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Helping Cash Transfer Recipients Prosper: Experimental Evidence from a Humanitarian Setting

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Helping Cash Transfer Recipients Prosper: Experimental Evidence from a Humanitarian Setting

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Abstract

Unconditional cash transfers are a popular social protection policy, but their impact is often short-lived. One plausible explanation is that recipients face challenges committing to long-term plans, and hence struggle to save or invest enough of the cash transfer to become self-reliant. By means of a field experiment with 861 refugee households in Uganda, we test whether a mental accounting intervention increases recipients' self-reliance. While control households receive their monthly cash payment in one envelope, treatment households are offered the opportunity to divide theirs between four envelopes labeled with their intended use ("Education", "Health", "Investment", and "Other"). Furthermore, the treatment group is randomized into two sub-groups: one where they choose their allocation, and another where they are first shown a default recommended allocation. We test the impact of the treatments on their prosperity, and economic, educational, and health outcomes, once the cash transfer program ends, and one year after.

Keywords: cash transfers, humanitarian aid, refugees, mental accounting, soft commitments.

JEL codes: C93, D14, D91, O12.

Study pre-registration: This study is registered in the AEA RCT Registry and the unique identifying number is AEARCTR-0010472: https://www.socialscienceregistry.org/trials/10472.

Proposed timeline *(required)*

Activities	**Timing**
Selection of eligible households	August 2022
Baseline and Randomization	September – October 2022
Program Implementation	September 2022 – March 2023
Midline Survey	End of February – April 2023
Endline Survey	February – March 2024

Reported Checklist

Section	Item	Description and details to report	Reported?	Page(s)
Cover page *(required)*	*Title*	Informative title specifying the study design, population, and interventions	Yes	i
	Date of latest draft	Date of when the prospective review article was last edited.	Yes	i
	Study pre-registration status	Link, registration identifier and registry name (or intended registry if not yet registered)	Yes	i
	Keywords	Up to six keywords, to be used for indexing purposes.	Yes	i
	JEL codes	Up to six codes.	Yes	i
Abstract (*required)*	*Abstract*	Summarize research question, outcome variables, methodological framework and contribution in less than 150 words.	Yes	i
Timeline *(required)*	*Expected completion date*	Expected date for completion of the pre-specified research design.	Yes	ii
Introduction	*Background and relevance of the study*	Brief overview of previous research, and relevance of the research question(s) for the field of economic development	Yes	2-6
	Research question(s)		Yes	2
Research design	*Basic methodological framework*	Outline of the identification strategy in your study (experimental/non-experimental)	Yes	7-10
	Hypotheses	Pre-specified hypotheses to be tested in the study and reported as primary findings in the Stage 2 full manuscript	Yes	13-17
	Outcome variable(s)	Definition of the main outcome variable(s) and (if applicable) secondary outcome	Yes	18-31
		Specification of how outcome(s) will be constructed from the dataset	Yes	50-58
	Intervention(s)	Details of the intervention (when, where, how, by whom)	Yes	7-13
		Number of treatment arms and whether they are exclusive or overlapping	Yes	7-8
		Randomization strategy	Yes	7
		Blinding strategy (if applicable)	Yes	8-9
		Instructions and supporting materials for administering the intervention	Yes	7-13
		Source(s) of exogenous variation	Yes	6-7
	Theory of change	How and why the intervention is predicted to lead to certain effects	Yes	13-17
	Sample	Specification of unit of analysis (individuals, organizations, countries, etc.)	Yes	7
		Data source(s)	Yes	12-13; 50-58
		Projected sample size and statistical power calculations	Yes	10; 36
	Variations from the intended sample	Specification of the degree of attrition that may threaten the robustness of the study	Yes	32
		Strategies to deal with attrition, non-compliance with the assigned treatment, etc.	Yes	32-36
	Data collection and processing	Type of data, collection method/data source(s), and timeline for collection	Yes	12-13; 50-58
		Rule for terminating data collection / stopping rule	No	
		Data management plan	Yes	61-69
		Pilot data and experiments run in preparation of the Stage 1 submission	Yes	7-13
Empirical analysis	*Statistical method(s)*	Main evaluation method(s) and underlying assumptions	Yes	7-8; 15-18
		Rules for handling missing values	Yes	33
		Definition and rules for handling outliers	Yes	33
	Multiple hypothesis testing	Strategies to prevent false positives	Yes	35
	Heterogeneous effects	Anticipated heterogeneous effects and theoretical justification	Yes	27-31
	Statistical model	A functional (mathematical) form of the causal mechanism explored in the study	Yes	15-18
		Specification if regression model is linear, generalized linear, or other	Yes	15-18
		How will standard errors be calculated	Yes	16
Limitations and challenges	*Challenges in the study implementation*	Potential objective circumstances that might jeopardize the implementation of the proposed study design	Yes	33
Administrative information *(required)*	*Ethics approval*	Statement confirming that all necessary ethics approvals are in place.	Yes	70
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Other items	*Appendices*	Tables and figures	Yes	43-58

Helping Cash Transfer Recipients Prosper: Experimental Evidence from a Humanitarian Setting*

Till Wicker, Patricio Dalton, Daan van Soest

July 19, 2023

Abstract

Unconditional cash transfers are a popular social protection policy, but their impact is often short-lived. One plausible explanation is that recipients face challenges committing to long-term plans, and hence struggle to save or invest enough of the cash transfer to become self-reliant. By means of a field experiment with 861 refugee households in Uganda, we test whether a mental accounting intervention increases recipients' self-reliance. While control households receive their monthly cash payment in one envelope, treatment households are offered the opportunity to divide theirs between four envelopes labeled with their intended use ("Education", "Health", "Investment", and "Other"). Furthermore, the treatment group is randomized into two sub-groups: one where they choose their allocation, and another where they are first shown a default recommended allocation. We test the impact of the treatments on spending behaviour and downstream variables, once the cash transfer program ends, and one year after.

Keywords: Cash transfers, humanitarian aid, refugees, mental accounting, soft commitment.
JEL codes: C93, D14, D91, O12.

*Department of Economics, Tilburg University. AEA RCT identification number: AEARCTR-0010472. This project received IRB approval from Tilburg University (IRB FUL 2022-004) and Mildmay Institute of Health Sciences (MUREC-2022-144). We gratefully acknowledge funding from the Dutch Research Council (NWO) Open Competition grant 406.21.E8.004.

1 Introduction

Cash transfers are an increasingly popular social protection policy in developing countries due to their flexibility, scalability, and preservation of individual autonomy. However, unless the cash transfers are very large lump-sums (Haushofer and Shapiro, 2016) or over a multi-year time horizon (Banerjee et al., 2023), promising short-term effects quickly dissipate once the cash transfer ends (Bastagli et al., 2016; Ercolano and Woolfenden, 2021; Altındağ and O'Connell, 2023). One potential cause may be the presence of self-control challenges, defined as the inability to manage one's impulses, emotions, and behaviors to achieve long-term goals. While the cash transfers allow the recipient to save and invest in (human) capital, recipients may struggle to commit to their savings and investment plans.

For this project, we partner with the Danish Refugee Council (DRC) to evaluate whether a light-touch intervention can improve the effectiveness of a seven month-long unconditional cash transfer program (of $8.36, or $22.89 PPP, per person per month), by addressing these self-control challenges. The context is a Randomized Controlled Trial among 861 highly vulnerable refugee households in Rhino Camp and Imvepi refugee settlements in Uganda. The intervention we design alters the transfer modality by using a soft commitment device that harnesses mental accounts. Instead of receiving their monthly cash transfer in one unlabeled envelope (the status quo), households are offered the opportunity to receive their cash transfers across four envelopes labeled "Education", "Health", "Investments", and "Other". We implement two versions of this intervention; one in which households allocate their cash transfer across the four different expenditure categories, and one in which households are first shown a default recommended allocation across the four envelopes, which they can either accept or adjust. Outcome variables are measured shortly after the cash transfer ends and one year later to evaluate the persistence of effects.

As is the case in the control group, households in the two treatment arms are free to spend their funds on whatever goods or services they like. Spending may thus be perfectly fungible, but pre-allocating the cash across the four envelopes can act as a soft commitment device. The four labeled envelopes make mental accounting explicit, by partitioning the cash transfer across multiple envelopes and labeling them (Cheema and Soman, 2008; Soman and Cheema, 2011). As posited by Thaler (1985), mental accounts can reduce the fungibility of money and align spending with ex-ante allocations, bringing together the intentions of the 'doer' with the actions of the 'planner' (Thaler

and Shefrin, 1981). Furthermore, the default recommended allocation provides households with valuable information on how to allocate their budget (Thaler and Sunstein, 2008; Mertens et al., 2022).

At baseline, we observe that the demand for commitment is very high: 93% of treatment households opted to receive their cash transfers allocated across the four labeled envelopes. Of these households, 83% stated that the four labeled envelopes would help them with their financial discipline, savings, and to resist temptation goods. This is in line with Ercolano and Woolfenden (2021) who document that refugee households in Uganda "had planned for expenditures towards the end of the cash transfer but had not saved enough," and "some did suggest that it might make sense for organizations to pay for the school fees directly, in order for the (cash transfer) recipients not to be tempted", indicating that self-control challenges could be undermining the effectiveness of cash transfers.

We measure outcome variables during a midline just after the cash transfers end, and an endline one year later to estimate the persistence of eventual treatment effects. Main outcome variables are: spending on productive investments, savings and durable assets, and education- and health-related expenses. We anticipate positive effects of our interventions on outcome variables and subsequent downstream variables, and identify several potential mechanisms and heterogeneous treatment effects.

The findings of this paper can be generalizable to contexts where physical cash transfers programs are in place, which are still widely used in humanitarian and development settings. Particularly, these are contexts where the population is vulnerable, people do not have access to phones, or the digital infrastructure is not sufficiently developed. For example, during Covid-19, 31 lower- and lower-middle income countries had cash transfer programs with a physical cash component, reaching 260 million beneficiaries. Of these, 16 countries offered only physical cash transfers, reaching 163 million recipients (Gentilini et al., 2022).

This paper contributes to three primary fields. First, it contributes to the literature evaluating cash transfers as a social protection policy. This paper establishes whether the effectiveness of cash transfers can be enhanced by low-cost interventions, and by how much. While the effects of cash transfers have been widely studied (Bastagli et al., 2016; Haushofer and Shapiro, 2016) - including in humanitarian settings (Hidrobo et al., 2014; Aker, 2017; Ozler et al., 2021; Altındağ and O'Connell, 2023) - few papers have looked at how the effectiveness of cash transfers can be improved. Studies in

this literature typically combine cash transfers with effective interventions such as psychosocial counselling or asset transfers (Blattman et al., 2017; Haushofer et al., 2020; Bossuroy et al., 2022). While these interventions have been shown to improve the effectiveness of cash transfers, they are often too expensive to be implemented at scale. Given the majority of funders of cash transfer programs are either governments of developing countries or (humanitarian) NGOs with restricted budgets, these costly interventions imply a smaller sample of beneficiaries for a fixed budget.

To the best of our knowledge, only one paper has tested whether the effectiveness of cash transfers can be enhanced by a low-cost intervention. Orkin et al. (2023) expose one treatment arm to a 90-minute long "future orientation" workshop on top of a cash transfer in Kenya; they find no additional impact compared to the treatment arm that got only the cash transfer. Our study differs from that of Orkin et al. (2023) because theirs does not take place in a humanitarian setting, and their cash transfer is an irregular three-time transfer totaling $2237 PPP (compared to our seven monthly payments of, on average, $1018 PPP, or $372). By altering the transfer modality to introduce four labeled envelopes across which to allocate the cash transfer, our intervention offers several advantages: it has negligible upfront fixed costs, it seamlessly integrates into ongoing NGO operations without additional labor, it is highly scalable, and it is easily adaptable to new settings (including digital payments). Given the popularity of cash transfers - both among recipients and donors - further research into their cost-effectiveness and how to improve them is required. Our paper contributes to this literature by evaluating the effectiveness of a cheap, flexible, and highly-scalable innovation that is grounded in economic theory.

Second, this paper contributes to the literature on mental accounting and soft commitments. Both have been extensively studied theoretically and empirically (Thaler and Shefrin, 1981; Thaler, 1985; Heath and Soll, 1996; Thaler and Benartzi, 2004; Cheema and Soman, 2008; Soman and Cheema, 2011; Brune et al., 2017; Aggarwal et al., 2023). Soman and Cheema (2011) were among the first to test the effectiveness of mental accounts in a developing country setting, offering workers in rural India the opportunity to set aside money for education by storing it in a labeled envelope. To the best of our knowledge, we are the first to harness mental accounting in the context of an unconditional cash transfer program, the first to do so in a humanitarian context (where psychological constraints may exacerbate self-control challenges; Kim and Park (2015)), and the first to empirically measure the difference between self-imposed and

externally-recommended soft commitments. Furthermore, because we offer multiple labeled envelopes - instead of just one as in Soman and Cheema (2011) - we can measure tradeoffs between different mental accounts. Aggarwal et al. (2023) introduce multiple physical mental accounts via painted lockboxes in urban Malawi, finding large positive effects on savings. Compared with the lockboxes, envelopes are subtler, cheaper, offer a visual reminder of the intended savings, and act as a softer commitment device.

We also contribute to the insights of Prelec and Herrnstein (1991) who distinguish between behavior-governing rules that are determined by "agents who have our interests in mind" and those "constructed by ourselves as we see the need for them". By comparing the default allocation treatment to the own-choice treatment, we can empirically distinguish between their effectiveness.[1] At baseline, we see a statistically significant different allocation across the four envelopes between the self-imposed and externally-recommended treatments, already an interesting finding in and of itself.

Third, this paper contributes to an emerging literature on humanitarian aid. The number of people that are dependent humanitarian aid is increasing, with over 100 million displaced individuals and over 300 million in need of humanitarian assistance (Urquhart et al., 2022; UNHCR, 2022). These numbers are expected to continue rising, as the International Organization for Migration projects up to one billion climate migrants alone by 2050 (IOM, 2014). With 74% of humanitarian aid recipients living in protracted displacements settings, humanitarian organizations are shifting their focus from purely addressing basic needs to incorporating development objectives, and thus adopting a longer time horizon for both their programs and outcome variables of interest.[2] As a consequence, cash transfers are becoming a very popular humanitarian policy, due to their scalability, flexibility, cost-effectiveness and the greater autonomy they offer recipients. In 2021, the value of humanitarian cash transfers exceeded $6.7 billion (UNHCR, 2021; Urquhart et al., 2022). If effective, our low-cost, light-touch, and highly scalable intervention would thus be very policy relevant indeed.

The remainder of this pre-analysis plan is structured as follows. Section 2 describes the context our study takes place in, and Section 3 presents the experimental design.

[1] The default allocation is based on the Minimum Expenditure Basket, which was created by the Uganda Cash Working Group, consisting of all humanitarian actors that engage in cash transfers in Uganda. We believe they satisfy Prelec and Herrnstein's definition of a benevolent actor due to the humanitarian Hippocratic oath of "do no harm". For more information on the Minimum Expenditure Basket, see Appendix A.

[2] A protracted displacement setting is defined as residing in a country with five or more consecutive years of UN-coordinated appeals for humanitarian funding.

Section 4 outlines the Theory of Change, Section 5 outlines primary, secondary, and exploratory outcome variables, and Section 6 describes the econometric specifications.

2 Research Context

Uganda experienced a major influx of refugees in 2016-2018, when over 900,000 South Sudanese nationals fled a civil war. Since then, refugee numbers have continued to increase, and is currently estimated to be around 1.5 million. Upon arrival at a refugee settlement, each refugee household is allocated a private 30-by-30 meter plot of land to build their shelter on and carry out small-scale cultivation. Furthermore, refugees have the freedom of movement as well as the right to work. Nevertheless, 91.5% of the refugees are currently residing within the refugee settlements.

Despite the international acclaim for their progressive refugee policy, Uganda is facing increasing difficulties in hosting refugees, caused by the combination of increasing needs and decreasing funds.[3] There is thus a dire need for policies that are able to help refugees regain self-reliance, and hence we partnered with the Danish Refugee Council (DRC) to improve the effectiveness of their cash transfer program. The program gives unconditional cash transfers in seven monthly installments of $22.89 PPP ($8.36) per household member per month to the most vulnerable households in four refugee settlements, with a dual aim - helping recipient households to meet their basic needs, but also to help them regain self-reliance by means of savings and investments.[4]

Recipients were free to choose their preferred modality, with the options being physical cash or mobile money. Over 90% chose physical cash, with reasons including not owning a mobile phone, poor cellular connection within the settlements, and cash being more widely accepted by merchants in the settlements. Nevertheless, households were free to transition towards mobile money throughout the cash transfer cycle, and the NGO invited a telecommunications company to be present at every cash transfer distribution to help recipients transition towards mobile money.

The size of the transfer is based on the Minimum Expenditure Basket (MEB), a calculation done by the Uganda Cash Working Group that captures the costs of a refugee household meeting its basic needs. The MEB consists of eleven categories divided into *food* and *non-food* items (see Appendix A), with DRC's cash transfers

[3]For example, the World Food Programme was forced to cut its food rations by 40-60% in 2021.

[4]DRC is one of five partners of the Uganda Cash Consortium, which carries out unconditional cash transfer programs in six refugee settlements across Uganda.

covering the MEB value for *non-food* items. In addition, all refugee households also receive food aid from the World Food Programme to cover the *food* component.

3 Experimental Design

3.1 Sample

The Ugandan Office of the Prime Minister, Mildmay Institute of Health Sciences, and Uganda National Council for Science and Technology granted us permission to conduct research in two refugee settlements, Rhino Camp and Imvepi. Both settlements are located in North-Western Uganda (see Appendix B), with populations of 143,200 and 62,874, respectively. Only the most vulnerable are eligible to receive the cash transfers, as determined by DRC.[5] Given DRC's budget, 1903 households were included in the cash transfer program. For our study, we exclude all single-person households, and also those of which the household head was under 18 or over 75. As our intervention is based on cash delivered in envelopes, we also excluded those households that received their first monthly cash transfer via mobile money. Of the remaining 1034 households we randomly selected 861 to be included in our RCT due to logistical and time constraints.

3.2 Interventions

We randomize our sample of 861 households across a control group, and two treatment groups. Randomization is stratified on: zone of residence, year of arrival, age and sex of the household head, country of origin, and the household's vulnerability score. The treatment groups are:

Control Group - Cash Only (*CO*): The control group is given their monthly cash transfer in one large, unlabeled envelope, the status quo.

Intervention Group 1 - Mental Accounting (*MA*): During the baseline survey, the head of the household is offered the opportunity to allocate their future monthly cash transfers between four smaller envelopes, labeled "Education", "Health", "Investments", and "Other" (see Figure 1), instead of one unlabeled envelope.[6] If the head of

[5]Vulnerability is measured on protection (e.g. disability, school attendance of children, chronic illness, single caretaker), economic (e.g. main income sources, negative coping mechanisms, food shortage), and health-related (e.g. condition of latrine, health needs met, water source) dimensions.

[6]Labels were pre-tested with DRC staff and randomly selected non-recipient pilot refugee households to ensure that the stickers represented the intended labels. Stickers, instead of text, were used

household accepts the offer, they are subsequently asked how they would like to allocate their monthly cash transfer across the four envelopes. At future cash distributions, the cash transfer is divided accordingly across the four envelopes.

If the head of household does not accept the offer of four envelopes, they receive their future monthly cash transfer in one large envelope, as in ***CO***.

Intervention Group 2 - Mental Accounting with Default (*MAD*): The setup is identical to ***MA***, except that if the head of household accepts the offer of the four labeled envelopes, they are shown a recommended allocation across the four envelopes, based on the Minimum Expenditure Basket. The head of household can choose to either accept or reject the recommendation. If they reject the recommendation, they are asked how they would like to instead divide their cash transfer across the four envelopes. At future cash distributions, the money is allocated accordingly, as in ***MA***.

If the head of household does not accept the offer of the four labeled envelopes, they receive their future monthly cash transfer in one large envelope, as in ***CO***.

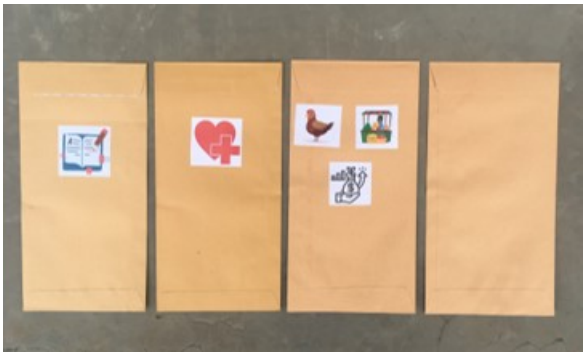

Figure 1. Four Labeled Envelopes ("Education", "Health", "Investments", "Other")

3.2.1 Logistics of Cash Transfer and Envelopes

Cash transfers are paid out on a monthly basis, on a pre-specified date. A money van from PostBank, a Ugandan bank, arrives at various locations throughout the refugee settlements at a pre-announced time. DRC staff first verify the identity of the recipient household head, after which the household head collects their cash transfer from the money van (see Figure 2). Once they receive their cash, the household head moves to the *Envelopes Stand* (see Figure 3). Household heads wait in a queue standing 3

because of the high level of illiteracy among our sample (68%).

meters from the stand, and arrive one at a time. Order and safety is ensured by two armed security guards.

At the *Envelopes Stand*, DRC workers verify whether the household is to receive the four labeled envelopes, or not. If not, the money is placed in one large unlabeled envelope.

Figure 2. Cash Distribution.

Figure 3. Envelopes Stand.

If the household had opted for receiving their cash in the labeled envelopes, the amount of cash it is entitled to is divided between the four envelopes based on the allocations elicited during the baseline survey. Once the money is divided across the four envelopes, the four envelopes are placed into one large unlabeled envelope. This is done to avoid signaling a difference in treatments, as all households leave the cash distribution site with their cash transfer in one large unlabeled envelope. Hence, we reduce the chance that households in the Control Group (***CO***) are aware of the other two treatments, minimizing spillovers.

The cash distribution process also has a Complaints Desk, where recipient households can lodge complaints to DRC staff. The staff members responsible for running the complaints desk have been trained by the research team on how to document and respond to complaints regarding the RCT and its treatments. To date, no complaint related to the field experiment has been lodged.

3.2.2 Uptake of Treatment

Demand for commitment was high at baseline: 93% of households in the ***MA*** and ***MAD*** treatments opted for the four envelopes. Furthermore, 96% of households in the ***MAD*** treatment accepted the default allocation. When asked about the perceived

advantages of the four labeled envelopes, 83% stated that they will help with financial discipline, savings, or to resist purchasing temptation goods. This is in line with our hypothesis that partitioning and labeling the envelopes within which the cash transfers are distributed helps discipline spending (Cheema and Soman, 2008; Soman and Cheema, 2011; Dupas and Robinson, 2013).

Figure 4 presents histograms of allocation shares across the four envelopes for households that opted for the four envelopes. While the distribution in the ***MAD*** treatment is almost entirely at the default allocation, the ***MA*** distribution is spread out more. Means are statistically significantly different between the two treatments: the shares for "Education" and "Health"are higher for ***MA***, but "Investment" and "Other" are higher for ***MAD***.

Table 1 presents the differences in the uptake and between-envelope allocations across the ***MA*** and ***MAD*** treatments. While a higher allocation than the default in one category necessitates a lower allocation than the default in another category, what is surprising is the wide distribution of allocations in the ***MA*** treatment, and that neither the mean nor median ***MA*** allocation equal the ***MAD*** default.

3.3 Descriptive Statistics

Our sample consists of 861 households (or 5471 individuals). 90% of these originate from South Sudan, and the other 10% from the DR Congo. 81.6% of the household heads are female who are, on average 38 years old, and 85% of them are classified as moderately or severely depressed. Households' mean (and median) monthly income - excluding cash transfers - is $44.25 PPP ($11.45 PPP), resulting in an average daily income of $0.23 PPP per household member.[7] Households primarily earn income from tending livestock or cultivating crops, in addition to the monthly food ration they receive from the UN's World Food Programme. For 85% of the households, the monthly cash transfer value exceeds their monthly income at baseline.

Tables 7 and 8 in Appendix C presents the results of the balance tests for the three treatment groups. The first three sets of columns present the mean and standard deviations for each of the characteristics of the three groups (as well as the number of households therein), the fourth column presents the value of the F-test for joint equality, and the last three columns present p-values of the bi-comparisons, with the

[7]The World Bank's extreme poverty line lies at $2.15 PPP per person per day. The non-PPP dollar values for the mean and median monthly income are $16.17 and $4.18.

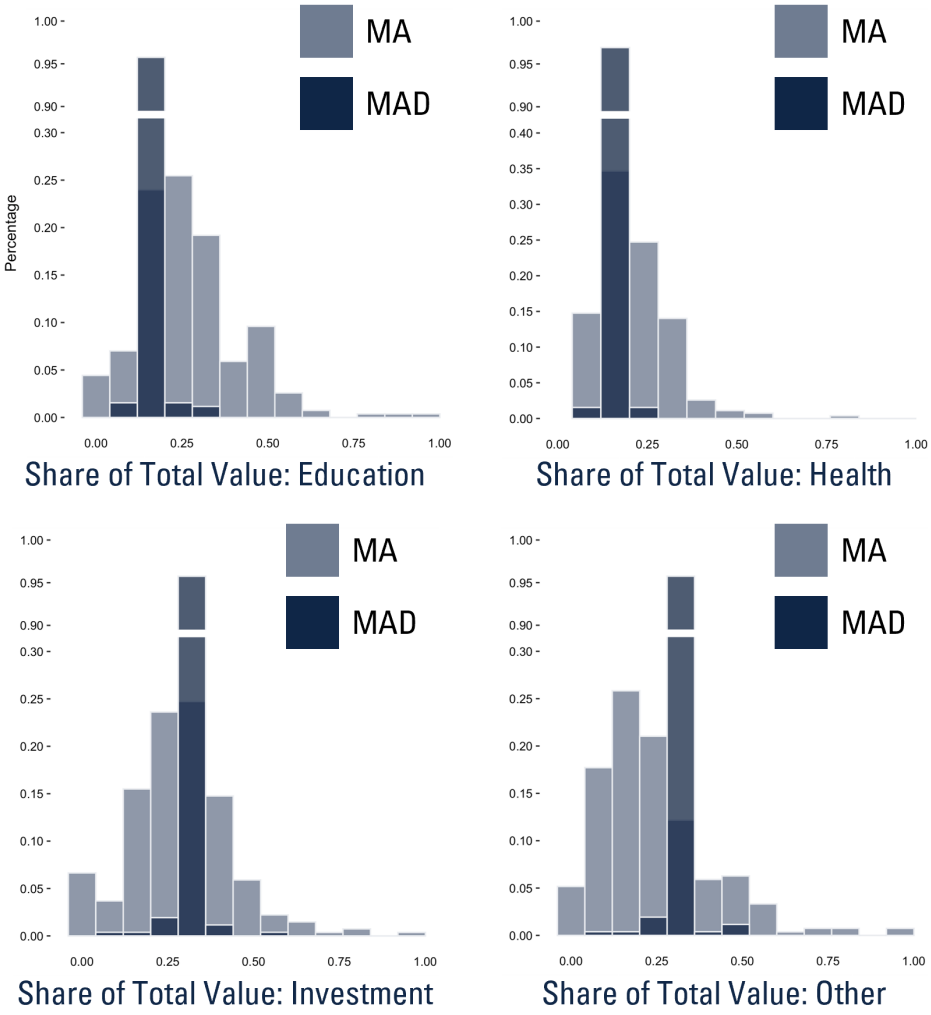

Figure 4. Histogram of Allocations across the Four Envelope Categories.

asterisks indicating significant differences based on standard t-tests. As is clear from this table, differences are typically small and statistically insignificant. None of the F-tests are significant at the 10% level or less, just three of the 75 bicomparisons for non-stratified variables are significantly different from zero at either the 10% or 5% level (Monthly Income, Self-Control, and Having Experienced a Negative Shock). Overall, balance is thus very good.

Table 1: Allocations Across Envelopes: ***MA*** vs. ***MAD***.

		(1)		(2)	(3)
		MA		***MAD***	Pairwise t-test
Variable	N	Mean/(SD)	N	Mean/(SD)	Difference
Uptake	288	0.938	281	0.925	0.013
		(0.242)		(0.263)	
Default Accepted			260	0.962	
				(0.193)	
Education Share	270	0.268	260	0.168	0.100***
		(0.149)		(0.021)	
Health Share	270	0.198	260	0.173	0.025***
		(0.112)		(0.017)	
Investment Share	270	0.288	260	0.330	-0.042***
		(0.148)		(0.023)	
Other Share	270	0.246	260	0.330	-0.084***
		(0.163)		(0.023)	
Joint distribution test					$\chi^2(2,8) = 40.24$***

Notes: Columns (1) and (2) show the average value (and standard deviation) for respondents in the two intervention treatments: Mental Accounting and Mental Accounting with Default. Differences in shares are reported in column (3), with statistical significance as determined using standard pairwise t-tests. The Chi-squared test checks for the equality of the distributions over the four envelope categories between ***MA*** and ***MAD***. ***, ** and * represent significant differences at the 1, 5 and 10% level, respectively.

3.4 Timeline and Survey Instrument

The baseline survey took place in September and October 2022, after the first and before the second cash transfer. The reason is that it was logistically not feasible to survey households before they received their first cash transfer; all interventions thus refer to future cash transfers (e.g. months 2-7). DRC adopted a staggered roll-out of the cash transfer program, resulting in 438 households being surveyed in September and 423 in October. The household was represented by the self-elected household head (the person who also collects the cash transfer on behalf of the household), and the interview took place in their home. Treatment status was revealed in the last module of the baseline survey, in which treatment households were offered the opportunity to receive future cash transfers in four labeled envelopes. All baseline variables were thus

measured before households were aware of their treatment status.

Survey tools were piloted on previous recipients of the cash transfer program - households that are similar in characteristics yet not eligible for the current cycle of cash transfers and hence not in our sample. Surveys were translated and back-translated (and then further adjusted based on input from the enumerators) from English to Lugbara and Swahili. The survey was also administered in two other languages, Juba Arabic and Kakwa - both informal, local languages that are spoken but not written, and which were translated on the spot by the enumerators from English. A substantial portion of the training of the enumerators placed emphasis on using the same words and terminology when translating into Juba Arabic and Kakwa.

A midline survey is scheduled for the last week of February and March 2023, one week after the completion of the cash transfer program. The aim of this survey round is to measure impacts immediately after the cash transfer program ends. An endline survey will take place in February and March 2024, one year after the midline in order to evaluate the persistence of the effects.

4 Theory of Change

4.1 Four labeled Envelopes Versus One Unlabeled Envelope

As outlined in Section 1, mental accounts and other forms of soft commitment devices (e.g. savings defaults) have been highly effective in a variety of settings, including among microenterprises and households in Malawi (Aggarwal et al., 2023; Brune et al., 2017) and wage labourers in India (Soman and Cheema, 2011). In the context of unconditional cash transfers among vulnerable refugees in Uganda, we hypothesise that being offered the opportunity to allocate money across four labeled envelopes will improve wellbeing via three different mechanisms: (i) it will induce recipients to think more acutely about their plans for the future, (ii) receiving a new set of envelopes every month acts as a reminder of those original plans, and (iii) taking out money from an envelope to spend on a different goal makes it very salient to the recipients that they are diverging from their initial plan and can be psychologically taxing. The three mechanisms will induce recipients to plan to save more, and spend their money more in line with their initial plans. The long-run effectiveness of the cash transfers are thus expected to improve as a result, as recipients save and invest more of the cash transfer in future-oriented expenditures.

By encouraging more future-oriented savings and expenditures, the mental accounts discourage expenditures on other items. Based on insights from Ercolano and Woolfenden (2021) and discussions with the NGO, cash transfer recipients in previous rounds of the program (before our interventions) typically spent part of their cash transfer on (i) more expensive food in addition to the food aid they receive from WFP, (ii) temptation goods (e.g. alcohol, tobacco, drugs, gambling), (iii) more luxury versions of essential items (e.g. coloured bed sheets instead of white ones), and (iv) "non-essential" items (e.g. take a motorbike for a journey they would previously have walked). While these types of expenditures may improve the recipient's wellbeing in the short-run, they are unlikely to improve long-run wellbeing to the same extent as savings or future-oriented investments such as in education, health, or income-generating activities do. Hence we posit that the mental accounts will change the recipient's spending patterns, away from non-essential or "luxury" items and towards future-oriented savings and investments. This may result in short-term sacrifices (e.g. walking instead of taking the motorbike), however these are expected to be outweighed by the greater longer-term positive effects on wellbeing.

Building on the literature of behavioural poverty traps, cash transfers present an excellent opportunity to introduce mental accounts that encourage future-oriented saving and spending. Laajaj (2017) predicts that as poverty concerns are relaxed through cash transfers, recipients expand their time horizon and think more about the future. As such, in the dual-self problem, the "planner" exhibits a longer time horizon as a result of the (anticipated) cash transfer, and hence allocates a greater share of their income to future-oriented investments, compared with if they had not received the cash transfer. Subsequently, the "doer" will be reminded of the "planner's" longer time horizon when receiving a new set of envelopes with the appropriate allocations every month. Similarly, due to the reduced fungibility of money as a result of the mental accounts, the "doer" will more likely adhere to the "planner's" future-oriented budget. Bernheim et al. (2015) develop a theoretical model that predicts that as cash transfers increase a household's stock of assets, the household will be better able to exert self-control. When the recipients collect their cash transfer allocated across the four envelopes, they are hence more likely to align their spending with the allocations, and less likely to spend the money on something else, as a result of the greater self-control due to the cash transfer. The reduced fungibility of money due to the mental account is further enhanced by the recipient's greater self-control as a result of the cash transfer

alleviating poverty concerns.

The interventions are expected to help households plan and budget their cash transfer allocation, as well as help households commit to their plans. 85% of the sample's household heads are women – highly unusual given the refugees' countries of origin (South Sudan and DR Congo) are very patriarchal societies. This means that for many women it is the first time they are responsible for household budgeting and dealing with (relatively) large sums of money – and as such, the mental accounts can provide a useful budgeting tool and reminder of how they planned to spend the money. In line with this, 74% of households that opted for the intervention stated it would help with financial planning and budgeting.

We posit that introducing mental accounting will be effective because it induces recipients to think about their future plans, reminds the recipient of their plans, and reduces the fungibility of the cash transfer. While the intervention is likely to be most effective if the recipient keeps the money separated across their four envelopes, the intervention is still expected to be effective even if they do not – because of the "induced thinking about the future" and monthly reminders. This is relevant because among the households with savings at baseline, 14% save at home, while 86% are members of a savings group. For those saving at home, we expect the envelopes to allow for targeted savings and a clear partitioning of expenditures. The savings groups also allow for targeted savings, however they are less salient. Unlike traditional ROSCAs, group members do not have to contribute a fixed amount, they can have a specified savings goal, and the total amount does not get paid out to one person every meeting. The bookkeeper tracks each individual's remaining savings and purpose for the savings. Like a traditional ROSCA, the money gets kept in a larger lockbox for the whole group of 20-25 members, with three separate keys kept by different group members. Hence if cash transfer recipients want to save a share of the amount in a labeled envelope, they can deposit it in their group savings account, with the appropriate saving purpose.

To sum up, our Theory of Change hence predicts that the four labeled envelopes will help households budget their cash transfer better, and help households commit to their planned budget through regular reminders and by reducing the fungibility of money. As such, future-oriented savings and investments substitute non-essential or "luxury" expenditures, and the mental accounts are still effective if households do not use the envelopes as their primary form of savings. Hence our hypothesis is that the 4 Envelopes will increase the spending allocation towards future-oriented expenditures,

which will have positive later effects on downstream outcome variables such as income, self-reliance, and education- and health-related outcomes. To test this hypothesis, we estimate the following regression:

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$$Y_{ht} = \beta_0 + \beta_1 FourEnvelopes_h + \delta_e + \gamma_z + X_h + Y_{h0} + Early_h + \varepsilon_h. \quad (1)$$

Here Y_{ht} represents outcome variables primary, secondary, and exploratory outcome variables are described in Section 5 for household h measured at time t. Time $t = \{1, 2\}$ refers to the midline survey (to be implemented one week after the cash transfer ends) and the endline survey (and one year later). X_h is a vector of baseline covariates, consisting of our stratification variables as well as Monthly Income, Self-Control, and Having Experienced a Negative Shock, the key variables that was found to be unbalanced (Bruhn and McKenzie, 2009). As a robustness check, control variables will be selected using a double-selection LASSO across all specifications (Belloni et al., 2014). Whenever available, we will also include the baseline value of the variable of interest (Y_{h0}), resulting in an ANCOVA specification (McKenzie, 2012). Next, we also include fixed effects for the Settlement Zone in which the household lives (γ_z) and for the enumerator (δ_e).[8] $Early_h$ is an indicator that equals one for households that received their first cash transfer in August 2022, and zero for households that received their cash transfer in September 2022, capturing any time-specific effects. Finally, ε_h is a heteroskedasticity-robust error term.[9] Estimation is by means of OLS.

4.2 MA v. MAD

The ***MAD*** default treatment provides households with additional information compared with the ***MA*** treatment, as the heads of household obtain information on the Uganda Cash Working Group's budget allocation via the default recommendation. Defaults are sticky if they are sufficiently close to one's preferences, or if one has no preferences (Brown et al., 2013; Sunstein, 2017). The stickiness of the ***MAD*** default (with 96% of households accepting the default) is likely due to the latter reason: the mean and distribution of the ***MA*** allocations are significantly different from the ***MAD***

[8] The Settlement Zone is chosen as the level of fixed effects as cash distributions take place per Zone. Enumerator fixed effects are used to follow Maio and Fiala (2020).

[9] Following Abadie et al. (2022), we cluster standard errors at the household level, as randomization was implemented at the household level.

default (see Figure 4; Table 1), and the sample consists primarily of heads of household with little or no budgeting experience. In line with this reasoning, the ***MAD*** treatment's sticky default can correct 'planning errors', where households incorrectly predict or neglect future expenses (Augenblick et al., 2023).

Unlike accepting the default in the ***MAD*** treatment, the ***MA*** treatment involves an active choice about the allocation across the expenditure categories, revealing a preference for larger education- and health-related budgets (see Figure 4; Table 1). The active choice made in the ***MA*** treatment can also make households more likely to stick to their budget when making spending decisions (Falk and Zimmermann, 2017, 2018; Brownback et al., 2023), and can hence more closely align actual spending with the planned spending. Alternatively, the active choice in ***MA*** could result in a naïve diversification heuristic, resulting in the household dividing the cash transfer equally across the four envelopes (Koszegi and Matejka, 2020). This was not observed in the budgeting decision, as only one household out of 270 did this. Nevertheless, the naïve diversification heuristic can also play a role in the spending of the budget (e.g. the spending on each household member is the total budget divided by the number of household members). Given the interventions are a soft commitment device, actual spending patterns are nevertheless likely to deviate from planned spending.

Given the arguments favouring both ***MA*** and ***MAD***, we remain agnostic regarding which one will outperform the other. To measure the differences between ***MA*** and ***MAD***, we estimate the following regression:

$$Y_{ht} = \beta_0 + \beta_1 MA_h + \beta_2 MAD_h + \delta_e + \gamma_z + X_h + Y_{h0} + Early_h + \varepsilon_h \tag{2}$$

where MA and MAD are indicators capturing whether household h was randomized into the ***MA*** or ***MAD*** treatment, respectively.

While the differences in means in the allocations across the envelopes between ***MA*** and ***MAD*** are quite small, the distributions are very different. Furthermore, given the intervention is light touch, actual expenditures may differ significantly from the budgeted allocations, and hence slight differences in means could result in even bigger differences in actual spending. To further understand the differences between the chosen allocations for ***MA*** and ***MAD***, we will perform an additional regression analysis. Specifically, we will only compare ***MA*** vs. ***MAD*** (not considering ***CO***). ***MAD*** will be the omitted variable, and we regress the outcome of interest on a ***MA*** dummy, and a ***MA*** dummy interacted with the sum of squared differences between household i's

MA allocation versus the default proposed by ***MAD*** (for all four envelopes). The regression contains the usual controls:

$$Y_i = \beta_0 + \beta_1 * MA + \beta_2 MA \cdot SSD + \delta_e + \gamma_z + X_h + Y_{h0} + Early_h + e_h \quad (3)$$

Where SSD = Sum of Squared Differences, $SSD = \sum_x (x_h - \tilde{x})^2$, where $x = \{Education, Health, Investment, Other\}$, x_h is the share of the total cash transfer that household h allocated to envelope category x, and $\tilde{x}$ is the ***MAD*** default allocation for envelope category x. The regression will only be run among households that opted in for the treatment, and its interaction term captures whether the ***MA*** treatment is more effective for households whose initial budget allocations would be far away from the default recommendation.

5 Outcome Variables

5.1 Primary Outcome Variables

Primary outcome variables capture changes in spending patterns due to the interventions. As outlined in Section 4, the treatment is expected to increase future-oriented savings, investments, and expenditures, in turn reducing the marginal propensity to consume. Specifically, the primary outcome variables we report are:

5.1.1 Spending on Productive Investments

Through helping households plan and then spend according to their plans (and hence substitute short-term consumption with future-oriented investments), the interventions are expected to increase investments in income-generating activities and productive assets.

> **H1:** Dividing the cash transfer across four labeled envelopes will increase spending on productive investments ($\beta_1 \geq 0$ in Equation 1 for Y_{ht} = Spending on Productive Investments).

Measurement: Value of productive assets for livestock, agriculture, and non-agricultural activities. Households are asked about the quantity of productive assets they have purchased in the last six months. Prices will be the median price after obtaining prices

from randomly chosen vendors from three different markets across the refugee settlements. All values will be aggregated (in 2021 USD) and winsorized at 1% to account for outliers.

5.1.2 Savings and Durable Assets

At baseline, we find that over 60% of households report a higher aspired level of savings than their expected level of savings, with one possible explanation being that households are aware of potential self-control challenges undermining their ability to save. By aiming to help overcome self-control challenges such that households are able to align spending with their plans, our interventions can lead households to spend less on immediate non-essential consumption, and in turn save and invest a greater share of their cash transfer.

Recipients are free to use the envelopes as they wish. While some households may decide to save within the envelopes by storing them - with the money inside them - at home, others may deposit their targeted savings in savings groups. Similarly, households are free to choose whether to combine money from the same envelope label (e.g. Education) across months, or keep them separately. By encouraging households to think about their budget allocation and how the money is best spent, the intervention can still have a positive effect on savings even if the envelopes are not used as a savings device themselves.

> **H2:** Dividing the cash transfer across four labeled envelopes will increase the value of savings and durable assets ($\beta_1 \geq 0$ in Equation 1 for Y_{ht} = Savings and Durable Assets).

Measurement: Savings either come in the form of financial savings or durable assets that can quickly be liquidized and are not income-generating (e.g. furniture). Self-reported saving amounts and the value of durable assets will be aggregated to measure total household savings (in 2021 USD) and subsequently winsorized at the 1% level.[10] If the household has no savings or durable assets of value, this will be coded as a value of $0. Furthermore, at midline we ask recipients whether the four labeled envelopes were used for savings.

[10]Households are asked which durable assets they own. Market prices will be determined based on taking the median value of three different vendors within the refugee settlements.

Savings (including Durable Assets) and Income will be used as a measure for a cost-effectiveness calculation of the interventions. Given the similarity of the intervention by Aggarwal et al. (2023), we will compare the cost-effectiveness of our intervention to theirs.

5.1.3 Education-related Expenses

Ercolano and Woolfenden (2021) document that households struggle to commit to paying school fees and other school-related expenses due to other temptations. Education within the settlements is not for free, as households have to pay school fees ($0.50 and $5.00 per term for primary and secondary schools, respectively) and buy school uniforms and appropriate shoes. Furthermore, transport to and from the school needs to be arranged, depending on the proximity to the school. At baseline, households reported to have spent 22% of their previous month's total consumption on education, in line with the mean allocations for the Education envelope in ***MA*** and ***MAD***.

> **H3:** Dividing the cash transfer across four labeled envelopes will increase education-related spending ($\beta_1 \geq 0$ in Equation 1 for Y_{ht} = Education-related Expenses).

Measurement: Education-related expenses include both school fees, as well as other costs related to schooling, such as school books, stationary, uniforms, and transport. Self-reported expenses will be aggregated (in 2021 USD) and subsequently winsorized at the 1% level. If the household has no school-related expenditures (e.g. because they do not have children), this will be coded as a value of $0.

5.1.4 Health-related Expenses

While health clinics are free of charge in the settlements, refugees nevertheless incur health-related costs, as they need to pay for transport to and from the clinics, and need to pay for non-prescribed medicine at pharmacies. Furthermore, some refugees visit health centres outside the settlements (where they have to pay transport, fees, and medicines themselves) due to the long wait times at health centres within the settlements. At baseline, 15.9% of monthly consumption was spent on health-related expenses, slightly lower than both the ***MA*** and ***MAD*** allocation for the Health envelope.

H4: Dividing the cash transfer across four labeled envelopes will increase health-related spending ($\beta_1 \geq 0$ in Equation 1 for Y_{ht} = Health-related Expenses).

Measurement: Health-related expenses include both medical fees, preventative expenses (e.g. malaria net, chlorine to purify water), purchase of medicines, and transport. Self-reported expenses will be aggregated (in 2021 USD) and subsequently winsorized at the 1% level. If the household has no health-related expenditures, this will be coded as a value of $0.

5.1.5 Marginal Propensity to Consume

Our interventions encourage households to substitute immediate consumption on "non-essential" goods with targeted savings and investments in education, health, and income-generating activities. As such, the marginal propensity to consume (MPC) on non future-oriented goods is expected to fall as a result of the interventions. The persistence of this effect beyond the duration of the cash transfers may depend on whether the households use the four labeled envelopes to separate non-cash transfer income.

H5: Dividing the cash transfer across four labeled envelopes will lower the marginal propensity to consume ($\beta_1 \leq 0$ in Equation 1 for Y_{ht} = Marginal Propensity to Consume).

Measurement: Self-reported allocation of spending in the last 30 days across different categories will be elicited at midline and endline. *Investments* will consist of spending on investments, education expenses, health expenses, construction, savings, and loan repayment, while *Consumption* will cover all other expenditures. The fraction of *Consumption* to *Total Expenditure* is the measure of the MPC.

5.2 Secondary Outcome Variables

Secondary outcome variables are downstream variables that can change as a result of changing spending patterns. It is more likely differences in downstream variables will be observed during the 1-year follow-up endline survey, rather than during the midline, which is immediately after the end of the cash transfer. Nevertheless, the four labeled envelopes are expected to have positive effects on the downstream variables.

5.2.1 Self-Reliance

The aim of the cash transfer program is to help vulnerable households regain control of their lives and transition towards self-reliance, even beyond the duration of the cash transfer program. As such, self-reliance is an all-encompassing measure that reflects the general living situation and prosperity of the program's beneficiaries.
Measurement: 12-item Self-Reliance Index, which was specifically designed for humanitarian settings.

5.2.2 Income

Mental accounts and other soft commitment devices help align the actions of the 'doer' with the intentions of the 'planner' (Thaler and Shefrin, 1981). This in turn can reduce current "non-essential" consumption and increase saving for longer-term investments necessary to achieve plans of having a sustainable source of higher income (Biljanovska and Palligkinis, 2018). Without any plan of how to generate an own source of income (if, for example, the household prefers to exclusively rely on humanitarian aid), soft commitment devices are unlikely to result in higher investments in income-generating activities, and in turn, higher income.
Measurement: Income can come from three sources: agriculture, livestock keeping, or non-agricultural activities. Self-reported household income across all three categories will be aggregated and subsequently winsorized at the 1% level to form a measure of total household income (in 2021 USD). See Section 5.4.6 for the measurement of the intention of having a sustainable source of income.

5.2.3 Food Security

Given the high level of vulnerability, and the limited food aid provided by WFP, many households struggle to be food secure. While the cash transfers can alleviate this concern as households can spend their unconditional cash transfers on more or better food, this stops once the cash transfers end. Hence a household can only sustainably increase food security if they either have a sustainable source of income, or have sufficient agricultural harvest to complement the WFP food aid.
Measurement: 5-item World Food Programme's Reduced Coping Strategies Index.

5.2.4 School Attendance

As discussed in Section 5.1.3, households face several education-related expenses. As such, households may not be able to afford to enrol their children to school. Furthermore, even if children are enrolled in school, there are multiple factors why children are not attending school five days a week. These include that the parents need the children to help at home/work (e.g. babysitting younger siblings), sickness or poor health preventing school attendance, or the inability to afford transportation to the school.

Measurement: Households are asked at midline and endline how many days each child of school-going age attended school in the week preceding the survey (Monday to Friday). The self-reported data will be compared to official administrative data on daily school attendance from the schools within the settlements.[11] School attendance will be averaged across all school-aged children in a household.

5.2.5 Ability to Meet Health Needs

Given the health-related costs that can arise in the refugee settlements outlined in 5.1.4, households may be unable to seek medical treatment for their conditions. As health costs are often unexpected and lumpy, they may often be not affordable unless the household has sufficient (targeted) savings or access to credit.

Measurement: During the midline and endline surveys, households are asked how many times each of their household members needed medical treatment in the last three months, and how many times each household member actually received medical treatment. The percentage of times health needs were met will be averaged across all household members.

5.2.6 Outstanding Loan Value

By encouraging cash transfer recipients to save and invest a larger share of their cash transfer via the use of the labeled envelopes, the value of outstanding loans is expected to decrease, as households are less likely to need to take out loans to (i) smooth consumption in response to an unexpected shock, and (ii) invest in an asset.

Measurement: Self-reported value of outstanding loans (in 2021 USD), winsorized at the 1% level to account for outliers. Households will further be asked what the loan's

[11] The administrative data was not yet available available at baseline.

purpose is, and hence we can provide qualitative support as to whether the loans are for productive purposes, or in response to shocks.

5.2.7 Value of Remittances Given

The pressure to share part of the cash transfer with neighbors, family, or friends is widespread - and often cited as a reason for the limited effectiveness of loans or cash transfers (Riley, 2023). We hypothesize that dividing the cash transfer across several labeled accounts will make it easier for recipients to turn down remittance requests by referencing to the intended allocated categories.
Measurement: Self-reported value of remittances given to other people in the last 30 days (in 2021 USD).

5.2.8 Spending on Temptation Goods

Mental accounts help align actual spending to planned spending, hence inducing a sense of remorse or guilt if money is spent on other goods or services (Soman and Cheema, 2011). As such, we anticipate a reduction in the share of spending on "non-essential" consumption goods, including temptation goods, as they are not labeled under one of the mental accounts. Several households mentioned alcohol, cigarette, or drug consumption as a bad habit possessed by a member of the household that they would like to discourage or stop.
Measurement: Self-reported spending on temptation goods in the last 30 days (in 2021 USD). The measure will be qualitatively complemented by the reported frequency of the occurrence of bad habits.

5.2.9 Spending Alignment

Soft commitment devices that harness mental accounting can help households overcome self-control challenges by helping align spending with ex ante planning. As such, we anticipate that the treatments will result in more closely aligned monthly spending patterns with ex ante budgets due to the partitioning of the cash transfer across several labeled accounts. The average correlation between the share of the total cash transfer allocated to a particular envelope, and the allocated share to that same category in the hypothetical choice scenario is 0.17 in the ***MA*** treatment, and 0.01 in ***MAD***.
Measurement: During the baseline survey, we present a hypothetical choice scenario in

which the household receives a lump-sum cash transfer of $153 PPP ($56) per person, and ask how the household would allocate the cash transfer across several different categories.[12] These are subsequently aggregated into four categories: "Education", "Health", "Investment", and "Others". The hypothetical choice scenario allocation is elicited before households are informed of their treatment status, and is hence independent of envelope uptake and allocations.[13] During the midline, we ask households how they have spent their last cash transfer across the same consumption categories in the last 30 days. The aligning of spending will be measured as the sum of differences in spending shared across the four categories, weighted by the self-reported importance of each category:

$$Align_h = \sum_x \omega_x \cdot (x_1 - x_0)^2,$$

where $x = \{\text{Education, Health, Investment, Other}\}$ and $w_x = \dfrac{\text{Baseline Allocation on x}}{\text{Baseline Budget}}$, and where subscripts 0 and 1 refer to the hypothetical and actual spending share elicited at baseline and midline, respectively. Furthermore, for compliers of the intervention in the ***MA*** and ***MAD*** treatments, we will compare how their actual spending share during the midline survey aligns with their allocation across the four labeled envelopes. The aligning of spending will be measured the same way as before, except that $w_x = \dfrac{\text{Baseline Allocation on x}}{\text{Cash Transfer Value}}$, and where subscripts 0 and 1 refer to the envelope division share and actual spending share elicited at midline, respectively. The regression will be as follows:

$$Y_{ht} = \beta_0 + \beta_1 MA_h + \delta_e + \gamma_z + X_h + Early_h + \varepsilon_h \tag{4}$$

5.3 Exploratory Outcome Variables

In addition to the above, we also register a set of outcomes for which no clear hypothesis exists about how they will be affected by the interventions. We will implement so-called exploratory analyses that may inform future research agendas and will be referred to as *suggestive evidence* in the final paper.

[12] $153 PPP is roughly equivalent to seven months of DRC unconditional cash transfer per person.

[13] Indeed, the allocations across the four categories in the hypothetical choice scenario are balanced across treatments ($\chi^2(3, 12) = 0.8937, p = 0.989$).

5.3.1 Mental Health

To the best of our knowledge, no theory or model exists that suggests a directional relationship between alleviating self-control issues and psychological well-being. Psychological constraints are seen as a contributing factor towards lower self-control (Rehm, 1977; Blackhart et al., 2015), but no research has looked at whether alleviating self-control challenges can help overcome psychological constraints.

Measurement: This measure consists of three variables: Subjective Well-being, Depression, and Anxiety. All variables will be re-coded such that larger values are a positive outcome, standardized, and subsequently aggregated into an index using inverse covariance weights.

5.3.2 Future Orientation

Adhering to the allocations across the different envelopes can strengthen one's aspirations, by sticking to ones plan and seeing the opportunities that arise (Thaler and Shefrin, 1981). Furthermore, increased economic- or education-related opportunities as a result of saving and investing a greater share of the cash transfer can result in a more optimistic outlook on the future. Conversely, an inability to stick to the allocations, or not seeing changes in well-being despite savings and investments, can lower ones aspirations and optimism (Benabou and Tirole, 2004). Hence the directional relationship between the treatments and future orientation is ex-ante unclear.

Measurement: This measure consists of two variables: Optimism and Aspirations. Both variables will be standardized and subsequently aggregated into an index using inverse covariance weights.

5.3.3 Seasonal Migration

Given refugees have the freedom to move and work throughout Uganda, occasionally household members seasonally migrate in pursuit of economic or educational opportunities. At baseline, 4% of households had one or more members seasonally migrate within the last 6 months. Our interventions can influence the decision to migrate in two conflicting ways. Our interventions can help set aside money for seasonal migration, hence increasing the likelihood of it happening. Alternatively, household members may be less inclined to migrate elsewhere if our interventions increase investments in local income-generating activities. Therefore, the directional relationship between the

treatments and seasonal migration is ambiguous.
Measurement: This measure will be an indicator equal to one if at least one household member seasonally migrated in the last six months, and zero otherwise.

5.3.4 Self-Control

Soft commitment devices that harness mental accounting are expected to help overcome self-control challenges. These self-control challenges have been documented by Ercolano and Woolfenden (2021), and the high uptake of and stated advantages of the four labeled envelopes indicate the existence of self-control challenges. The Self-Control Score at baseline is not correlated with the uptake of the four envelopes (r = 0.009), suggesting that the intervention is attractive to cash transfer recipients with varying levels of self-control.
Measurement: Self-Control is the score of the standardized 10-item Self-Control Scale (Tangney et al., 2004; Sedlmayr et al., 2020), coded such that a higher score means greater self-control.

5.3.5 Habit Formation

While the cash transfers only ran for seven months, the intervention could have a larger impact on outcomes if households continue to use the four labeled envelopes to separate income both during and after the end of the cash transfers. These questions will in turn be converted into an indicator variable. As such, the interventions could form a new mental accounting habit that will continue to help households budget and spend according to their intentions.
Measurement: At endline, households will be asked whether they are still using the four envelopes or not. Furthermore, households will be asked if they use any other method to partition their income into different expenditure categories. The regression will only be performed among compliers of the ***MA*** and ***MAD*** treatments. Specifically, ***MAD*** will be the omitted variable and hence the regression form is:

$$Y_{ht} = \beta_0 + \beta_1 MA_h + \delta_e + \gamma_z + X_h + Early_h + \varepsilon_h \tag{5}$$

5.3.6 Desired Income Source

The aim of the cash transfer program is to foster long-term self-reliance, in part by helping households set up a sustainable source of income. At baseline, respondents had

a clear vision of their desired source of income, however it is unclear whether the soft commitment devices helped households set up their desired income source.
Measurement: The desired income source is an indicator equal to one if the reported source of income at midline and endline is in the same category as the at baseline reported desired source of income in 6-8 months and 2 years, respectively, and zero otherwise.

5.3.7 Theft

Distributing large amounts of physical cash can bring with it a heightened risk of theft. While this is not a major concern for the NGO, we nonetheless measure it as an outcome variable. At baseline, some respondents stated that they thought the four labeled envelopes would help reduce theft, as the envelopes could be hidden in separate locations to reduce the risk of the entire sum ending up being stolen.
Measurement: At midline and endline, households are asked if they experienced a theft incident within the last six months, and if yes, how frequently these occurred.

5.4 Heterogeneous Treatment Effects

We exploit the natural variation among participants in our balanced treatment groups to estimate heterogeneous treatment effects. Specifically, we evaluate the impact of the effectiveness of our interventions on various sub-groups by running the following specification:

$$\begin{aligned} Y_{ht} =& \beta_0 + \beta_1 FourEnvelopes_h + \beta_2 V_{h0} + \beta_3 FourEnvelopes * V_{h0} \\ &+ \delta_e + \gamma_z + X_h + Early_h + \varepsilon_h \end{aligned} \tag{6}$$

where V_{h0} is the moderating variable of interest. We consider the following moderators, all measured at baseline ($\{t = 0\}$): Self-Control, Depression, Vulnerability, Income, Sex, the Desire for Sufficient Future Income, Hyperbolic Discounting, and Naive Diversification.[14] Furthermore, to disentangle between ***MA*** and ***MAD***, Equation 6 will be expanded to incorporate indicator and interaction terms for ***MA*** and ***MAD***. Given limited power, we will perform randomized inference using 1000 runs to

[14]Note that Naive Diversification was only measured at endline, however we do not believe that the treatment will influence whether the respondent exhibits the naive diversification heuristic in a hypothetical investment decision or not. To confirm this, we will perform a t-test to check for equality across treatments.

test the robustness of the heterogeneous treatment effect (Fisher, 1935; Rosenbaum, 2002).

5.4.1 Self-Control

While we find no correlation between self-control and the uptake of treatment (r = 0.009), a household's level of self-control at baseline can influence the effectiveness of the intervention. The interventions are not expected to have added value for households with no self-control challenges, and that have clear plans for how to spend their budgets. At the other extreme, for households with severe self-control challenges the interventions may not be strong enough due to their light-touch nature. Hence we anticipate the greatest effect among recipients with mild self-control challenges. To capture these anticipated non-linear dynamics, Equation 6 will include quadratic terms:

$$\begin{aligned} Y_{ht} =& \beta_0 + \beta_1 FourEnvelopes_h + \beta_2 V_{h0} + \beta_3 FourEnvelopes * V_{h0} \\ &+ \beta_4 V_{h0}^2 + \beta_5 FourEnvelopes * V_{h0}^2 + \delta_e + \gamma_z + X_h + Early_h + \varepsilon_h \end{aligned} \tag{7}$$

5.4.2 Depression

Ridley et al. (2020) and Haushofer and Fehr (2014) document the relationship between psychological constraints (e.g. depression), poverty, and self-control challenges, which in turn can influence the effectiveness of our interventions. Furthermore, depression and other psychological constraints can stifle ones self-worth, which in turn reduce ones willingness to save and invest in the future. This is an additional mechanism through which depression can moderate the effectiveness of our interventions.

Depression is an indicator equal to one if the head of household scores $\geq$ 16 on the CES-Depression scale at baseline. A score above 16 implies moderate or severe depressive symptoms, which applies to 85% of surveyed household heads (Radloff, 1977). However, our ex ante hypothesis does not posit a linear heterogeneous treatment effect with respect to depression. The impact of the interventions may be largest for households with mild or moderate depression, and it is unlikely to have an impact on households that are severely depressed, due to the light-touch nature of our interventions. To explore this hypothesis, V_{h0} will be expanded into three indicator variables, equaling one if the head of household is characterized as mildly, moderately, or severely depressed, respectively (with not being depressed as the omitted category).

5.4.3 Vulnerability

All cash transfer recipients are considered highly vulnerable, but some are more vulnerable than others. Households referred by other humanitarian partners (covering 60% of the sample) are considered the most vulnerable. One can argue that it is the most vulnerable households that will benefit the most from the cash transfer and the mental accounts. But it may also be the case that extremely vulnerable households will use the cash transfers exclusively to meet their basic needs. As such, these households will not save or invest part of their cash transfer, and the interventions will have limited effect.

V_{h0} will be coded as an indicator equal to one if the respondent is referred from another humanitarian actor (signaling high vulnerability), and zero otherwise. 60.28% of the sample were referred by another humanitarian actor.

5.4.4 Income

Having a sustainable source of income is a pre-requisite for regaining self-reliance and prosperity. Due to the high level of vulnerability, many households (42.04%) report having no income at baseline other than the cash transfer. Households that already have a larger income at baseline are likely to find it easier to generate further income and hence can benefit more from the cash transfers and mental accounts. Having below-median income is weakly correlated with Vulnerability (r=0.28).

V_{h0} will be coded as an indicator equal to one if the respondent has a self-reported monthly income (aside from the cash transfer) above the median ($4.18) at baseline, and zero otherwise.

5.4.5 Sex

The hypothesis that the interventions can have differential effects based on the sex of the household head comes from the literature documenting differing spending patterns between male and female recipients of cash transfers (Bastagli et al., 2016) and the highly patriarchal societies that the refugees originate from, which limit the exposure women have had to money and budgeting decisions in our sample. We remain agnostic regarding a hypothesis that male- or female-headed households will benefit more from the soft commitments.

V_{h0} will be coded as an indicator equal to one if the head of household is a woman,

which applies to 80% of households in our sample.

5.4.6 Desire for Sufficient Future Income

If households have the intention (as well as a plan as to how) to generate income in the future, cash transfers can play an important role by enabling future-oriented investments due to a windfall of money. Furthermore, the effects of the cash transfers are likely to be further amplified by our interventions as they help households stick to their plans and invest accordingly. On the contrary, if cash transfer recipients intend to remain dependent on humanitarian aid in the future and do not aim to earn a larger income, the longer-term effects of temporary cash transfers and our interventions will be muted.

V_{h0} will be coded as an indicator equal to one if the respondent's stated desired monthly income in 8 months time (asked at baseline) is greater than the value of their monthly cash transfer, and zero otherwise. 52.26% of the sample state a desired monthly future income above the cash transfer, and this indicator is weakly correlated with an Aspirations index (r = 0.15).

5.4.7 Hyperbolic Discounting

Soft commitments can help align the intentions of the 'planner' with the actions of the 'doer' if the person is a hyperbolic discounter (Thaler and Shefrin, 1981). As such, the effectiveness of cash transfers at fostering self-reliance is likely to be lower among hyperbolic discounters, due to their inability to commit to future plans. However, the interventions, by invoking mental accounts via soft commitments, are likely to be more effective for hyperbolic discounters than others (Ashraf et al., 2006).

V_{h0} will be coded as an indicator equal to one if the respondent is a hyperbolic discounter, following an unincentivized elicitation approach, adapted from Ashraf et al. (2006).

5.4.8 Naive Diversification Heuristic

The naive diversification heuristic (Koszegi and Matejka, 2020), which would result in households equally dividing their cash transfer across the four envelopes, could influence the effectiveness of the intervention both in terms of its effect on the household's budget planning, as well as their ability to stick to their plans. Only one household split the

cash transfer evenly across the four categories, and there were only 16 households (of the 530 households that opted for the four labeled envelopes, 3%) for which each allocation across the four envelopes is between 20% and 30%, suggesting that the naive diversification heuristic did not play a major role in the budgeting decision. Nevertheless, it could play a role in the spending patterns of households.

V_{h0} will be coded as an indicator equal to one if the respondent exhibited the naive diversification heuristic during an investment decision at the endline survey, and zero otherwise.

6 Econometric Specifications

6.1 Multiple Hypothesis Testing

Cash transfers have wide-ranging impacts on a host of different variables. As such, we will account for multiple hypothesis testing by computing False Discovery Rate q-values (Benjamini et al., 2006; Anderson, 2008). We will report both p- and sharpened q-values for our primary outcome variables which capture spending patterns. Specifically, we will perform the MHT correction for the four β_1 coefficients for Equation 1 with $Y_{ht} = \{$Spending on Productive Investments; Savings and Durable Assets; Education-related Expenses; Health-related Expenses; Marginal Propensity to Consume$\}$, corresponding to primary hypotheses H1 - H5. We will not do any MHT on any analyses of secondary outcomes (Section 5.2), open hypotheses (Section 4.2. - equations 2 and 3), and exploratory outcomes (Section 5.3).

Additionally, given we have two treatment arms, we will report an F-test on all regression tables that tests the null hypothesis that both treatments are jointly null (Young, 2018).

6.2 Differential Attrition

Risk of attrition is not a major concern for two reasons. First, the cash transfers are a significant share of the recipient household's monthly income. As such, households have an incentive to remain within the settlements to receive the cash transfers. Second, the situations in South Sudan and DR Congo (making up 100% of our sample's country of origin) have not improved enough for households to want to return to their country of origin, as was elicited during the baseline survey. This is also reflected by

Uganda's protracted displacement setting, with most households spending >5 years in the settlements.

Nevertheless, we use four approaches to control for attrition. First, we asked households at baseline for their mobile phone numbers (if they have them), such that we can contact them during later rounds of data collection. Second, households were incentivized to complete the entire survey, as they received a token of our appreciation at the end of the survey (30cm bar of soap). Third, we asked households at baseline to list the names, location, and mobile phone numbers of their three closest friends in the refugee settlement, who we could contact in case we were unable to reach the household during the midline and endline. Lastly, we control for attrition via the econometric specification described below.

The magnitude of attrition will be compared across treatment and control households, using the following equation:

$$Attrition_{ht} = \beta_0 + \beta_1 MA_h + \beta_2 MAD_h + \gamma_z + X_h + Early_h + \varepsilon_h \tag{8}$$

Testing whether $\beta_1, \beta_2 = 0$, where $Attrition_{h,t}$ is an indicator equal to one if we were unable to survey household h at time $t = \{1, 2\}$. This regression also captures whether any baseline covariates are related to attrition (using Belloni et al. (2014)). Standard errors are heteroskedasticity-robust.

If the difference in attrition between the treatment and control groups (e.g. whether β_1, β_2 are statistically significantly different from zero in Equation 8), our main specifications will be adjusted for the potential effects of attrition using Lee (2009) bounds.

6.3 Missing Data

Missing variables at midline and endline will be replaced by the sample mean and include a missing data indicator $\mathbf{1}\{missing\}$ as an additional regressor, following the best practice of Haushofer and Shapiro (2016) and Blimpo and Pugatch (2021).[15] If the missing value variable is used in an outcome index (e.g. Prosperity), the index will be constructed only based on variables for which data is available.

[15] At baseline, two missing values were observed: for one household it was mistakenly recorded that there were no adults. UNHCR administrative data was used for the age and sex of the household head.

6.4 Outliers

Based on the baseline data, outliers are primarily expected when reporting all Primary Outcome variables, along with Income, and Loan Amount Outstanding. These categories will be winsorized at the 1% level, to account for outliers. For indices that depend on these variables (e.g. Aspirations), the variable is first winsorized before being incorporated in the index. As a robustness check, equations and indices with winsorized variables will report outcomes for (i) non-winsorized data, and (ii) winsorized at the 5% level.

6.5 Compliance

Cash transfer recipients had the opportunity to transition towards receiving their cash transfer via mobile money at any point in time. It was not possible to transfer the four labeled envelopes to mobile money. As of February 23rd, 2023, 13.01% of households did so at some point throughout the cash transfers. There is no statistically significant difference between the transition to mobile money across the three treatments (15.4%, 11.8%, 11.78%). Table 2 presents results when regressing the Transition to Mobile Money on Treatment Status and a host of household characteristics (including stratified variables, unbalanced baseline variables, and risk preferences and income). Treatment and *FourEnvelopes* indicators are statistically insignificant, while possessing a mobile phone at baseline, a larger household size, being highly vulnerable, and from DR Congo make the transition to Mobile Money more likely. These are interesting patterns that we leave for future research on the adoption of mobile money.

6.6 Spillovers

While we aim to minimize spillovers - for example by placing the four labeled envelopes within one larger envelope at the distribution site - they can still arise as a result of households interacting with each other outside of the cash distributions. Spillovers among the control group will be measured at endline. As a robustness check to ensure that spillovers are not biasing results, we will re-estimate Equations (1) - (8) excluding ***CO*** households that may have been subject to spillovers based on their responses to spillover-related questions at endline.

Table 2: Transitioning to Mobile Money.

	Dependent Variable: Transitioning to Mobile Money			
	(1)	(2)	(3)	(4)
MA	-0.036	-0.040		
	(0.028)	(0.027)		
MAD	-0.037	-0.036		
	(0.028)	(0.028)		
FourEnvelopes			-0.037	-0.038
			(0.024)	(0.024)
Household Size	0.009**	0.007	0.009**	0.007
	(0.004)	(0.005)	(0.004)	(0.005)
Origin: South Sudan	-0.185***	-0.184***	-0.185***	-0.184***
	(0.051)	(0.051)	(0.051)	(0.051)
Protection Referral	0.138***	0.133***	0.138***	0.133***
	(0.030)	(0.030)	(0.030)	(0.030)
Risk Preferences		-0.005		-0.005
		(0.003)		(0.003)
Owns Phone		0.092***		0.092***
		(0.021)		(0.021)
Monthly Income		0.000		0.000
		(0.000)		(0.000)
Observations	861	861	861	861
R-squared	0.068	0.088	0.068	0.088

Notes: Columns (1) and (3) show the results of a regression of Receiving Cash Transfer via Mobile Money on treatment status (either *MA*, *MAD* or the pooled *FourEnvelopes*), stratified variables, and unbalanced variables. Columns (2) and (4) include additional outcome variables, including Risk Preferences, Owning a Phone at baseline, and Monthly Income. The constant, statistically insignificant stratified variables (Age and Sex of Household Head, and Arrival Year) and statistically insignificant unbalanced baseline variables (Monthly Income, Self-Control, and Having Experienced a Negative Shock) were dropped from the table for presentation purposes. ***, ** and * represent significant differences at the 1, 5 and 10% level, respectively.

6.7 Experimenter Demand Effect

Our outcome variables are based on self-reported measures, which could lead to concerns that experimenter demand effects will bias our results. We address these concerns in the following ways.

Firstly, enumerators are independent of DRC's cash transfer program. The informed consent letter explicitly states that the research is entirely independent of the program. Furthermore, enumerators wear reflector jackets with the logo of the surveying company. All households in our sample are recipients of cash transfers, and also know that they are not eligible for future cash transfers, irrespective of their survey responses - which we reiterate during the Informed Consent form. Hence we do not expect households to systematically overstate their vulnerability.

Secondly, to directly test whether household heads are answering truthfully or reporting what they believe the enumerator would like to hear, we can draw on administrative data collected by UNHCR and international NGOs. For example, detailed administrative data on schooling outcomes is available - including whether a child is enrolled in school, and their daily school attendance - and any discrepancy observed between the self-reported outcomes and administrative data would suggest the presence of experimenter demand effects.

Lastly, the midline survey will contain a Marlowe-Crowne Social Desirability Scale, which has been used as a proxy for Experimenter Demand Effects (Dhar et al., 2022). Similar to attrition, the Social Desirability Scale will be compared across treatment and control households, as follows:

$$Desirability_h = \beta_0 + \beta_1 MA_h + \beta_2 MAD_h + \delta_e + \gamma_z + X_h + Early_h + \varepsilon_h. \quad (9)$$

In the equation 9, X_h contains Enumerator Fixed Effects to account for any enumerator-induced social desirability bias. If both β_1 and/or β_2 are statistically significantly different from zero, the score on the Social Desirability Scale will be included as a control variable (X_h) in Equations (1) - (8).

6.8 Statistical Power

Power calculations are based on two-sided t-tests of independent samples with a 5% significance level. Furthermore, we assume an attrition rate of 6% (based on the actual attrition at midline), and 15% attrition due to transitions to Mobile Money. Lastly,

we assume that the variables we stratify upon have 25% explanatory power of the outcomes, based on the average adjusted R^2 of regressions of the baseline values of various outcome variables (self-reliance, income, savings, loans, poverty) regressed on stratified variables with zone-level and enumerator fixed effects. By pooling together treatments MA and MAD, we are well-powered to detect treatment effects of the four envelopes of 0.192 standard deviations; see Table 3. Power is lower when looking at MA and MAD individually, in which case we are well-powered to detect treatment effects of 0.223 standard deviations.

Table 3: Power Calculations

Effect Size	Four Envelopes	***MA*** vs. ***MAD***
0.15 s.d.	0.59	0.47
0.20 s.d.	0.83	0.71
0.25 s.d.	0.95	0.88
0.30 s.d.	0.99	0.96

To help with the interpretation of the detectable effect sizes for ***CO*** vs. *4 Envelopes*, and ***MA*** vs. ***MAD***, we have illustrated the detectable effect sizes for Savings, Income, and Outstanding Loans. Comparing ***CO*** vs. 4 Envelopes, we are powered to detect a 0.192 standard deviations effect, which equals \$4.06 in savings, \$5.01 in income, \$4.52 in outstanding loans. Distinguishing between ***MA*** vs. ***MAD***, we are powered to detect a 0.223 standard deviations effect, equalling \$4.72 in savings, \$5.82 in income, and \$5.25 in outstanding loans. The average monthly cash transfer equalling \$53.14, while the difference in allocation shares to the Investment envelope between ***MA*** and ***MAD*** is 4.2%, equalling \$13.39 across the six months. As such, we believe that we are sufficiently powered to detect an effect caused by the treatments.

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A Investment Opportunity and Envelopes Sheet

Investment Opportunities Sheet

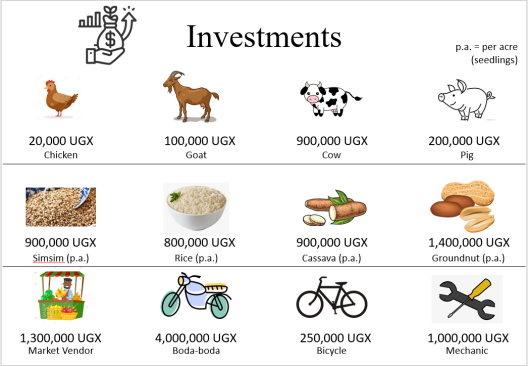


Figure 5. Investment Opportunities page 1.

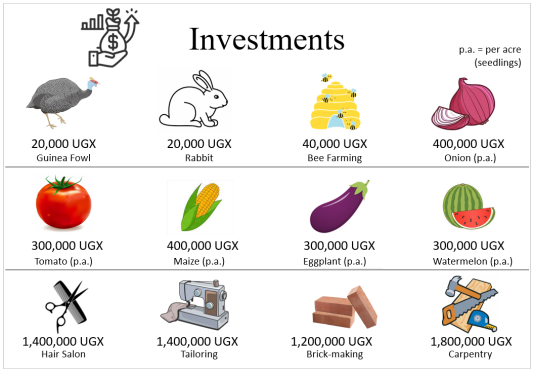


Figure 6. Investment Opportunities page 2.

At baseline, the *Investment Opportunities* sheet was given to households in all three treatments, to provide information about available investment opportunities and associated prices. Market prices are the median price after obtaining prices from three randomly chosen vendors from different markets across the refugee settlements. The prices were further confirmed by both DRC staff, the enumerators, and households that participated in the pilot.

Envelopes Overview Sheet

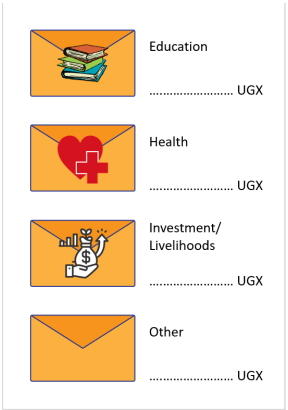


Figure 7. Envelopes Overview Sheet.

This *Envelopes Overview Sheet* was given to households in the ***MA*** and ***MAD*** treatments at the end of the baseline survey that opted to receive future cash transfers across the four

envelopes instead of the status quo. The enumerator wrote the monetary values allocated to each of the four envelopes, as a reminder for the households.

Minimum Expenditure Basket

Table 4: Minimum Expenditure Basket

MEB Component	2021 (UGX)
Food	276,904
Hygiene	16,069
Water	3,750
Education	28,667
Energy	49,495
Transport	11,001
Communication	4,256
Clothing	3,806
Health	2,669
Personal Expenditure	6,080
Livelihood	37,705
Total	440,342

The Minimum Expenditure Basket (MEB) consists of eleven categories, divided into *food* and *non-food* items that are all deemed basic needs, and is specific to the setting of refugee settlements in Uganda. The United Nations and NGO partners in the Cash Working Group base the allocations per category on household surveys conducted with refugees across all settlements in Uganda (including Rhino Camp and Imvepi), and also consider local prices. In 2019, a harmonization of the MEB was conducted, during which each sub Working Group (e.g. the Health Working Group) identified basic needs within their domain - and hence the composition of each category is the same across all refugee settlements in Uganda. The cost of meeting these basic needs can vary per settlement based on local prices and is updated on a quarterly basis based on the prices per refugee settlement. The process of the MEB is used in most humanitarian settings, for example Ethiopia/Somalia, Jordan, Turkey, Bangladesh, etc.

The default allocation for ***MAD*** is: Education (16.6%), Health (16.6%), Investments (33.3%), and Others (33.3%). Percentages are in terms of the household's total cash transfer value.

B Uganda's Refugee Context

Figure 8 is a map of Uganda that highlights its refugee settlements. Rhino Camp and Imvepi, boxed in black, are in the North-Western region of Uganda, close to both the borders of South Sudan and the Democratic Republic of the Congo.

Refugee settlements are divided into Zones, which are further divided into Villages of a few hundred households. Figure 9 captures a typical 30-by-30 meter plot of land given to a refugee household upon arrival. The self-constructed shelter is surrounded by small-scale agriculture. Given the modest size of the shelters, envelopes are easier to store and hide, compared with more space-consuming savings devices such as lockboxes, and hence a more appropriate mental accounting tool for this setting.

There is quite some room to spend more on the categories used to label the envelopes, in the context of this study. Education within the settlements is not for free, as households have to pay school fees ($0.50 and $5.00 per term for primary and secondary schools, respectively) and buy school uniforms and appropriate shoes. Furthermore, transport to and from the school needs to be arranged, depending on the proximity of the school.

Health clinics are free of charge in the settlements. Nevertheless, refugees incur health-related costs, as they need to pay for transport to and from the clinics, and need to pay for non-prescribed medicine at pharmacies. Furthermore, some refugees visit health centres outside the settlements (where they have to pay transport, fees, and medicines themselves) due to the long wait times at health centres within the settlements.

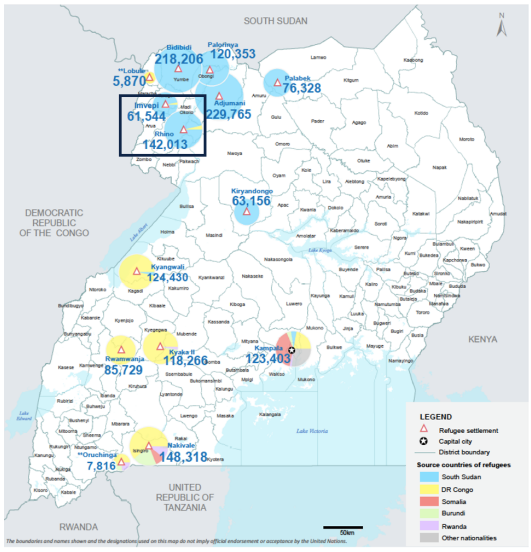


Figure 8. Locations of refugee settlements in Uganda.

Figure 9. 30 x 30 meter plot of land in Imvepi Refugee Settlement.

C Outcome Variables and Measurement Waves

Table 5: Outcome Variable Collection Period.

Variable	Baseline $\{t = 0\}$	Midline $\{t = 1\}$	Endline $\{t = 2\}$
Depression	x	x	x
Outstanding Loan Value	x	x	x
Monthly Income	x	x*	x*
Savings Amount	x	x	x
Seasonal Migration	x	x	x
Self-Control	x	x	x
Self-Reliance Index	x	x	x
Aspirations	x	x	x
Productive Investments	x	x*	x*
Human Capital Expenditure		x	x
Consumption Pattern	x	x	x
School Enrollment	x	x	x
School Attendance		x	x

Notes: *:Monthly Income and Productive Investments are measured differently at midline and endline than it was at baseline. During baseline, households were asked to report their cumulative level of income, and asked to list how much livestock and poultry they had. Market prices are the median from three different market vendors. For midline and endline measures, see Tables 9 and 10. Human capital expenditure covers education- and health-related expenses.

Table 6: Outcome Variable Collection Period, Cont.

Variable	Baseline $\{t = 0\}$	Midline $\{t = 1\}$	Endline $\{t = 2\}$
Remittances	x	x	x
Reduced Coping Strategies Index		x	x
Subjective Well-being		x	x
Health Needs Met		x	x
Hypothetical Choice Scenario	x		
Hyperbolic Discounter	x		
(Desired) Income Source	x	x	x
Negative Shock	x	x	x
Durable Assets		x	x
Optimism		x	x
Anxiety		x	x
Theft		x	x
Habit Formation			x
Spillovers			x
Naive Diversification			x

Notes: For midline and endline measures of income and productive investments, see Tables 9 and 10. Human capital expenditure covers education- and health-related expenses.

Table 7: Balance Table for Stratified Variables.

	(1)		(2)		(3)		F-test	(1)-(2)	(1)-(3)	(2)-(3)
	CO		***MA***		***MAD***			Pairwise t-test		
Variable	N	Mean/(SD)	N	Mean/(SD)	N	Mean/(SD)	N	F-stat/P-value	P-value	P-value	P-value
Stratified Variables										
Age of HH Head	292	38.110	288	38.056	280	37.004	860	0.542	0.964	0.354	0.371
		(14.764)		(14.302)		(13.706)		0.582			
HH Head is Female	292	0.815	288	0.806	280	0.829	860	0.267	0.771	0.660	0.467
		(0.389)		(0.396)		(0.377)		0.766			
HH size	292	6.455	288	6.375	281	6.228	861	0.501	0.730	0.316	0.524
		(2.767)		(2.838)		(2.662)		0.606			
Arrival Year	292	2018.240	288	2018.201	281	2018.242	861	0.011	0.901	0.994	0.898
		(3.675)		(3.737)		(3.829)		0.989			
Country of Origin: South Sudan	292	0.901	288	0.910	281	0.900	861	0.093	0.711	0.990	0.704
		(0.300)		(0.287)		(0.300)		0.911			
DRC Vulnerability Score	119	60.057	112	59.479	111	59.442	342	0.616	0.362	0.327	0.953
		(4.888)		(4.731)		(4.585)		0.541			
Share of Protection Referrals	292	0.592	288	0.611	281	0.605	861	0.109	0.647	0.760	0.881
		(0.492)		(0.488)		(0.490)		0.897			

Notes: Columns (1), (2), and (3) show the average value (and standard deviation) for respondents in each of the three treatments: Cash Only, Mental Accounting, and Mental Accounting with Default. The F-test reports the joint test for orthogonality, including both the F-statistic and associated p-value. The normalized difference between means is reported, together with significance levels based on t-tests. 861 households were surveyed, of which one did not have an adult head of household and another did not answer whether the adults were working (hence Percentage Adults working has 859 observations). 342 households had Vulnerability Scores from DRC. Randomization was further stratified on the Zone of Residence, however as this is a categorical variable, it is not included in the balance table. ***, ** and * represent significant differences at the 1, 5 and 10% level, respectively.

Stratified Variables: Age is stratified based on a median split, and thus becomes binary. Zone is our largest category of strata. Randomization was done separately for the two different start dates of the cash transfer program: in the first batch of households, there were 21 strata, and in the second batch of households, there were 18 strata. The average number of observations per strata was around 40, and hence sufficiently large (Halabi et al., 2009). The strata were chosen in coordination with the NGO based on which variables were likely to have significant explanatory power.

Table 8: Balance Table for Non-Stratified Variables.

		(1)		(2)		(3)		F-test	(1)-(2)	(1)-(3)	(2)-(3)
		CO		***MA***		***MAD***			Pairwise t-test		
Variable	N	Mean/(SD)	N	Mean/(SD)	N	Mean/(SD)	N	F-stat/P-value	P-value	P-value	P-value
Non-Stratified Variables											
Depressed	292	0.880	288	0.837	281	0.836	861	1.448	0.135	0.133	0.987
		(0.325)		(0.370)		(0.371)		0.236			
Outstanding loan amount ($)	292	12.330	288	10.279	281	9.326	861	1.226	0.313	0.139	0.601
		(26.624)		(22.015)		(21.461)		0.294			
Monthly Income ($)	292	13.119	288	13.740	281	17.152	861	1.815	0.764	0.082*	0.157
		(22.685)		(25.035)		(17.152)		0.163			
Savings ($)	292	10.256	288	10.050	281	9.501	861	0.096	0.910	0.681	0.737
		(24.223)		(19.613)		(19.349)		0.908			
Seasonal Migration	292	0.027	288	0.052	281	0.053	861	1.470	0.128	0.114	0.945
		(0.164)		(0.223)		(0.225)		0.231			
Self-Control	292	36.760	288	36.455	281	37.384	861	1.825	0.544	0.199	-0.059*
		(6.009)		(6.108)		(5.587)		0.162			
Self-Reliance Index	292	1.950	288	2.016	281	2.019	861	1.106	0.195	0.198	0.965
		(0.614)		(0.617)		(0.660)		0.331			
Aspirations	292	0.005	288	0.069	281	-0.017	861	1.173	0.253	0.726	0.137
		(0.717)		(0.640)		(0.735)		0.331			
Highest Schooling Attained	292	5.233	288	5.149	281	4.801	861	0.886	0.807	0.211	0.309
		(4.160)		(4.061)		(4.102)		0.413			
Fraction of Adults Working	291	0.375	288	0.404	280	0.412	859	0.563	0.432	0.310	0.820
		(0.427)		(0.439)		(0.435)		0.570			
Fraction of Kids in School	267	0.952	264	0.957	253	0.964	784	0.312	0.748	0.426	0.634
		(0.178)		(0.166)		(0.141)		0.732			
Livestock ($)	292	24.498	288	32.116	281	31.653	861	1.096	0.183	0.203	0.933
		(63.583)		(74.512)		(70.670)		0.335			
Acres of Land	56	1.304	54	1.734	60	1.350	170	0.203	0.543	0.945	0.642
		(2.619)		(4.663)		(4.307)		0.816			
Locus of Control	292	28.462	288	28.500	281	28.238	861	0.155	0.939	0.660	0.613
		(5.859)		(5.995)		(6.321)		0.857			
Poverty Likelihood	292	60.395	288	58.582	281	58.041	861	0.926	0.314	0.204	0.764
		(22.340)		(20.917)		(21.969)		0.396			
Experienced Shock	292	0.418	288	0.455	281	0.488	861	1.408	0.369	0.094*	0.436
		(0.494)		(0.499)		(0.501)		0.245			
Response to Hyp. Shock: Savings	292	0.479	288	0.517	281	0.480	861	0.536	0.362	0.981	0.379
		(0.500)		(0.501)		(0.501)		0.585			
Risk Preferences	292	4.305	288	4.003	281	4.064	861	0.639	0.278	0.402	0.832
		(3.364)		(3.315)		(3.510)		0.528			
Time Preferences	292	5.267	288	5.163	281	5.125	861	0.109	0.743	0.650	0.904
		(3.755)		(3.867)		(3.761)		0.897			
Hyperbolic Discounters	292	0.086	288	0.122	281	0.125	861	1.382	0.156	0.128	0.913
		(0.280)		(0.327)		(0.331)		0.252			
Remittances Given	292	1.207	288	1.294	281	0.801	861	1.273	0.804	0.196	0.124
		(4.142)		(4.255)		(3.320)		0.281			
Remittances Received	292	1.646	288	1.329	281	1.018	861	1.331	0.439	0.112	0.369
		(5.421)		(4.372)		(3.845)		0.265			
1st CT: Share on Educ.	277	0.224	268	0.221	261	0.220	806	0.046	0.845	0.768	0.916
		(0.181)		(0.169)		(0.170)		0.955			
1st CT: Share on Health	277	0.115	268	0.120	261	0.128	806	0.660	0.661	0.257	0.491
		(0.124)		(0.133)		(0.145)		0.517			
1st CT: Share on Inv.	277	0.284	268	0.272	261	0.285	806	0.194	0.601	0.960	0.575
		(0.264)		(0.257)		(0.270)		0.824			

Notes: Columns (1), (2), and (3) show the average value (and standard deviation) for respondents in each of the three treatments: Cash Only, Mental Accounting, and Mental Accounting with Default. The F-test reports the joint test for orthogonality, including both the F-statistic and associated p-value. The p-value between means is reported, together with significance levels based on t-tests. 861 households were surveyed, of which one did not have an adult head of household and another did not answer whether the adults were working (hence Percentage Adults working has 859 observations). 170 had additional land, and 784 households had children in a school-going age. 55 households did not know how they intended to spend their first cash transfer (CT). Variables winsorized at the 1% level include: Outstanding Loan Value, Monthly Income, Savings Amount, Livestock, Acres of Land, Remittances Given, Remittances Received, and Aspirations. ***, ** and * represent significant differences at the 1, 5 and 10% level, respectively.

Table 9: Primary Outcome Variables Description.

Spending on Productive Investments	
Livestock	Self-reported purchases of livestock, vet visits, and livestock feed in the last 6 months. Market values are the median from three market vendors in the refugee settlements.
Agriculture	Self-reported purchases of seeds, fertilizers, agricultural tools, and pesticides in the last 6 months. Market values are the median from three market vendors in the refugee settlements.
Non-Agricultural Activities	Self-reported purchases of market stalls, supplies, sewing machines, and other products in the last 6 months. Market values are the median from three market vendors in the refugee settlements.
Savings and Durable Assets	
Savings	Self-reported level of savings.
Durable Assets	Self-reported quantity of durable assets (including furniture, battery, solar panel, etc.). Market values are the median from three market vendors in the refugee settlements.
Education-Related Expenses	
School fees	Self-reported spending on school fees.
Other expenses	Self-reported spending on books, pens, school uniforms, and bags. Market values are the median from three market vendors in the refugee settlements.
Health-Related Expenses	
Medical Fees	Self-reported spending on medical fees.
Preventative expenses	Self-reported spending on water filters, ORS solutions, chlorine, mosquito nets, and waterguard. Market values are the median from three market vendors in the refugee settlement.
Other expenses	Self-reported spending on medicines, building a latrine, and other health-related expenses. Market values are the median from three market vendors in the refugee settlements.

Table 10: Secondary Outcome Variables Description.

Self-Reliance	
Self-Reliance	12-item Self-Reliance Index.
Food Security	
Reduced CSI	5-item Reduced Coping Strategies Index.
Income	
Livestock	Self-reported Livestock related income in the last three months, divided by three. Combined with self-reported monthly wage livestock income (in case of wage employment).
Agriculture	Self-reported income during the last harvest, divided by "12 / the number of harvests per year". Combined with self-reported monthly wage agricultural income (in case of wage employment).
Non-agri. activities	Self-reported profits over the last three months, divided by three. Combined with self-reported monthly wage enterprise income (in case of wage employment).
School Attendance	
Self-reported	Average across all school-aged children (6-18) of self-reported school attendance (number of days) in the week before the survey.
Admin data	Official UNHCR data on school attendance for all official primary and secondary schools within the refugee settlements.
Ability to Meet Health Needs	
Health Needs Met	Average across all household members of the number of times that a household was able to meet the health needs in case there were health needs in the last 3 months.
Outstanding Loan Value	
Outst. Loan Value	Self-reported value of outstanding loan value to be repaid.
Value of Remittances Given	
Remittances Given	Self-reported amount of remittances given in the last 30 days.
Spending on Temptation Goods	
Temptation Goods	Self-reported spending on alcohol, tobacco, drugs, and gambling in the last 30 days. Elicited in the consumption survey module.
Spending Alignment	
Hypo. Choice Scen.	Households were presented a scenario where they received a one-off transfer of \$153 PPP (\$56) per household member, and were asked to allocate across expenditure categories which were aggregated into "Education", "Health", "Investment", and "Other".
Spending Pattern	Households are asked to recall their expenditures over the last 30 days across a variety of expenditure categories. These are subsequently aggregated into "Education", "Health", "Investment", and "Other".

Table 11: Secondary Outcome Variables Description Cont.

Marginal Propensity to Consume	
MPC	Self-reported share of total consumption that is not spent on savings, loan repayment, or investments into (human) capital.
Spending on Productive Investments	
Hypo. Choice Scen.	Households were presented a scenario where they received a one-off transfer of \$153 PPP (\$56) per household member, and were asked to allocate across expenditure categories which were aggregated into "Education", "Health", "Investment", and "Other".
Spending Pattern	Households are asked to recall their expenditures over the last 30 days across a variety of expenditure categories. These are subsequently aggregated into "Education", "Health", "Investment", and "Other".

Table 12: Exploratory Variables Description.

Mental Health	
Subjective Well-Being	5-item Satisfaction With Life Scale.
Depression	20-item CES-D Scale.
Anxiety	7-item GAD-7 Scale.
Future Orientation	
Optimism	10-item Revised Life Orientation Test (LOT-R)
Aspirations	Adaptation of Bernard and Taffesse (2014), considering income, savings, and education as the three variables of interest.
Seasonal Migration	
Seasonal Migration	Self-reported frequency whether at least one household member seasonally migrated out of the refugee settlement in the last six months.
Self-Control	
Self-Control	10-item Self-Control index from Tangney et al. (2004), adapted by Sedlmayr et al. (2020).
Habit Formation	
Habit Formation	Households will be asked at endline whether they still use the four labeled envelopes, and whether they have adopted any soft commitments or mental accounts to partition money and align spending with planning.
Desired Income Source	
Desired Income Source	Households report their desired income source, which the enumerators categorize across eight categories.
Obtained Income Source	Households report their income source, which the enumerators categorize across eight categories.
Theft	
Theft	Frequency within which the household had experienced theft within the last six months.

Table 13: Heterogeneous Treatment Variables Description.

Self-Control	
Self-Control	10-item Self-Control index from Tangney et al. (2004), adapted by Sedlmayr et al. (2020).
Depression	
Depression	20-item CES-D Scale.
Vulnerability	
Vulnerability	Indicator variable equal to one if the household is a Protection Referral from another humanitarian organization to DRC.
Income	
Income	Indicator variable equal to one if the self-reported level of monthly income is greater than the median income at baseline.
Sex	
Sex	Sex of household head (equal to one if female).
Desire for Sufficient Future Income	
Desire for Suff. Inc.	Indicator variable equal to one if the baseline self-reported desired level of monthly income in 8 months is lower than the household's monthly cash transfer value, and zero otherwise.
Hyperbolic Discounting	
Hyperbolic Discounter	Unincentivized adaptation of Ashraf et al. (2006) elicitation approach, by comparing trade-offs between now vs. one month, and six vs. seven months. Indicator variable equal to one if the respondent is impatient in the choice between 'now vs. one month' but patient in the choice between 'six vs. seven months'.
Naive Diversification Heuristic	
Naive Diversification	Indicator variable equal to one if the respondent exhibits the naive diversification heuristic during a hypothetical investment decision at endline.

C.1 Hypothetical Spending Alignment

During the baseline survey, households were presented a hypothetical scenario in which they received a one-off transfer of $56 ($153 PPP) per household member, and were asked to allocate across expenditure categories which were aggregated into "Education", "Health", "Investment", and "Other". Figure 10 presents histograms for all four categories. Households allocated a greater share to Education and Health in the envelopes than in the hypothetical choice scenario, and less to Investments and Others.

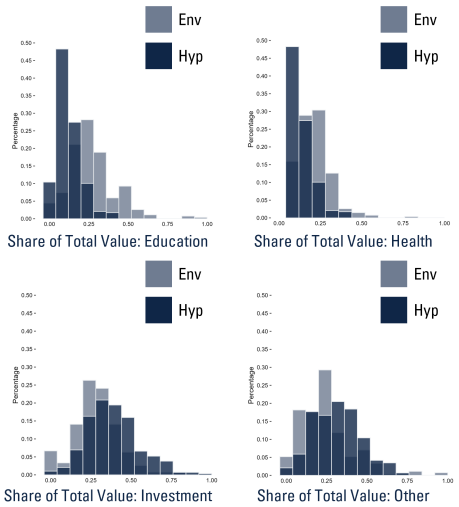


Figure 10. Histogram of MA Envelope and Hyp. Choice Scen. Allocation

Figures 11 and 12 plot scatter plots of the shares of the hypothetical cash transfer allocated to Education vs. Health, and to Investment vs. Others across ***CO***, ***MA***, and ***MAD***. No difference in the allocations across the four categories in the hypothetical choice scenario is observable across the treatments (F-test>0.225; $\chi^2(3,12)=0.894, p=0.989$).

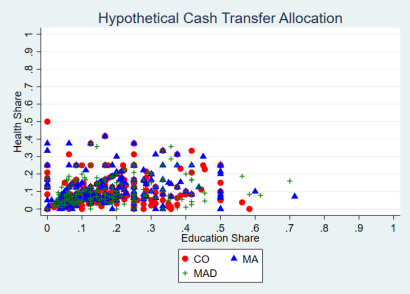


Figure 11. Hyp. Choice Scen. Education and Health

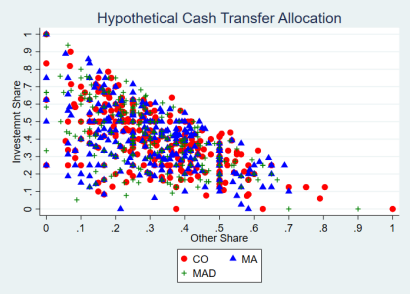


Figure 12. Hyp. Choice Scen. Investment and Other

D Indices

Self-Control: 10-item Self-Control index from Tangney et al. (2004), adapted by Sedlmayr et al. (2020). Question responses range from 1 to 5, with questions 1, 2, 3, 7, 8, 9 reverse-coded. The index is generated by aggregating the scores from all 10 questions, and the range is from 10 to 50. Higher values indicate greater levels of self-control.

Depression: 20-item CES-D Scale. Question responses range from 0 to 3, with questions 4, 8, 12, 16 reverse-coded. The index is generated by aggregating the scores from all 20 questions, and the range is from 0 to 60. Higher values indicate greater symptoms of a depressive state, where 16 is categorized as the cut-off for moderate depressive symptoms.

Optimism: 10-item Revised Life Orientation Test (LOT-R). Question responses range from 0 to 4, with questions 3, 7, 9 reverse-coded. The index is generated by aggregating the scores from questions 1, 3, 4, 7, 9, and 10, and the range is from 0 to 24. Higher values indicate greater optimism.

Aspirations: Adaptation of Bernard and Taffesse (2014), considering income, savings, and education as the three variables of interest. FOr each category, the difference between the aspired and current level is normalized.[16] The aspirations score is a weighted average of the normalized values across the three categories, weighted by the respondents importance (out of 10 coins) assigned to each category.

Subjective Well-being: 5-item Satisfaction With Life Scale. Question responses range from 1 to 7. The index is generated by aggregating the scores from all 5 questions, and the range is from 5 to 35. Higher values indicate greater subjective well-being.

Anxiety: 7-item GAD-7 Scale. Question responses range from 0 to 3. The index is generated by aggregating the scores from all 7 questions, and the range is from 0 to 21. Higher values indicate greater symptoms of anxiety.

Self-Reliance: 12-item Self-Reliance Index. Responses range from 1 to 5, and get converted into a question-specific score. Questions 2, 5, and 9 are reverse coded and subsequently multiplied by 0.15, 0.1, and 0.2, respectively, before being subtracted from the sum of the other questions. Then, the total score is divided by 10. The range is from 1 to 5, with higher values indicating greater self-reliance.

Food Security: 5-item Reduced Coping Strategies Index. Question responses range from 0 to 7, capturing the number of days in the last week that a certain prompt applied. The index is generated by multiplying the scores by a 'severity measure', ranging from 1 to 3, and subsequently aggregating the multiplied scores from all five questions. The range is from 0 to 56, where higher values indicate greater food insecurity.

Future Orientation: Inverse-covariance weighted index of Optimism and Aspirations. For

[16] The aspired level is in two years time, except for education, which has no time limit.

i = {Optimism, Aspirations}, Future Orientation = $\frac{\sum_i y_i/\sigma_i^2}{\sum_i 1/\sigma_i^2}$, where y_i and σ_i^2 are the observations and variance for variable i, respectively.

Mental Health: Inverse-covariance weighted index of Subjective Well-being, Depression, and Anxiety. For i = {Subjective Well-being, Depression, Anxiety}, Mental Health = $\frac{\sum_i y_i/\sigma_i^2}{\sum_i 1/\sigma_i^2}$, where y_i and σ_i^2 are the observations and variance for variable i, respectively.

D.1 Other Measures

Experienced Shock is measured as a binary variable equal to 1 if the household responded "yes" to a question of whether they experienced a negative shock in the last 3 months, where a negative shock was defined as "death or illness of a household member, an accidental injury, a loss of employment, failure of crops, or a drought".

Response to Hypothetical Shock: Savings is measured as a binary variable equal to 1 if the household responded "savings" to a question of how they would respond to a hypothetical negative shock in the last 3 months, where a negative shock was defined as "death or illness of a household member, an accidental injury, a loss of employment, failure of crops, or a drought".

Risk preferences is an unincentivized measure from 0-10, where the question read: "Some people usually avoid taking any risk, others are generally fully prepared to take risks. Please imagine a yard stick from 0 to 10. 0 means you usually "avoid taking any risk" and 10 means you are generally "fully prepared to take risks".

Time preferences is an unincentivized measure from 0-10, where the question read: "Some people usually want to have things now rather than later, others are generally willing to wait a long time. Please imagine a yardstick from 0 to 10. 0 means you "usually want things now rather than later" and 10 means you are "generally willing to wait".

Spillovers are measured by asking respondents of ***CO*** at endline: 'Did you notice anything unusual taking place during cash transfer distributions last year?' If they answer yes, they will be asked to specify what the unusual behaviour was via an open-ended question. If their answer relates to the four labeled envelopes, they will be categorised as having been 'exposed to spillovers'.

Mental Accounting Dynamics: During the midline survey, compliers in ***MA*** and ***MAD*** are asked "Every month you received four new envelopes. When you returned home after every cash transfer, did you combine the money you had left over from previous months into the new envelope?". The response options are Yes or No, and was followed by an open-ended question explaining the reasons why. Furthermore, they are asked whether "I took money from one envelope and spent it on things that were not part of the envelope's category"

applied, with the response options being 'Rarely or none of the time; Some or a little of the time; Occasionally or a moderate amount of time; Most or all of the time'. Subsequently, if the respondent respond that the claim applied 'Some, Occasionally, or Most of the time', they are asked whether "I felt like a failure when I spent the money on something different than the label of the envelope" and "I felt guilty when I spent the money on something different than the label of the envelope" apply to their situation. The response options are 'Strongly disagree, Disagree, Neutral, Agree, Strongly agree'.

E Ethics Appendix

Asiedu et al. (2021) recommend including an Ethical Appendix in the final paper. We believe the presence of an ethical appendix in the Pre-Analysis Plan is equally valuable.

1. Policy Equipoise.

The cash transfers were provided by DRC, and hence the interventions refer to the four labeled envelopes. Ex ante, there is no reasonable expectation that the four labeled envelopes will provide more benefits than the status quo, as there is no empirical support for this. Hence there is policy equipoise.

2. Role of researchers with respect to implementation.

Researchers were not active, in the sense that the researchers did not directly provide any of the interventions, or interact directly with the participants. Interventions were provided by employees of DRC at the monthly cash distribution. While the research staff covered costs related to the interventions (e.g. the procurement of the envelopes), the staff and cash transfers were paid by DRC.

3. Potential harms to participants or nonparticipants from the interventions or policies.

Selection of households into the cash transfers was done by DRC, and hence our intervention only refers to the labeled envelopes. While participants are vulnerable (they are categorized as the most vulnerable refugees, which already is a highly vulnerable population), the interventions were piloted beforehand, and hence do not pose any additional risks. The interventions do not impact participants' access to future services or policies.

Participants may have faced harm during the surveys as some questions were sensitive, however all questions were piloted and adapted to the local context, and obtained approval from an IRB in Uganda and the Netherlands, as well as got approval from the Ugandan Office of the Prime Minister. Participants were reimbursed for their time to answer the survey, receiving a bar of soap (30 cm).

4. Potential harms to research participants or research staff from data collection (e.g., surveying, privacy, data management) or research protocols (e.g., random assignment).

Enumerators were trained to deal with sensitive questions and the high vulnerability of the surveyed population. Participants were also reminded that they were under no obligation to answer any of the questions, and could refuse to answer a question. Informed consent was obtained, and the safe handling of data is captured in a Data Protection Impact Assessment.

Prior to conducting surveys with individual households, consent was obtained from the community leader, who was also presented a letter from the Office of the Prime Minister documenting their approval for our survey instrument. Participants were reimbursed for

their time to answer the survey, receiving a bar of soap (30 cm).

IRB was obtained from Tilburg University (IRB FUL 2022-004) and Mildmay Institute of Health Sciences (MUREC-2022-144).

5. Financial and reputational conflicts of interest.

None of the researchers have financial conflicts of interest, nor reputational ones as this is a new area of academic research for all three of them. Till Wicker used to work for the Danish Refugee Council, the implementing organization of the cash transfers.

6. Intellectual freedom.

There are no contractual limitations regarding the researchers' ability to report the results of the study.

7. Feedback to participants or communities.

Upon completion of the endline survey, participants will be informed about their participation in the RCT. Community feedback will take place by informing humanitarian actors of the findings of the field experiment, who are then requested to then share the results with the local community leaders within the refugee settlements.

8. Foreseeable misuse of research results.

No. Nevertheless, agreements are in place with DRC that the data collected will only be made available to DRC in an anonymized manner, in order to avoid being able to identify individual responses. Summary findings of the RCT will be shared with the donor of the cash transfers (the European Civil Protection and Humanitarian Aid Operations), and other interested (humanitarian) actors.

9. Other Ethics Issues to Discuss.

None that we are aware of. In addition to receiving two IRB approvals, approval was obtained from the Ugandan Office of the Prime Minister, and the interventions were carefully designed together with the Danish Refugee Council (DRC). DRC is also the official *UNHCR Protection Partner* in both refugee settlements, and hence the interventions, RCT, and survey instruments were carefully scrutinized by protection experts, guided by the Hippocratic oath of *"do no harm"*.

F Data Management Plan

A. Description of processing

The purpose of processing is always scientific research

The sections below can be taken in part from the IRB application form. These reflect the research and the need to conduct the DPIA. Furthermore, additional questions are asked regarding the processing of personal data.

1. Briefly describe what the study entails. (This can be taken from the IRB application form)

a. Background

The number of refugees rapidly increases worldwide, and this trend is expected to continue (UNHCR, 2021). Humanitarian aid organizations increasingly use cash transfers to help recipients regain control of their lives. While a recent pilot program in Uganda documented that cash transfers for 8 months improved refugees' short-run quality of life, they did not encourage savings and investments, failing to strengthen refugees' long-term self-reliance. The NGO documented that "[the cash recipients] had planned for expenditures towards the end of the 8 months but had not saved enough", suggesting that other factors, such as psychological constraints, hindered recipients' ability to save and invest. This is consistent with the view that poverty is multifaceted, and that merely relaxing the financial constraint is not sufficient to escape poverty (Banerjee et al. 2015). In this study, we aim to relax both the financial constraint – using cash transfers – as well as the self-control constraint – via the use of soft commitment devices - to improve the long-run effectiveness of cash transfers by helping refugees save and invest in their future.

b. Research question

In this project, we partner with the Danish Refugee Council (DRC) to test the effectiveness of innovative, low-cost, and scalable interventions aimed at helping refugees regain self-reliance through savings and future-oriented investments.

This project's overarching question is which intervention is the most cost-effective in helping refugees regain self-reliance, and why? This gives rise to three key research questions:

- RQ1: How can cash transfers be made more effective (by helping households to commit to saving more)?
- RQ2: What are the exact mechanisms via which the interventions affect the ability to save and invest?
- RQ3: Do these impacts and mechanisms differ depending on family composition, age, gender, and cause of displacement?

RQ1 establishes which of interventions are able to increase the overall effectiveness of cash transfers, and by how much. Combined with RQ2 it also uncovers the most important psychological constraints hampering savings and investments, and whether and how the interventions can help alleviate their consequences. Key insights regarding RQ2 will be obtained not just by analyzing the overall effectiveness of the interventions, but also the extent to which refugees are keen in adopting them – by analyzing take-up. RQ3 is important because of its focus on the existence of potential heterogeneous treatment effects – the extent to which some interventions are more effective among some types of refugee households than others.

c. Study Design and Methodology

We conduct a Randomized Controlled Trial (RCT) among 900 refugee households in Northern Uganda (Rhino Camp and Imvepi refugee settlements). These households are all eligible for an unconditional

cash transfer from DRC as they meet their vulnerability criteria. These households are randomly assigned to, in total, 3 groups: two treatments and one control group (thus 300 per group).

All households receive unconditional monthly cash transfers, over a period of 7 months. Additional interventions consist of combining the unconditional cash transfers with two different (soft-) commitment devices to help recipients overcome self-control challenges.

Outcomes of the two intervention groups are evaluated against those who only receive the cash transfers. We will sample eligible households and randomize (stratified) across treatments and comparison groups.

The core of the interventions has been designed by DRC. The cash funds have been made available by the European Union, and the number of eligible households is larger than the amount of funds available. Cash transfers are given to highly vulnerable households, who are all scored along a vulnerability index, and are ranked based on a Vulnerability Index.

The interventions that the Tilburg team will develop are offering soft-commitment devices on top of the cash transfers. A baseline survey will be conducted in between the first and second payments of the cash transfer, in September and October 2022. The baseline survey will be conducted by a professional surveying company, for which we plan to partner with Apata Insights. In line with DRC's common survey practice, participation in the survey is voluntary. The plan is to do home-visits to implement the surveys. If budgetary or logistical constraints do not allow this, we will survey participants at the place when they receive the cash transfer. Participants will be offered snacks and water and be given a token of our appreciation for participating in the survey (e.g. a bar of soap and a notebook and pen, as this is used by all refugee households and highly appreciated).

A second survey will take place a few months after the last cash transfer (February/March 2023). To elicit long-term effects, a follow-up survey will be conducted 1 year after the second survey, under the same setup (February/March 2024).

d. Materials and Procedures

See part c.

2. Indicate who the participants are within this study.

☐ Students
☐ General population without complaints
☐ General population with specific "complaints," such as medically unexplained complaints.
☐ Patients, namely ...
☒ Otherwise, namely refugees eligible for cash transfers by DRC in Northern Uganda

3. Indicate the age range of the participants.

☐ Younger than 12 years
☐ Older than 11 years and younger than 16 years
☒ 16 years and older

4. Indicate the categories of personal data processed (ERB Form 8.1). For each category, indicate what personal data are processed from them.

☒ Ordinary personal data, namely: Country of Origin, Gender, Age, Household composition
☒ Special personal data, namely: Religious or philosophical beliefs, questions on health, psychological wellbeing, stress, self-reliance, aspirations, spending patterns (all validated scales often

used in this field of research)

☐ Sensitive personal data, namely: ....

5. After collection, is the data anonymized or pseudonymized (explain how) and if so, who has access to the identifying file?

Pseudonymized.

SurveyCTO is used as data collection software and once trained enumerators have conducted the interviews with the respondents and have sent the surveys, the data is encrypted on the SurveyCTO server. Upon successful transmission, the data are removed from SurveyCTO's servers. The surveying company will temporarily store the data on their servers, while they are cleaning the data. Once the data has been cleaned, the data will be transferred to TiU's secure OneDrive server via SURFfile Sender. On the OneDrive it's being saved with Cryptomator encryption.

Only the research team will be able to access and download the data with the required key. Once the data is downloaded to TiU's secure OneDrive server (with Cryptomator encryption), they will be pseudonymized. We do so by creating arbitrary IDs for all respondents, storing all personal information, all references to specific locations as well as the newly created ID in a separate file to be stored in a separate folder on TiU's OneDrive server (again with Cryptomator encryption), and subsequently deleting those records from the data file to be used by the researchers. By removing all the personal and location information from the Masterfile and by storing the key separately from the Masterfile, we reduce the risk of leaking identifiable data. While the researchers will have access to the key, it will only be used in preparation for the next survey round, in order to locate refugees and minimize attrition. However upon completion of the research project, the key will be deleted (see below).

Only members of the research team will be able to access the data. After the completion of the analysis (including analysis of the data from the long-term follow-up after 4 years), the file linking IDs to the personal and location information will be deleted. The anonymized data (with the arbitrary IDs per respondent) will be published together with the survey instrument and field manuals in the DANS-supported EASY archiving system for open access.

6. In the ERB application form, question 8.8 asks you to click which categories apply to this study. Again, please click which categories apply; you can copy this from the ERB application form.

☐ Assessing individuals based on personal characteristics.
☐ Automated decisions
☐ Systematic and large-scale monitoring
☒ Sensitive data
☒Large-scale data processing (i.e. 900 households)
☐ Combining databases
☒ Data on vulnerable data subjects
☐ Use of new technologies
☐ Data transfer outside the European Union
☐ Obstructing a right, service, or contract

7. Who is the process owner responsible for the privacy compliance of the processing (by default this is the process owner of the research)? Who is ultimately responsible for this processing (by default the Dean of Faculty)? List the names and positions.

- Process owner: Daan van Soest, Full Professor, TiSEM economics
- Final responsible party: Lex Meijdam, Dean TiSEM

8. What third parties are the personal data disclosed to? Are these parties processors?

Processor: a natural or legal person, government agency, department or other body that processes personal data on behalf of the Controller.

- TiU is the controller
- Apata Insights will conduct the data collection, using CTO survey, and are processor.
- DRC gets a report but no (access to) data.

Data will be stored/archived in OneDrive and Dataverse.

9. Have you entered into processing agreements with these processors that meet the GDPR requirements?

A Processor Agreements with Apata Insights is being developed (using the TiU model agreement)

10. In which countries does the processing take place? Are personal data transferred to third countries (= countries outside the EEA) or to international organizations? If so, are there appropriate safeguards, and if so, what are they?

Processing takes place in Uganda and NL. A Processor Agreement with Apata Insights is drawn up.

11. Determine what retention periods apply to this personal data.

The data is pseudonymized after collection (Household Identifiers). There is separate key file with personal data which will be deleted after data collection is completed (31st of August 2024). After that date, and once the key file is removed, the data in anonymized form will be stored for at least 10 years (in accordance with the Netherlands Code of Conduct for Research Integrity and the Tilburg University Research Data Management Regulation).

12. What is the basis of the processing?

☒You have consent from the person involved. (skip 12.1)
☐It is necessary to process data in order to perform a contract.
☐It is necessary to process data because of a legal obligation.
☐It is necessary to process data to protect vital interests.
☐It is necessary to process data to carry out a task of public interest or official authority.
☐It is necessary to process data in order to pursue your legitimate interest.

12.1 To what extent and in what way are participants aware of the processing of their data?

NA

13. Until what point can participants withdraw their consent and is the removal of their data still possible?

Participants can withdraw at any time, as long as info can be traced back to the individual (31st August 2024). After that data is anonymized (see #11)
Respondents can contact Apata Insights for withdrawal, but also contact one of the researchers (Till Wicker) directly via phone or email. This information is communicated in the Consent Form.

14. How is the basic privacy knowledge of all those involved in the processing brought up to the required level? This includes all researchers and any student assistants involved, but also processor's possible employees.

- Controllers: Training offered by Research Data Office, advice from and discussion with data representative and privacy officer, DPIA. Guidelines also available.
- Processors: There is a week-long training at Apata Insights. One of the TiU researchers (Till Wicker) will be present at this training as well.

Tilburg University also provides secure storage and information and training on ethical, data management and GDPR aspects of research data.

15. What (types of) security measures have you taken in this processing? What specific security standards apply to this process? Are they being met?

- Processor Agreement with Apata Insights
- Encryption
- Pseudonymizing after data collection
- Anonymizing before publishing any data
- Using secured and TiU approved (cloud) services (OneDrive, SURFfile sender)

16. Who has access to the data and why?

See #5.
Members of the research team will be the owners of the data, and thus have the rights to control access. This has been agreed with our partner NGO, and the surveying company. Members of the research team are only researchers from Tilburg University.

17. Do you have a data breach policy, an effective procedure, and a data breach register?

University policy: https://www.tilburguniversity.edu/about/conduct-and-integrity/privacy-and-security/careful-handling-personal-data/duties/data-leaks

B. Assessment of the necessity and proportionality of the processing.

In this section, the necessity and proportionality of the (proposed) data processing is assessed based on the above inventory. Is the processing lawful? Does it achieve the intended purpose? Is there no other, less burdensome way to achieve the result?

18. **Necessity**. Are all processing operations necessary to achieve the purpose?

Yes, the processing that will be carried out is necessary to properly conduct this research.

19. **Data minimization**. Are all personal data strictly necessary to achieve the purpose?

During the DPIA we extensively discussed the personal data that was necessary to conduct the research. This includes variables often used in the literature in the field of research.

20. **Proportionality**. Is the invasion of privacy proportionate to the processing purposes?

Yes, this is proportional in light of the purpose of processing (scientific research). In addition, the processing is only carried out with the (explicit) consent of the data subjects involved.

21. Is there no other way, less burdensome for the participants, to achieve the same goal?

There is no other, less burdensome way.

C. Determining the risks.

In this section the risks are determined. Here we start from the situation where no measures have yet been taken, i.e., not even those already in place. We divide the risks into risks for the participants and risks for the organization

Risks to participants.

Describe and determine the (gross) risks to participants.
Gross risk refers to the risk to stakeholders without (additional) measures in place. Classify the risks into High (H), Medium (M) or Low (L).

Consider the following risks, among others:

1. Discrimination against an individual
2. Identity theft or fraud
3. Financial losses
4. Reputation damage

5. Loss of confidentiality of information protected by professional confidentiality (e.g., in the professional practice of a physician)
6. Undoing encryption
7. Significant economic or social harm
8. Restriction of exercise of rights or freedoms of an individual
9. Obstruction from exercising control over an individual's personal data
10. Evaluating personal aspects (*profiling*)
11. Processing of personal data of vulnerable persons

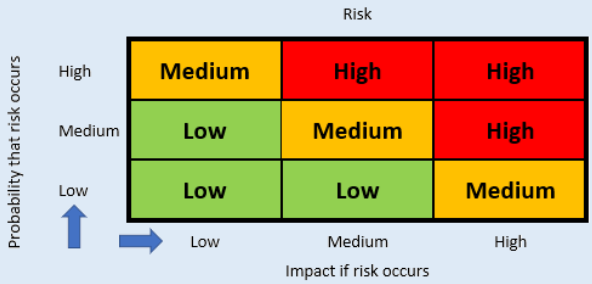
Risk Assessment

For each identified risk, assess how "heavy" that risk weighs. This can be done by estimating the impact and probability per risk by answering the following two questions:

- How do you estimate the probability for your organization of this risk occurring?
- How do you estimate the impact?

Answer these questions with "High," "Medium," or "Low" and use the matrix below (or your own) to indicate how "heavy" the risk weighs for the individual.
There are several factors that may be taken into consideration regarding this estimation. Examples of factors include:

- The nature of the personal data (ordinary, sensitive, special and/or under criminal law)
- The amount (a lot of data on an individual) of the personal data
- Location of processing (internal to organization/external/inside or outside the EEA)
- Etc.



	Explanation risk	Probability
1.	Data leak could lead to information being possibly traced back to individuals	M
2.	Processing of personal data of vulnerable persons	M
3.	Data leaked about who gets cash transfer and who doesn't	L

Risks to the Organization.

Describe and determine the (gross) risks to the organization.
Gross risk refers to the risk to data subjects without (additional) measures in place. Classify the risks into High (H), Medium (M) or Low (L).

Describe what risks the organization faces if things go wrong when processing personal data in this process. Consider the following risks, among others:
1. Reputational damage/loss of trust (among the general public/collaborating partners)
2. Sanctions from supervisory bodies

3. Complaints and claims
4. Disruption of business processes
5. Liability/financial loss

Risk Assessment

For each identified risk, assess how "heavy" that risk weighs. This can be done by estimating the impact and probability of each risk by answering the following two questions

- How do you estimate the probability for your organization of this risk occurring?
- How do you estimate the impact?

Answer these questions with "High," "Medium," or "Low" and use the matrix below to indicate how "heavy" the risk weighs for the organization.

There are several factors to consider in this estimation. Examples of factors are:

- Whether this process is critical to the continuity of the organization;
- Whether the organization already has some experience with this method of processing;
- Whether the Dutch Data Protection Authority has previously expressed a negative opinion on this type of processing and/or possibly even issued fines;
- Etc.

	Explanation risk	Probability
4.	Reputational damage/loss of trust	L
5.	Complaints and claims	L

D. Measures

What measures are being taken to reduce risks?

Assess what technical, organizational, and legal measures can be taken to prevent or reduce the risks described above. Describe which measure addresses which risk and what the expected residual risk is after implementing the measure. Include these control measures in the "control measures" column of the DPIA. If the measure does not fully cover the risk, justify why the residual risk is acceptable and include this motivation in the risk acceptance document.

Indicate per identified risk:
What management measures can be taken? What is the effect on the gross risk? What is the residual risk (*net risk*)? Have the measures to be taken been approved for further implementation? Have they already been implemented?
**Standardly, the Dean (or his or her derived signatory) approves the measures and signs for the approval for the measures to be taken and the remaining risks)*
*** At the time the DPIA is conducted.*

Risk No:	Gross score (H/M/L)	Management measures to be taken	Impact on gross risk	Residual risk: H/M/L/None	Measures agreed*: Yes/No	Measure already implemented**: Yes/No
1-5	1&2 M 3-5 L	• Processor Agreement Apata Insight & TiU • Sending data encrypted • Once data is received by TiU, data is deleted on Apata server • Data saved at OneDrive with Boxcryptor encryption • Data is pseudonymized (limited access, key file in different location), limited access, Household Identifiers only) • After data collection is finished, the key file is destroyed and data is archived in anonymous form	Risks are mitigated	L	Yes	No. Data collection has not yet taken place but measures have been described and agreed upon.

Administrative information

Funding:

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Institutional Review Board (ethics approval): IRB approval was obtained from Tilburg University (IRB FUL 2022-004) and the Mildmay Uganda Research Ethics Committee (MUREC-2022-144).

Declaration of interest: None.

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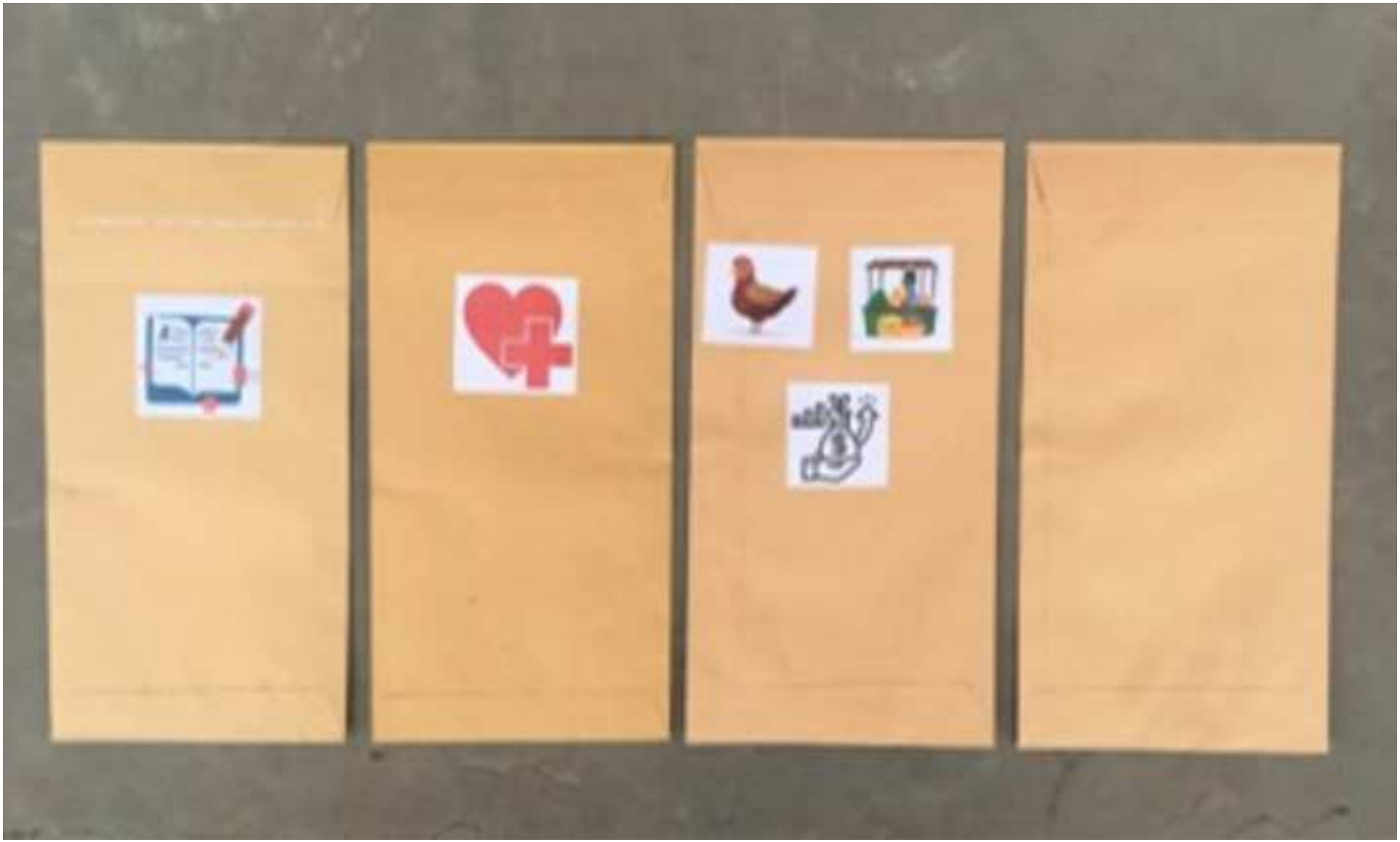
We are further grateful for the support from Apata Insights for their coordination of the data collection. Special thanks go to Timothy Rubashembusya, Emmanuel Nshakira Rukundo, Nixon Omviti, Cynthia Kuzira, and Sam Mukama.

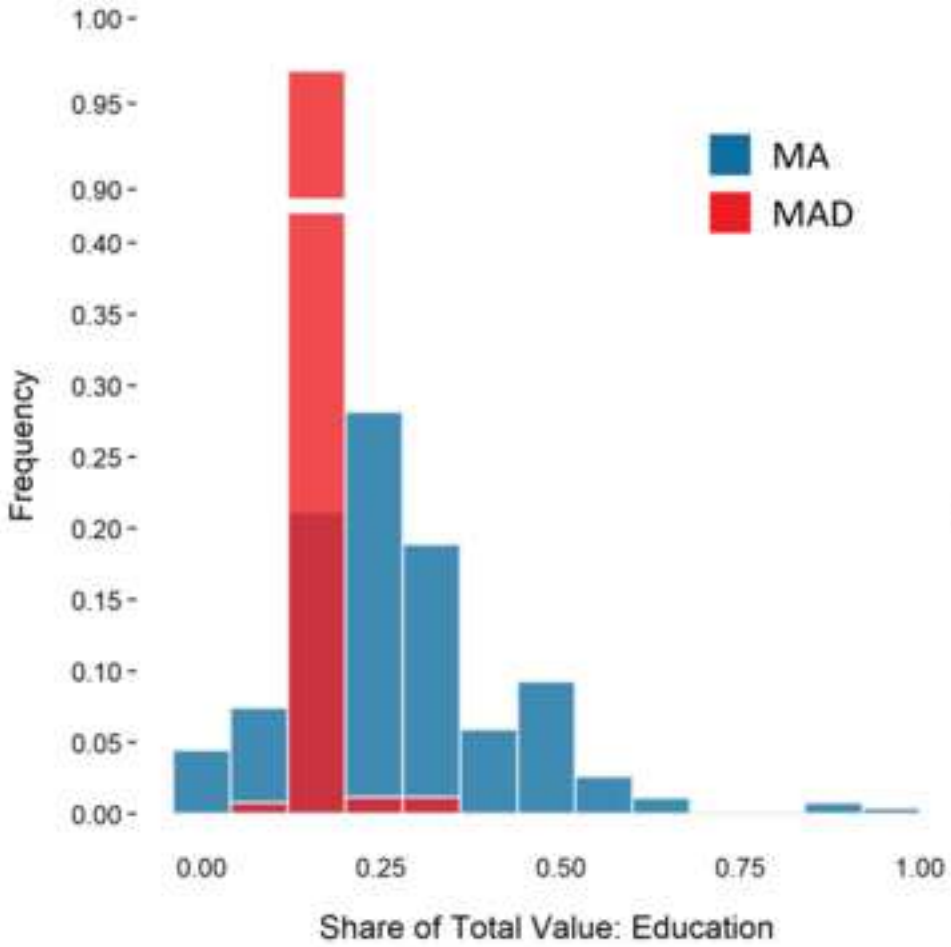
Latex code references

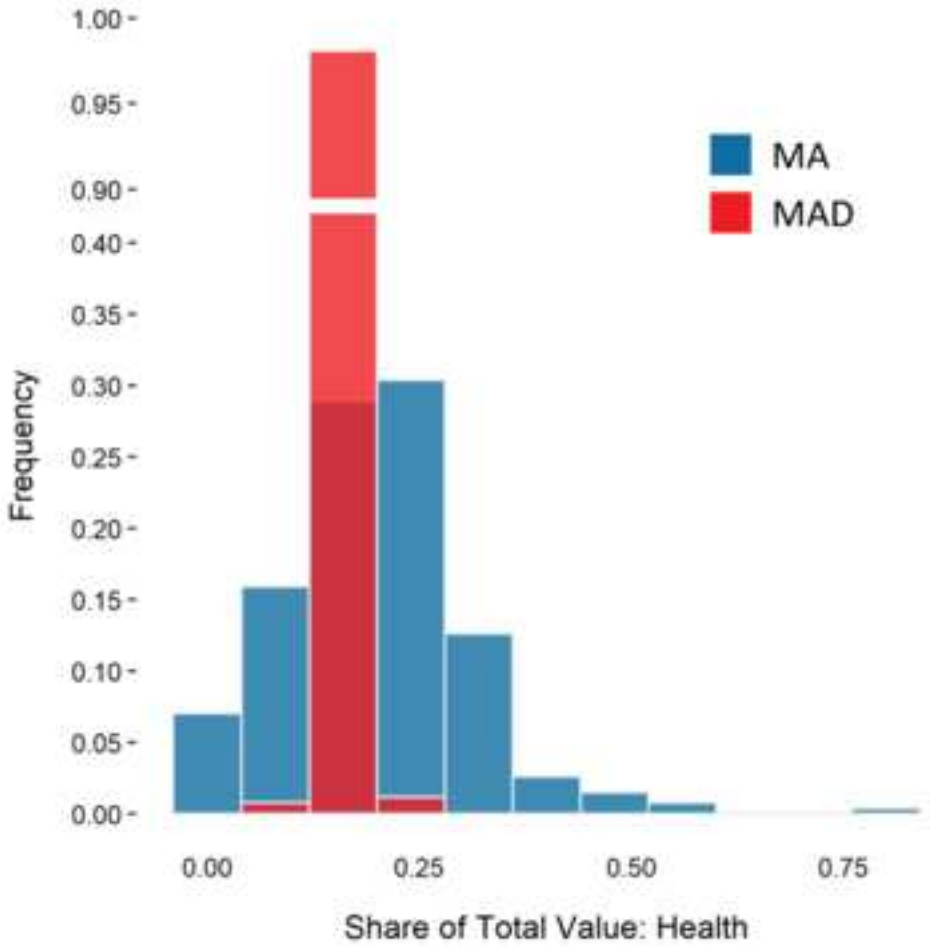
Click here to access/download

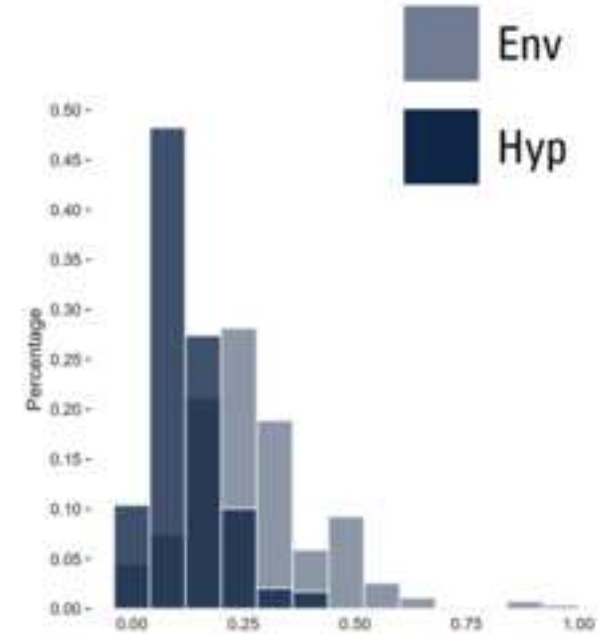
LaTeX Source File

main.tex

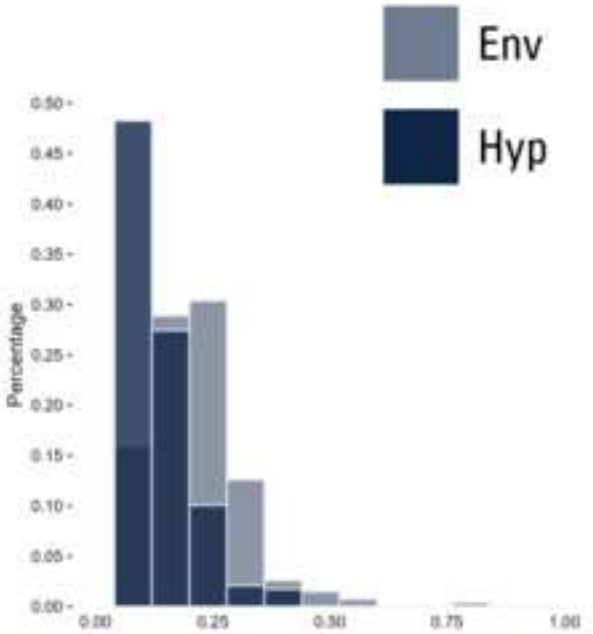








Share of Total Value: Education



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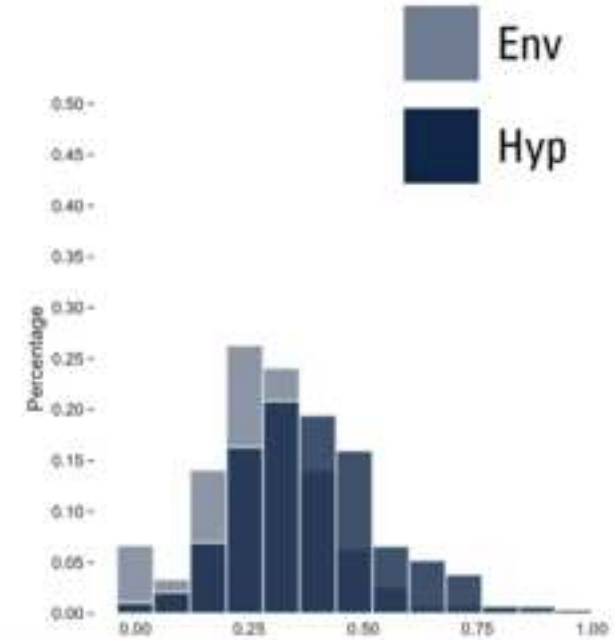
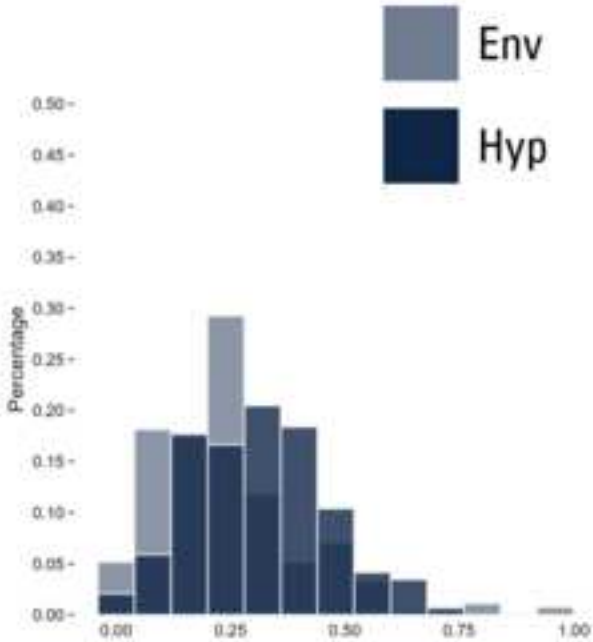
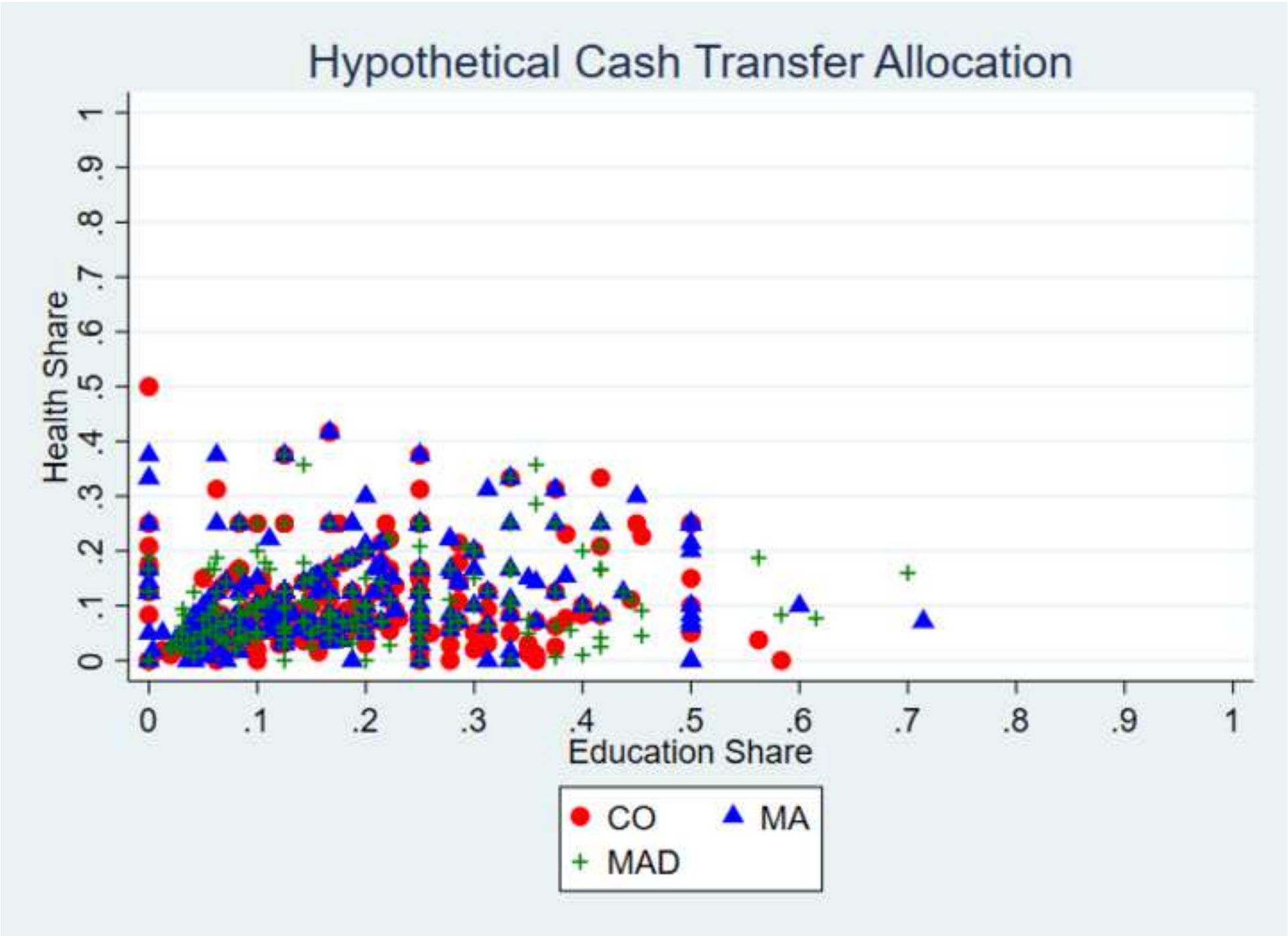
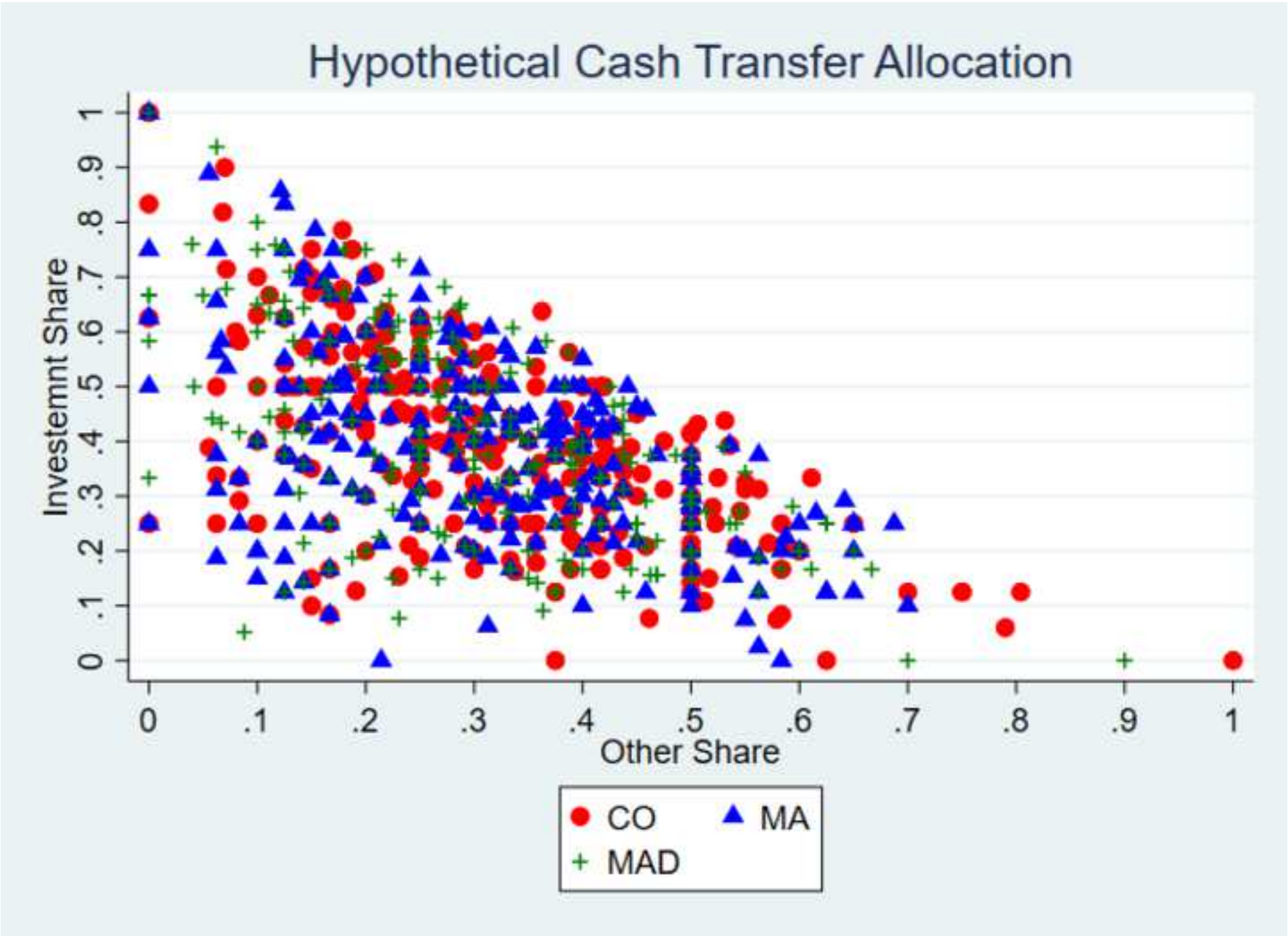


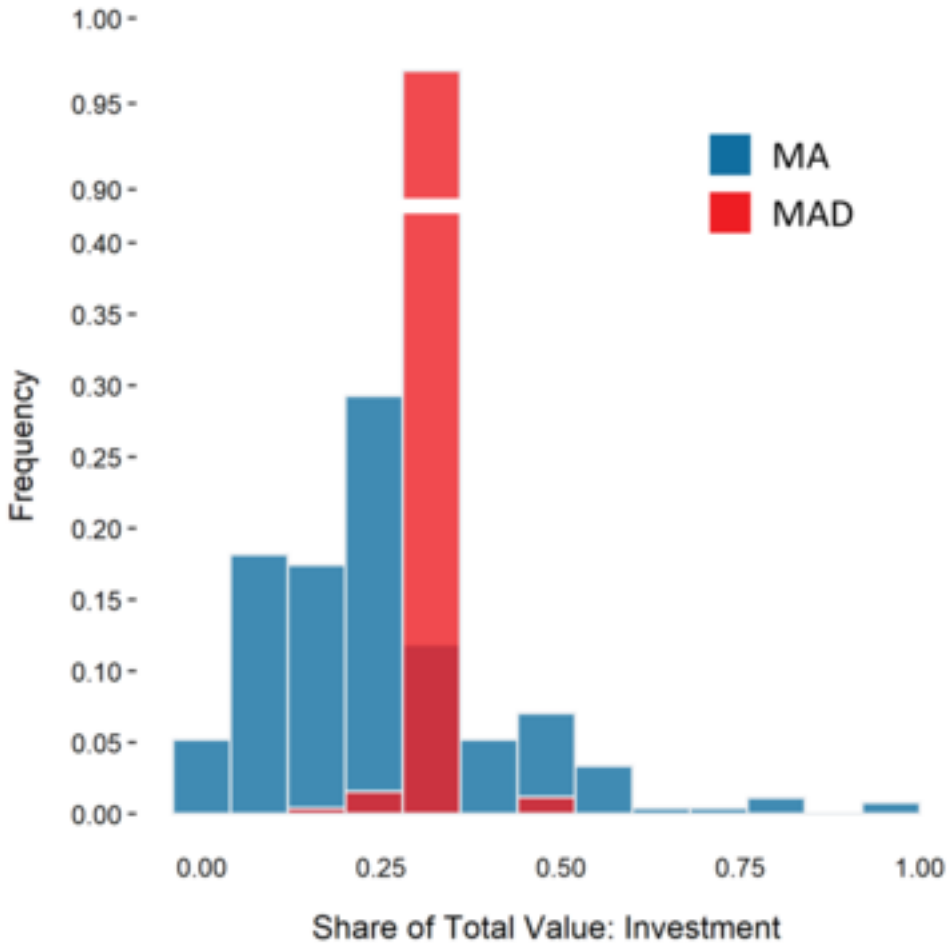
Share of Total Value: Investment

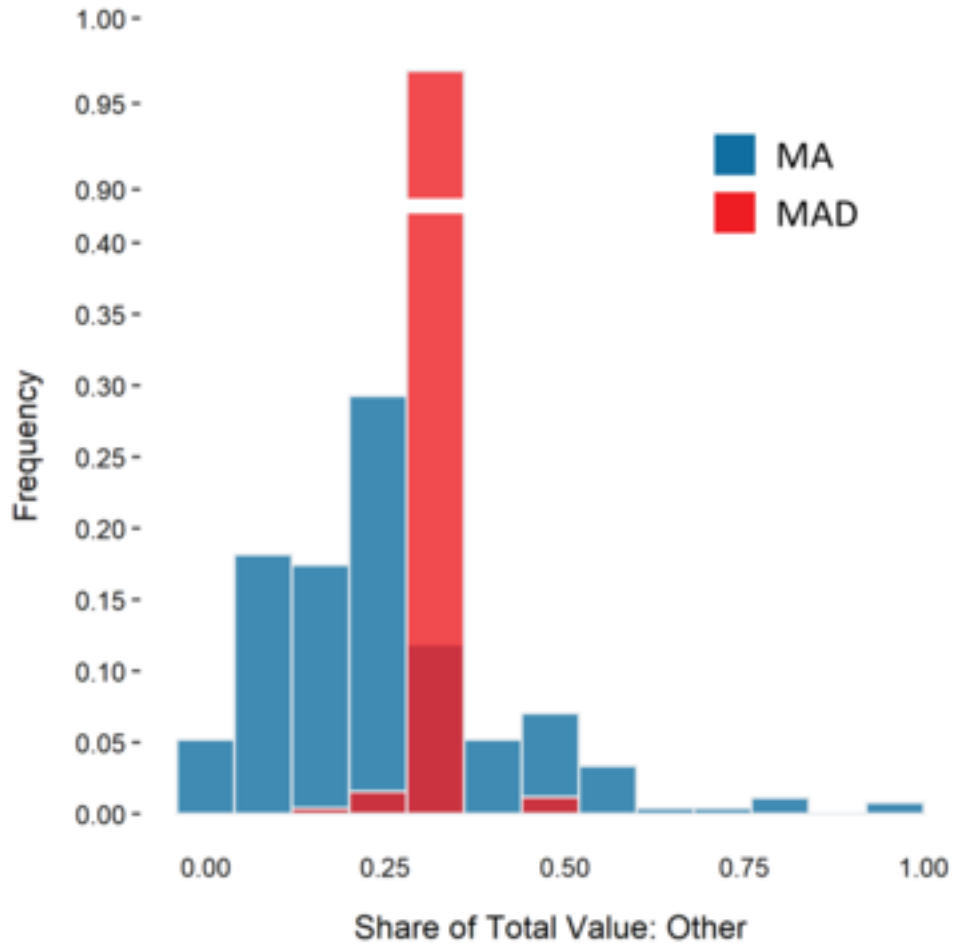


Share of Total Value: Other









Investments

p.a. = per acre (seedlings)

20,000 UGX
Chicken

100,000 UGX
Goat

900,000 UGX
Cow

200,000 UGX
Pig

900,000 UGX
Simsim (p.a.)

800,000 UGX
Rice (p.a.)

900,000 UGX
Cassava (p.a.)

1,400,000 UGX
Groundnut (p.a.)

1,300,000 UGX
Market Vendor

4,000,000 UGX
Boda-boda

250,000 UGX
Bicycle

1,000,000 UGX
Mechanic

Investments

p.a. = per acre
(seedlings)

20,000 UGX
Guinea Fowl

20,000 UGX
Rabbit

40,000 UGX
Bee Farming

400,000 UGX
Onion (p.a.)

300,000 UGX
Tomato (p.a.)

400,000 UGX
Maize (p.a.)

300,000 UGX
Eggplant (p.a.)

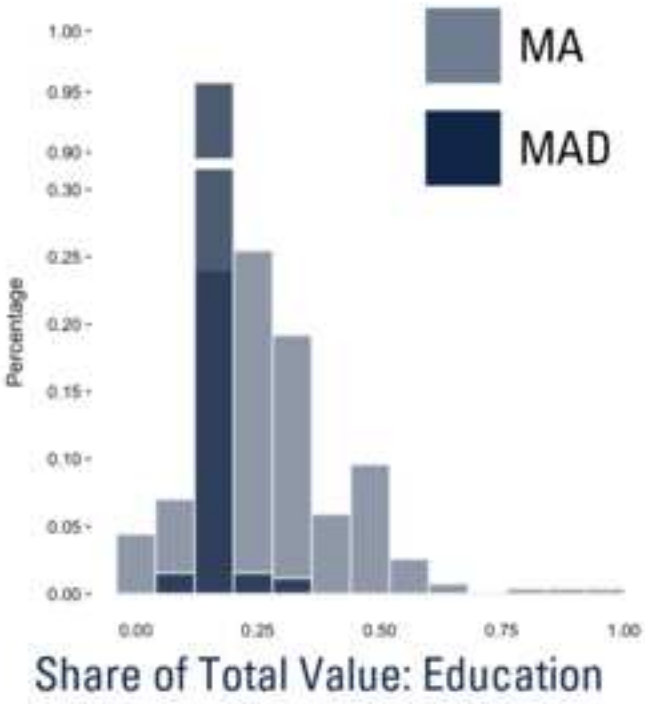
300,000 UGX
Watermelon (p.a.)

1,400,000 UGX
Hair Salon

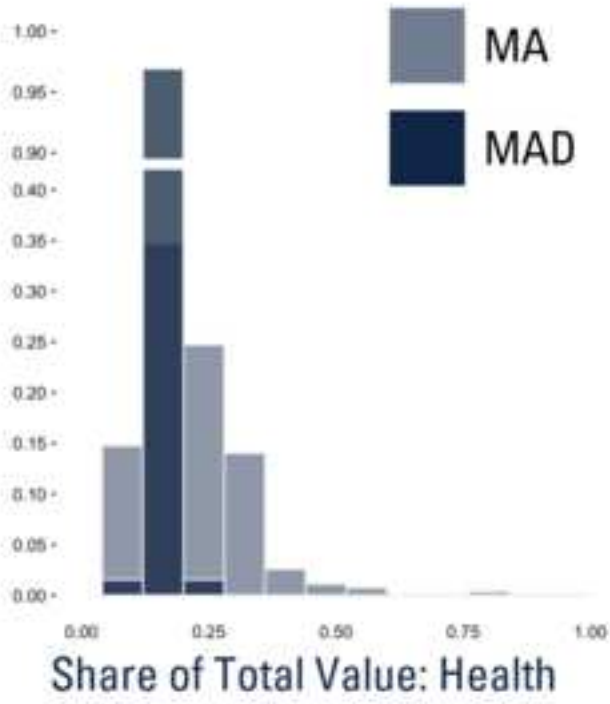
1,400,000 UGX
Tailoring

1,200,000 UGX
Brick-making

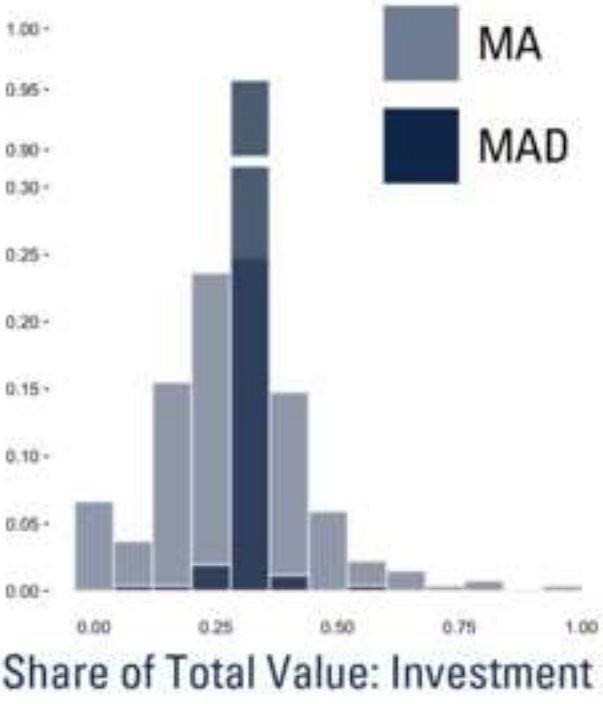
1,800,000 UGX
Carpentry



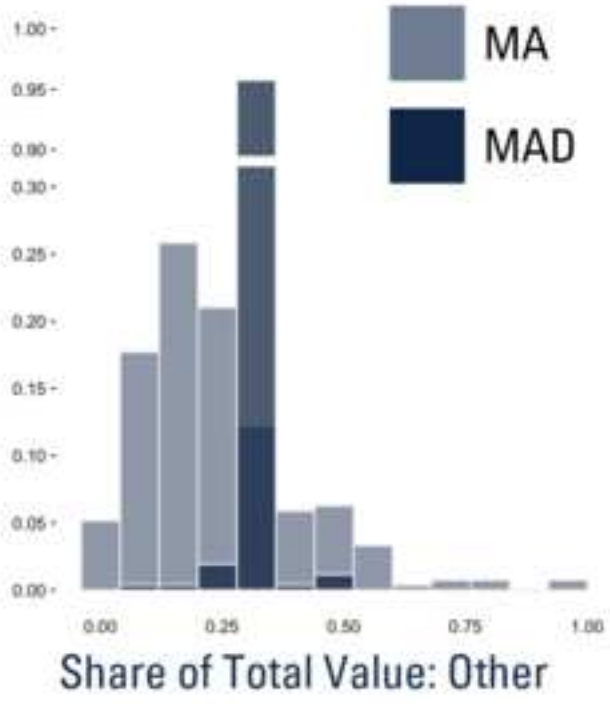
Share of Total Value: Education



Share of Total Value: Health



Share of Total Value: Investment



Share of Total Value: Other

Education

..... UGX

Health

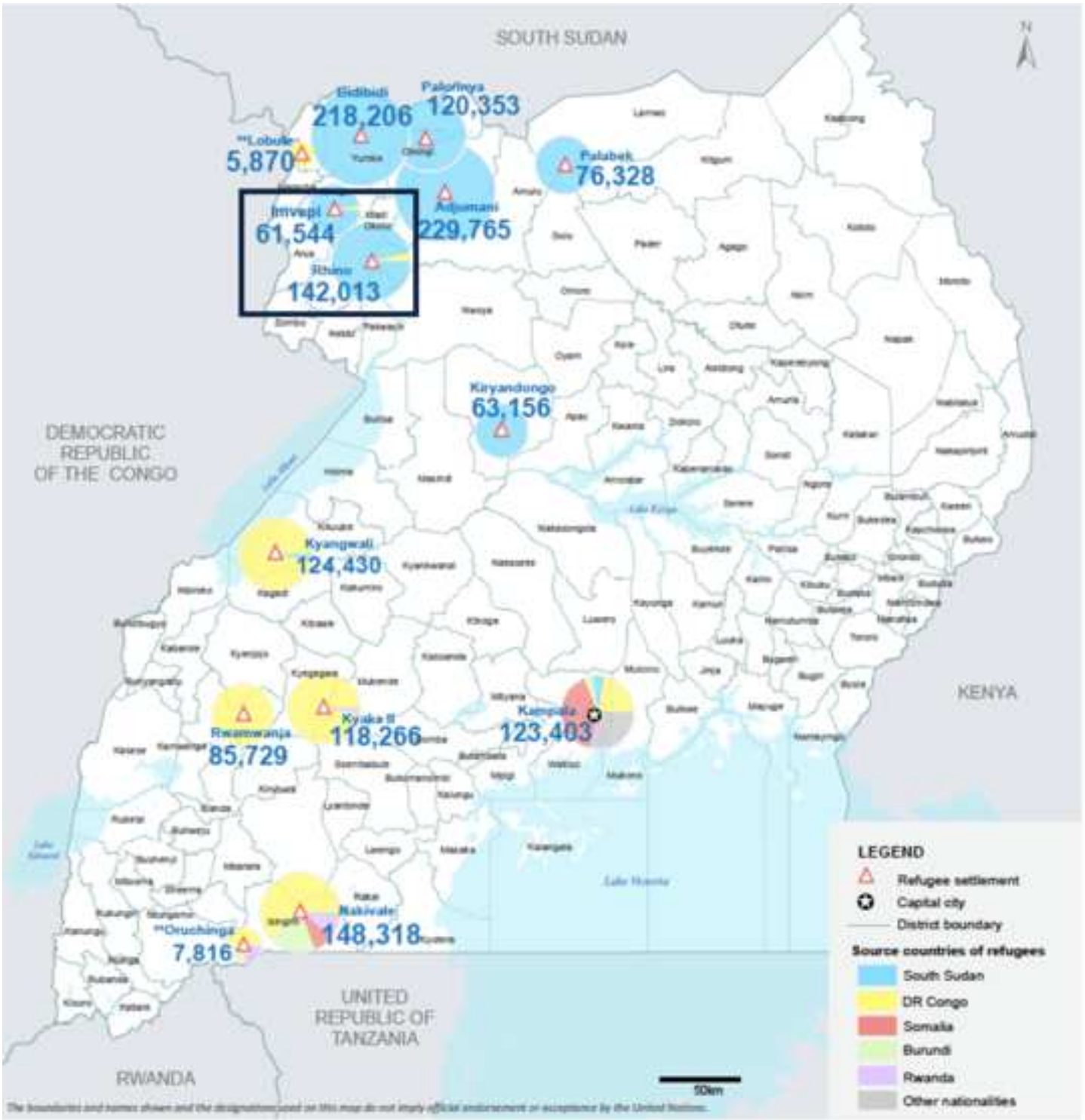
..... UGX

Investment/
Livelihoods

..... UGX

Other

..... UGX



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Patricio Dalton: Conceptualization; Funding acquisition; Investigation; Methodology; Resources; Supervision; Validation; Roles/Writing - original draft; Writing - review & editing.

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