabatés-Wheeler, 2010).

[6] In high-income countries with substantive progressive income taxation a strand in the literature argues welfare weights are unnecessary (Kaplow, 2004).

[7] Individualistic because only the welfare of the individuals in society counts so that if $yi^A > yi^B$ in social state A and social state B, then $W^A > W^B$; and impartial because social welfare does not depend on a particular assignment of labels to the individuals in society, so that W(y1 ,y2,...,yn) = W(yn ,y2,...,y1) (Cowell & Gardiner, 1999).

with indirect utility being concave in the welfare measure. Aversion to poverty and inequality, discussed in more detail below, implies $\partial^2 W/\partial V_i^2 \leq 0$ with social welfare concave in indirect utility. Here we are interested only in the latter.[8] Impact evaluations of antipoverty transfer programmes measure dy_i but neglect to pay attention to β_i, the welfare weight or social marginal valuation attached to changes in welfare of unit i. Implicitly, they assume a utilitarian $\beta_i = 1$.

A prioritarian social welfare function assigns a higher value to improvements in the welfare of worse off groups (Adler, 2012; Broome, in press). Social welfare is concave in indirect utilities, satisfying the Pigou-Dalton transfer axiom. Following Atkinson's constant elasticity social welfare function (Atkinson, 1970), a prioritarian social welfare function can be written as:

$$W = W(V_1(y_1), V_2(y_2), \dots, V_{\mathrm{n}}(y_{\mathrm{n}});\ \varepsilon) = \begin{cases} \sum_{i=1}^{n} \left(\frac{V_i(.)^{1-\varepsilon}}{1-\varepsilon}\right), & \varepsilon \neq 1 \\ \sum_{i=1}^{n} log\ V_i(.), & \varepsilon = 1 \end{cases} \qquad (5)$$

Here ε represents preferences for redistribution. In a prioritarian setting, larger values of ε assign increasing value to benefits improving the welfare of the least advantaged. In the extreme case of $\varepsilon = 0$ there is no inequality aversion and distributional issues are not relevant in the social welfare and, consequently, in the cost benefit analysis. All it matters would be the absolute value of programme benefits, but not who receives them; in this sense there would be efficiency but no equity considerations. When ε approaches infinity, only the condition of the worse off in society is of interest (following Rawls, 1972).

In the context of a prioritarian social welfare function of this type, assessing the gain in social welfare of a transfer will require applying welfare weights normalised as

$$\beta_i = \left(\frac{V(\bar{y})}{V(y_i)}\right)^{\varepsilon} \quad , \qquad (6)$$

where $\bar{y}$ is a reference level of welfare. The next section discusses strategies to generate empirical estimates of preferences for redistribution in Uganda.

[8] Carlsson et al. (2005) provide separate estimates of aversion to risk and preferences for redistribution. Kaplow (2010) examines the two components analytically. He finds that "concavity of the underlying social welfare function remains significant at low levels of income" (p.39).

4. Estimating preferences for redistribution

In the literature several strategies for estimating ε are available. First, social preferences for redistribution could be specified analytically by working out the properties of ε which could satisfy fairness axioms (Adler, 2012). Second, it might be possible to establish social preferences for redistribution by working backwards from existing policies that are assumed to reflect distributive preferences, e.g. tax code. This is the policy revealed preference approach (Bargain, Dolls, Neumann, Peichl, & Siegloch, 2011; Bourguignon & Spadaro, 2012). Third, social preferences could also be ascertained by asking people what is the right ε. The survey approach works by implementing a questionnaire on a sample of respondents. Fourth, the experimental approach works by placing people in hypothetical situations in which they are incentivised to reveal their aversion to inequality (Traub, Seidl, & Schmidt, 2009). Fifth, in the context of optimal taxation, Saez and Stantcheva (2013) argue that distributional objectives can be modelled directly, without the need for social welfare functions. This is the generalised social marginal welfare weights approach.[9] In our analysis below, we rely on the experiment and survey approach.

Survey approaches developed to provide estimates of preferences for redistribution are based on the 'leaky bucket' hypothesis (Okun, 1975). Transfers from rich to poor are normally associated with deadweight losses, administrative costs for example. Strong preferences for redistribution are associated with a willingness to accept significant deadweight losses. Weaker preferences for redistribution would reject small transfers at low deadweight losses. Surveys asking individuals to choose between alternative levels of deadweight losses could therefore indicate their aversion to poverty (Amiel, Creedy, & Hurn, 1999; Pirttilä & Uusitalo, 2010).

There are potential confounders associated with this approach, as identified in the literature. People are more willing to endorse redistribution if they believe they will benefit directly from it (Beckman, Formby, & Smith, 2004). And expectations of future incomes can also influence choices on alternative costs and benefits of redistribution (Alesina & Ferrara, 2005; Benabou &

[9] Bangman (2006) discusses a further approach to estimating preferences for redistribution, the one-person-one-vote approach. This is relevant to projects where prices take account of beneficiaries' differential resources.

Ok, 2011). Furthermore, aversion to inefficiency and maximin preferences could confound for inequality aversion (Engelmann & Strobel, 2004).

Experimental strategies incentivise respondents to reveal their attitudes to redistribution by placing them in an experimental context in which they have to opt for alternative distribution. The experimental approach can address some of the potential confounders undermining survey approaches (Traub, Seidl, & Schmidt, 2009).

We followed the approach proposed by Carlsson, Daruvala, and Johansson□Stenman (2005). Their starting point is a utility function specified as:

$$U = h(y\phi^{-\gamma}) \ , \qquad (7)$$

where h is a monotonically increasing transformation, ϕ is a measure of income inequality and γ is a parameter indicating preferences for redistribution. This parameter is interpreted as an income elasticity. Keeping utility constant, the parameter reflects by how much incomes would need to change to compensate for changes in income inequality. In this formulation $\gamma = 0$ implies utility is independent of inequality, $\gamma = 1$ implies a one-to-one substitution of income and inequality, whereas $\gamma > 1$ indicates that a 1 percent reduction (increase) in inequality increases (decrease) utility by more than a 1 percent increase in income. We use the coefficient of variation as the measure of income inequality so that $\phi = \frac{\sigma_y}{\bar{y}}$.[10] In the experiment, individuals choose between two distributions A and B with varying income and inequality levels. A utility maximiser would be indifferent between the two distributions if $y_A{\phi_A}^{-\gamma} = y_B{\phi_B}^{-\gamma}$, so that γ can be specified as:

$$\gamma = \frac{\ln(\frac{y_A}{y_B})}{\ln(\frac{\phi_A}{\phi_B})} \qquad (8)$$

The parameter is the critical value at which an individual is indifferent between the two distributions.

[10] We use the coefficient of variation following Carlsson et al. (2005). Applying the GINI coefficient instead, leads to inequality aversion parameters ranging from 0 to 1.09.

5. Preferences for redistribution in Uganda

This section describes the implementation of, and results from, the survey and experimental work in Uganda. The objective is not to ascertain the respondents' own preferences for redistribution, but instead to capture their view on social preferences for redistribution (Cowell & Gardiner, 1999). The data collection was carried out in June 2016 at the Christian University in Kampala, Uganda. Students were invited to sessions held on campus based on participation lists and in coordination with course coordinators. Up to 22 students participated in each session. Following 3 pilot sessions, we implemented 16 questionnaire sessions with 312 participants and 8 experiment sessions with a total of 144 participants.

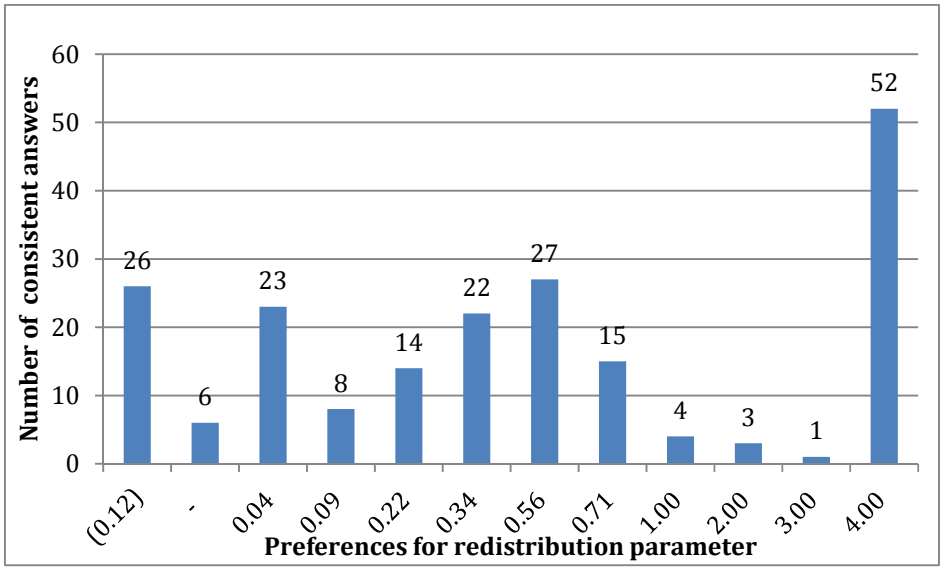
Survey

Following the literature (Amiel, Creedy, & Hurn, 1999; Carlsson, Daravula, & Johansson-Stenman, 2005), students are considered an appropriate group to provide information on society's preferences for redistribution. Respondents were asked to choose between a fixed distribution and 12 changing distributions, with different mean incomes. The mean incomes and the spread of the distributions are associated ex ante with values of the redistribution parameter (Amiel et al., 1999). The survey questionnaire was implemented on 312 students with 201 among them (64 percent) giving consistent answers.[11] The distribution of responses is presented in Figure 1. The distribution is skewed towards extreme parameters, this is explained by implementation issues and issues with the selection of the sample.[12] If the extreme values are excluded, an approximation of a normal distribution can be found. The mode is found at the centre of the distribution at 0.56.

[11] Inconsistent answers were excluded. Inconsistent answers are defined as those where the inequality aversion parameter could not be estimated as the respondent switched more than once from the reference distribution to one of the alternative distributions. For example once you chose to stop redistributing given a level of income, you cannot restart redistributing for a lower level of income.

[12] Some students from other faculties (outside economics and statistics) with little knowledge of statistics undertook the experiment and survey.

Figure 1: Preference for redistribution survey responses



Source: Authors' elaboration

Experiment

The experimental strategy follows the design used in Beckman, Formby, Smith, and Zheng (2004). Participants were grouped into five different income levels and were asked to choose whether they preferred to belong to society A or B, represented by their respective income distributions. Incomes in society B are more equally distributed than in society A, but this comes at a cost of lower mean incomes, a leakage rate. We used leakage rates (deadweight losses) of 0 percent, 50 percent, 67 percent, and 100 percent of redistributed incomes to classify responses. Following equation 8, they correspond to four ranges of redistribution preferences in case of indifference between A and B: 0; 0-0.16; 0.16-0.19; 0.19-0.72.

In order to disentangle social preferences for redistribution from risk aversion (see (4) above), we captured participants' choices under three slightly different sets of conditions. In the first stage, participants made their decisions before they knew the income level they were randomly assigned to (individually and independently). Decisions taken under the veil of ignorance (Rawls, 1971) are guided by inequality and risk aversion. At a second stage, subjects were randomly assigned to income positions 1-5 before they made their redistribution decisions. Participants knew which society yielded the highest income for them ruling out risk aversion concerns. At the third stage,

all participants are collectively assigned to the same income category, but do not know beforehand which category 1-5 they will be in. Using a single income group for all participants helps to separate out inequality aversion from risk aversion by comparing results from the first and third stages (Kroll & Davidovitz, 2003). The sequence of stages, and the sequence of decisions within stages, changed across sessions.

Participants were informed about the three stages of the experiment, but we gave detailed instructions of each stage progressively in order to avoid strategic behaviour. To incentivise experiment responses, participants received a payment based on their decisions and the decisions of other session participants. After the experiment one response of one round out of the three stages was randomly picked to determine payouts. If a round of stage 1 or 3 was selected, subject's income position was randomly assigned after the experiment using playing cards. In rounds of stage 2, the income position was randomly assigned ex ante also using playing cards. After 3 pilot sessions, we implemented 8 sessions with a total of 144 participants.

Table 1: Rejection of Redistribution by Leakage rate and Stage

	Stage 1	**Stage 2**	**Stage 3**	**Total**
	Veil of Ignorance	No Uncertainty	No Inequality	
Leakage Rate	(n=143)	(n=143)	(n=144)	(n=430)
Leakage 100%	0.71	0.71	0.72	0.71
Leakage 67%	0.55	0.58	0.55	0.56
Leakage 50%	0.55	0.66	0.51	0.58
Leakage 0%	0.42	0.48	0.40	0.43

Source: Authors' elaboration

Table 1 shows the results of the experiment. As expected, rejection rates of income redistribution were highest when leakage rates were highest. However, even if 100 percent of the redistributed incomes were lost, about one third did not reject redistribution. At the same time, 43 percent of participants preferred to not redistribute even at a leakage rate of 0 percent. Results for the intermediate leakage rates of 50 percent and 67 percent are very similar, which could suggest participants were on average indifferent between both options. In the second stage, rejection rates

were even slightly higher for a leakage rate of 50 percent compared with a leakage rate of 67 percent.

Compared with the results in Beckman et al. (2004), the responses indicate a lower sensitivity to leakage rates particularly a higher acceptance of redistribution, even at a leakage rate of 100 percent. Around 12% of participants were inconsistent in all stages. About two thirds of the inconsistencies are explained by seemingly contradictory changes in responses between the two intermediate leakage rates, supporting the view that many participants were indifferent between both options. Misunderstanding the experiment is unlikely to explain these inconsistencies as more than three quarter of the participants answered the control question correctly.[13] Confining the sample to those who answered the control question correctly does not alter the results.

The inequality aversion parameter was recovered from a regression of the experimental data as described in equation 9. We calculate a leakage rate rejection parameter *Red* of each participant in each stage and regress the parameter on the experiment stages and individual control variables.[14] The results are presented in Table 2.

$$Red_i = \beta_0 + \beta_1 Stage_{\,2} + \beta_2 Stage_3 + \beta_3 Controls_i + u_i + u_{it} \quad (9)$$

We use data for the first stage, in which decisions were made under the veil of ignorance, as baseline. Dummy variables for the second and third stages capture the influence of risk aversion (stage 2) and inequality aversion (stage 3). The coefficient of the dummy variable for the third stage is negative but not significant, implying decisions were not significantly different after we ruled out inequality aversion. Revealing the subject's income position ex ante had on average no statistically significant effect on responses. However, as expected, controlling for income positions shows subjects in higher income positions reported significantly lower preferences for redistribution (see column 2). Controlling for individual characteristics shows no significant effects, except that participants with more friends in the session were more likely to endorse redistribution.

[13] After the instructions, a control question was applied to check whether participants understood the process of the experiment.

[14] The rejection parameter describes a participant's average rejection across the 4 leakage rates of a stage.

Our variable of interest, the constant β_0, suggests that subjects preferred on average an inequality aversion category of slightly more than two, which corresponds to a leakage rate of 50 percent. In the fixed effects model (column 1) the estimated constant is 2.20 (2.05 in the random effects model controlling for income positions), which corresponds to an inequality aversion parameter of about 0.17 following equation 8.

Table 2: Preference for redistribution parameter estimates

	(1) ***RED*** Fixed Effects	(2) ***RED***Random Effects	(3) ***RED***Random Effects	(3) ***RED***Random Effects Tobit Model
Stage==2	0.01	0.50*	0.15	0.18
	(0.04)	(2.03)	(1.61)	(1.45)
Stage==3	-0.14	-0.14	-0.07	-0.08
	(-1.38)	(-1.42)	(-0.74)	(-0.67)
Income Position		0.04	-0.02	-0.02
		(1.36)	(-0.62)	(-0.31)
Income Position * Stage 2		-0.08**		
		(-2.67)		
Age			0.00	-0.00
			(0.06)	(-0.00)
Gender			0.00	0.00
			(1.45)	(0.95)
Friends in Sessions			0.03**	0.04*
			(3.61)	(2.44)
Stage order			-0.05	-0.07
			(-1.30)	(-1.35)
Self-Assessed Family Income Position (1-5)			-0.06	-0.07
			(-1.44)	(-1.01)
MaxiMin			0.34+	0.42
			(1.74)	(0.78)
Constant	2.20**	2.05**	2.23*	2.24*
	(30.17)	(13.75)	(2.37)	(2.01)
Observations	316	307	250	250

Source: Authors' own elaboration. Note: MaxiMin refers to participants who maximised minimum income in all questions of the experiment, even for 18 control questions with equal mean incomes; stage order refers to the sequence in which stages were played. Tobit model accounts for censoring at 0 and 4. Changing N because of missing observations.
t statistics in parentheses. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

The estimated values of the inequality aversion parameter resulting from the experimental approach and the survey approach (0.17 and 0.56 respectively) are within the lower and upper bounds found in literature, mainly conducted in developed countries. For example Carlsson et al. (2005) report an inequality aversion range of 0.09-0.22 from students in Sweden and Amiel et al. (1999) a parameter in the range of 0.1- 0.22 with students in Israel and Australia. Pirttilä and Uusitalo (2010) find an inequality aversion parameter of just below 0.5 for Finland. Empirical

estimates of preferences for redistribution in developing countries are scarce. To our knowledge, only one study is available. Behrman and Birdsall (1988) found a parameter estimate equal to 0.68 for Brazil. The rest of the literature in developing countries relies on ad hoc parmeters. Alderman et al. (2017) adopt an aversion parameter of 0.7, while Brent (2013) adopts an inequality aversion parameter of 0.57 and 1.

6. Rates of return for the components of SAGE

We now present the returns to the SAGE programmes components using utilitarian and prioritarian welfare weights.

Programme benefits B in year t are computed as:

$$B_t = \sum_{i=1}^{n}(y_{i,t} - y_{i,1}) = \sum_{i=1}^{n} \Delta y_{i,t} \ , \ i = 1,\dots,n; \ t = 1,\dots,10 \quad (10)$$

Where $y_{i,t}$ is the welfare outcome for participant household i at time t under the programme scenario, and $y_{i,1}$ is the outcome for the baseline scenario (without policy interventions). Δy represents the benefits (in consumption terms) associated with participation in the programme. They include the direct benefits from the income transfers and the indirect benefits due to the accumulation of human capital. Applying welfare weights defined by consumption levels at the baseline generates weighted benefits WB as in:

$$WB_t = \sum_{i=1}^{n} \beta_i \Delta y_{i,t} \quad (11)$$

In the calculation of welfare weights (see equation 8) we follow the literature and use median consumption as the reference level of consumption.[15] Ugandan household data from the 2011/2012 wave show median consumption at 17,462 UGX while the mean consumption 25,110 UGX. We employ a range of values for the redistribution parameter. A lower bound is 0.17 and 0.56 reflect our main results for survey and experimental estimates for Uganda.

[15] We experimented with the mean as a robustness check on our results. Deaton, 1997, Alderman et al., 2017, Atkinson and Brandolini, 2010, use the mean; Olken, 2007, uses the median. Coady and Skoufias, 2004 employs the mean income of poorest quintile, while Brent, 2013 uses mean consumption.

The estimation of the benefits take into account the effects of SAGE transfers on child health and schooling and the effects of improved human capital on consumption. Indirect effects are captured through the effects of variations in consumption on increased human capital. We follow the approach used by Mideros et al. (2016) in estimating the returns to human capital. They use the maximum level of education in the household as the 'allocative effect' of human capital (following Joliffe, 2002). The effect of the maximum level of education on household per capita consumption is then computed with human capital investment elasticities, defined as the percentage increase in human capital from a percentage increase in consumption.[16]

Rates of return (RoR) are calculated as:

$$RoR^U = \left(\frac{\sum_{t=1}^{T}(B_t)(1-\delta)^{-t}}{\sum_{t=1}^{T} C_t(1-\delta)^{-t}} - 1\right) * 100 \quad , \quad (12)$$

for the utilitarian case, and

$$RoR^P = \left(\frac{\sum_{t=1}^{T}(WB_t)(1-\delta)^{-t}}{\sum_{t=1}^{T} C_t(1-\delta)^{-t}} - 1\right) * 100 \quad , \quad (13)$$

for the prioritarian case. c_t are programme costs and δ is the discount rate. We apply a discount rate of 10 percent and assume a propensity to consume of 80% as in Dietrich et al. (2017). We also run robustness checks using different propensities to consume and discount rates. [17]

Overall the results are far more sensitive to the choice of the propensity to consume than to the choice of the discount rate. Compared to other studies, we do not consider financing issues or distortions arising from the tax revenues (Alderman et al., 2017; Brent, 2013). Neither do we account for any potential reduction in labour participation of children associated with improvements in school attendance (Alderman et al., 2017; Ravallion & Wodon, 2000).

The rates of return for the two components of the SAGE, the Senior Citizen Grant and the Vulnerable Family Grant, are shown in Tables 3 and 4. Applying prioritarian welfare weights raises the rates of returns in all cases.

[16] The returns of programme participation on adult health are not considered in this paper.
[17] They are presented in the Appendix.

Rates of return are fairly constant for the first four periods as the direct benefits of program transfers dominate, the indirect benefits from human capital accumulation are limited, and administrative costs are significant (23 percent and 7 percent for the VFG and SCG respectively). In the utilitarian case, rates of return are negative throughout. Around the sixth year after the introduction of the program the benefits from accumulated human capital kick in and rates of return improve. There is a steeper rise in rates of return around ten years from the start of the programme.

Table 3: Rates of Returns by period, Vulnerable Family Grant

	Period									
	1	2	3	4	5	6	7	8	9	10
RoR^U $\varepsilon = 0$	-34.85	-34.83	-34.78	-34.66	-34.40	-34.10	-33.73	-33.31	-32.86	-32.38
RoR^P										
$\varepsilon = 0.17$	-33.42	-33.26	-33.13	-33.06	-32.90	-32.66	-32.32	-31.90	-31.46	-30.93
$\varepsilon = 0.56$	-26.19	-25.76	-25.64	-25.56	-25.49	-25.46	-25.20	-24.75	-24.29	-23.58

Source: Author's calculations

Table 4: Rates of Returns by period, Senior Citizen Grant

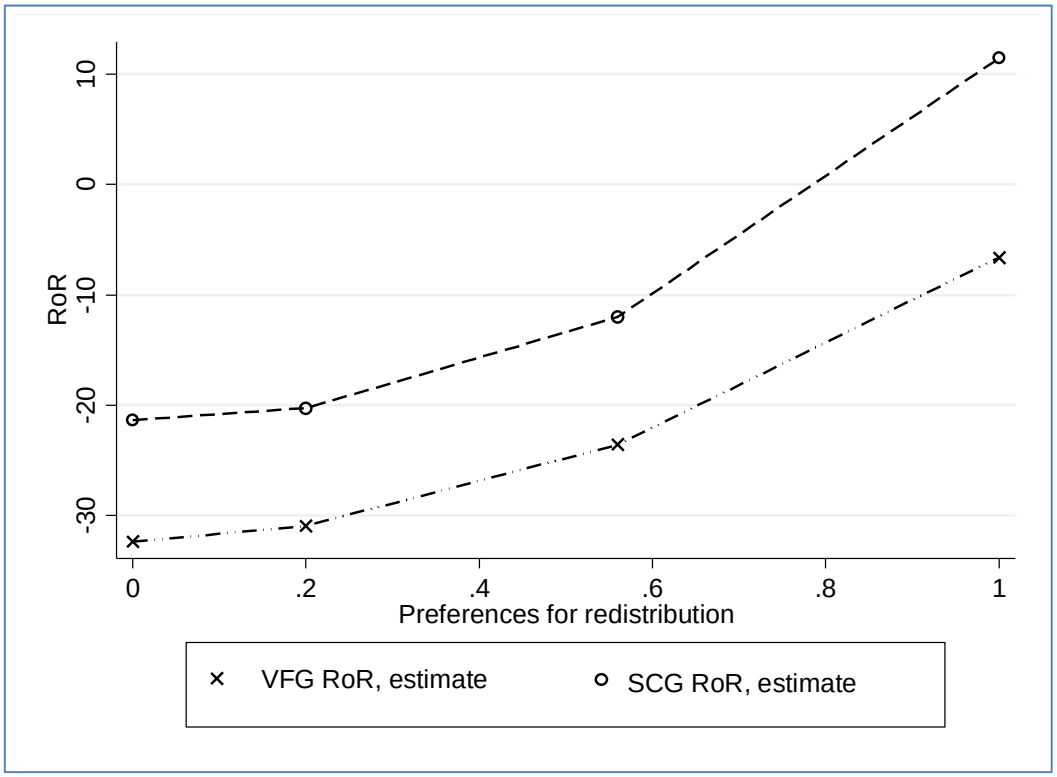
	Period									
	1	2	3	4	5	6	7	8	9	10
RoR^U $\varepsilon = 0$	-25.13	-24.90	-24.61	-24.28	-23.86	-23.42	-22.93	-22.43	-21.91	-21.34
RoR^P										
$\varepsilon = 0.17$	-24.23	-24.02	-23.72	-23.38	-22.94	-22.47	-21.96	-21.43	-20.88	-20.27
$\varepsilon = 0.56$	-16.38	-16.25	-15.94	-15.57	-15.08	-14.54	-13.96	-13.34	-12.71	-12.01

Source: Author's calculations

Applying prioritarian welfare weights changes rates of return significantly. The RoR for the VFG is -32.3 after 10 periods in the utilitarian case. It increases to -30.9 and -23.5 respectively when the preferences for redistribution are set at 0.17 and 0.56. A similar result is found when considering the SCG. The RoR for the prioritarian estimations at -20.2 and -12.0 when the preferences for redistribution are set at 0.17 and 0.56 are higher than the utilitarian RoR at -21.3.

Why are rates of returns higher for the SCG program higher compared to the VFG? This is explained by the difference in administrative costs between the two programmes and the relatively higher transfer value of the SCG.[18] The VFG has significantly higher administrative costs than the SCG because the additional costs of targeting are magnified by the limited scale of the programme at its pilot stage. In addition, most senior citizens are eligible for the SCG live in households that are poor and have more children. SCG transfers generate higher indirect benefits through improved education from the children living in these households.

Figure 2: RoRs for VFG and SCG after 10 periods, by redistribution parameter



Source: Authors' own elaboration

These findings suggest that prioritarian welfare weights make a significant difference to estimates of rates of return of antipoverty transfer programmes. Figure 2 shows rates of return under alternative welfare weights. It focuses attention on the threshold value of redistribution parameters at which rates of return switch from negative to positive after 10 periods. With the SCG, the switch to positive rates of return takes places at just below the 0.8 parameter value.

[18] SCG is an individual grant, while VFG is for the entire household.

With the VFG, the inequality aversion parameter needs to be higher than 1 to generate a rate of return equal to zero.

In summary, prioritarian welfare weights result in higher estimated benefits, and higher rates of return, for the SAGE programmes than under utilitarian welfare weights. Applying prioritarian welfare weights shows that, considered as social investment, antipoverty transfers make a positive contribution to social welfare. Explicit consideration of welfare weights, and therefore distributional concerns, in the evaluation of antipoverty transfer programmes is crucial for an accurate measurement of the value of these programmes.

Conclusions

The growing literature evaluating the impact of antipoverty transfers in low- and middle-income countries is building a strong body of evidence on their effectiveness in reducing poverty and in facilitating the accumulation of human capital. To date, this literature has focused on developing countries and implementing reliable and precise methods to identify the changes associated with programme participation. Scarce attention has been paid to providing information on the net benefits flowing from these programmes, and even less attention has been given to assessing these benefits in welfare terms. The absence of explicit attention to social welfare effects has by default privileged a utilitarian assessment. This paper aims to contribute to fill in these knowledge gaps by estimating rates of return to an antipoverty transfers programme in Uganda applying prioritarian welfare weights. A prioritarian assessment bestows higher value to improvements in the welfare of low-income households compared with better off households.

The research reported in the paper makes several contributions to the literature. First, the analysis in the paper demonstrates the need to pay explicit attention to social welfare in the assessment of antipoverty transfers. Estimates of antipoverty transfer programme participation effects failing to pay attention to net benefits and failing to value these in welfare terms provide at best a partial, and at worst a misleading, assessment of their social value. Second, the paper constructs, for the first time, empirical estimates of redistribution preferences in Uganda. Survey and experimental estimates of preferences for redistribution in Uganda yield results that are similar to those from high-income countries. Third, applying prioritarian welfare weights, based on these estimates of preferences for redistribution, yield rates of return to the components of an antipoverty transfer

programmes in Uganda significantly higher than rates of return estimated based on utilitarian assumptions. Fourth, prioritarian rates of return for the Senior Citizen Grant are positive after 10 periods with redistribution parameters just above 0.8. Fifth, prioritarian rates of return for the Vulnerable Family Grant are lower, due to the demographic composition of these households and the costs associated with low scale. The implication is that in the short run protection, as opposed to promotion, objectives are paramount for some households in extreme poverty. In the medium run and with scaling up, promotion objectives are met.

The paper confirms that rates of return of antipoverty transfers are strongly influenced by redistribution preferences. Further research is needed to improve the precision of estimates of redistribution preferences in low- and middle-income countries and to assess the validity of alternative functional forms used to estimate social welfare.

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Appendix

The Appendix reports robustness checks performed using instead a marginal propensity to consume at 100 percent, taking account the extreme poverty among the SAGE participants (Mideros et al., 2016) and a discount rate at 5 percent in line with the assumption in Alderman et al. (2017). The rates of return using these parameters are shown in Tables A1 and A2

Table A1: Rates of Returns by period, Vulnerable Family Grant

	Period									
	1	2	3	4	5	6	7	8	9	10
RoR^U $\varepsilon = 0$	-18.57	-18.54	-18.43	-18.21	-17.83	-17.38	-16.84	-16.21	-15.53	-14.80
RoR^P										
$\varepsilon = 0.17$	-16.78	-16.57	-16.36	-16.22	-15.97	-15.60	-15.10	-14.46	-13.78	-12.99
$\varepsilon = 0.56$	-7.74	-7.20	-6.93	-6.84	-6.75	-6.69	-6.25	-5.55	-4.83	-3.73

Source: Author's calculations

Table A2: Rates of Returns by period, Senior Citizen Grant

	Period									
	1	2	3	4	5	6	7	8	9	10
RoR^U $\varepsilon = 0$	-6.45	-6.21	-5.89	-5.51	-5.02	-4.46	-3.85	-3.20	-2.51	-1.74
RoR^P										
$\varepsilon = 0.17$	-5.33	-5.12	-4.79	-4.40	-3.89	-3.31	-2.67	-1.99	-1.27	-0.46
$\varepsilon = 0.56$	4.46	4.55	4.87	5.28	5.86	6.50	7.21	7.98	8.78	9.69

Source: Author's calculations

Applying prioritarian welfare weights raises the rates of returns in all cases.

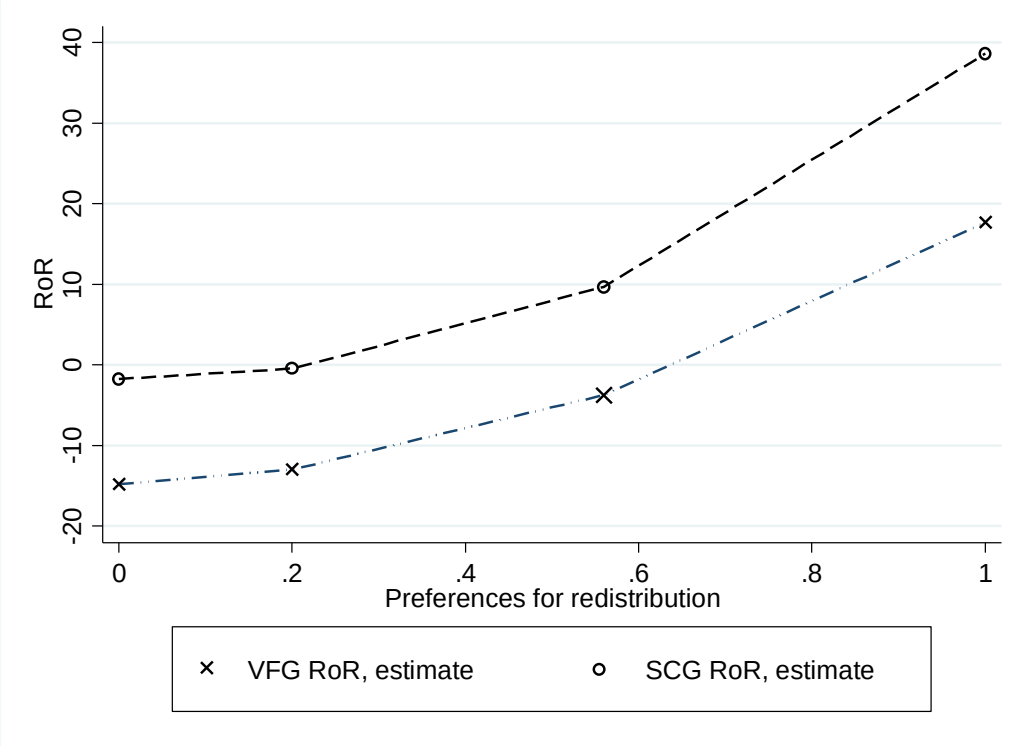
Rates of return are fairly constant for the first four periods as the direct benefits of program transfers dominate, the indirect benefits from human capital accumulation are limited, and administrative costs are significant (23 percent and 7 percent for the VFG and SCG respectively). In the utilitarian case, rates of return are negative throughout. Around the sixth year after the introduction of the program the benefits from accumulated human capital kick in and rates of

return improve. There is a steeper rise in rates of return around ten years from the start of the programme.

Applying prioritarian welfare weights changes rates of return significantly. With the redistribution parameter set at 1, rates of return for the SCG and VFG are positive throughout. With the redistribution parameter set at 0.56, rates of return are positive throughout for the SCG, rising from 4.4 percent at the start of the programme to just below 10 percent ten years after the start of the programme. Rates of return for the VFG are negative initially becoming closer to zero at the end of the period under examination. They are -7.7 and -3.7 at the beginning and ten years after the start of the programme respectively. With the redistribution parameter set at 0.17, rates of return are negative throughout for the VFG, and equal zero at the end of the period for the SCG.

These findings suggest that prioritarian welfare weights make a significant difference to rates of return of antipoverty transfer programmes. Figure A1 shows rates of return under alternative welfare weights. It focuses attention on the threshold value of redistribution parameters at which rates of return switch from negative to positive. With the SCG, the switch to positive rates of return takes places at just above the 0.2 parameter value. With the VFG, the inequality aversion parameter needs to be equal to at least 0.63 to generate a rate of return equal to zero.

Figure A1: RoRs for VFG and SCG after 10 periods, by redistribution parameter



Source: Authors' calculations.

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