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The role of cash and food assistance

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Abstract

Social protection transfers are the most widespread measures adopted to stabilize refugee households' livelihoods and alleviate their food insecurity. This paper contributes to the literature on the effectiveness of different types of support on livelihoods and productivity outcomes of one of the largest refugee populations in Africa. Taking advantage of a unique panel dataset representative of the largest part of the 1.4 million people hosted in the Uganda refugees' settlements, this paper investigates how different social protection interventions (cash and food) are effective in alleviating food insecurity and in contributing to beneficiaries' self-reliance. The results show that the effectiveness of transfers depends on beneficiaries' characteristics, on context specificity, and on the outcome assessed. Cash and food transfers are particularly shown to reduce the likelihood of implementing a large set of negative coping strategies. However, food transfers also contribute to increase the quality and variety of households' diet, while cash transfers are more suitable to support the refugees' self-reliance, providing that households operate on a sufficient extent of agricultural land. The use of these findings for policymaking adds further insight to alleviating the short-term humanitarian needs of refugees while paving the way to build long-term and sustainable pathways towards self-reliance. Furthermore, the trade-offs highlighted are expected to inform some improvements of the refugees' self-reliance integration model implemented in the country.

Keywords: refugees, cash transfers, food transfers, food security, self-reliance.

JEL codes: 015, 019, Q12, Q15.

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1 Introduction

Food insecurity remains a significant challenge in Africa, where the prevalence of undernourishment is the highest in the world (FAO *et al.*, 2020). High population growth rates, poverty, land degradation and low agricultural productivity are some of the main factors severely affecting food security across the continent. This is particularly true in many rural areas of sub-Saharan African countries, where food security issues are intrinsically related to households' agricultural self-reliance capacity.

With half of its population still food insecure and one third of its households still living under the poverty line of USD 1.90 a day, Uganda is one of the poorest and most food insecure countries of the world. Yet, Uganda maintains an open-door policy to refugees from neighbouring countries and thus hosts one of the largest sub-Saharan Africa communities of refugees, which amounts of about 1.4 million people (UNHCR, 2021a), mainly coming from Burundi, the Democratic Republic of the Congo and South Sudan. Primary drivers of displacement include war and ethnic and political persecution in a context of extreme poverty and competition for control over finite resources. The incidence of food insecurity in Uganda reaches its peak in refugee settlements, where up to 47 percent of households experience insufficient food consumption (UNHCR, 2021a).

In the context of refugees, the use of social protection transfers is key to help stabilize refugee households' livelihoods and alleviate food insecurity within and outside official settlements. When well-targeted, these interventions can indeed serve far more than the protective function for which they are typically designed. Recent literature has shown that transfers can support agricultural systems, notably by allowing households to invest in improved and sustainable agricultural productivity (Banerjee *et al*., 2015; Daidone *et al*., 2019; Haushofer and Shapiro, 2016; Hidrobo *et al*., 2018; Prifti, Daidone and Davis, 2019; Sitko *et al*., 2021; Tirivayi *et al*., 2016). Social transfers also enable refugees to integrate themselves within host communities (Alix-Garcia *et al.*, 2018; Kreibaum, 2016). This social cohesion supports infrastructure development and stimulates demand for goods and services, which in turn create job and market opportunities that are beneficial to the local community (D'Errico *et al.*, 2021).

Social transfers typically contain either in-kind contributions, and notably food packets, or cash (Betts *et al.*, 2019; Taylor *et al.*, 2016). Previous research suggests that, while all transfer types tend to improve welfare, the relative impacts of different types of transfers strongly depend on the socio-economic context in which the programmes are implemented (Daidone *et al.*, 2019). These impacts can be highly heterogeneous across different segments of beneficiaries. For example, some findings suggest that cash transfers tend to be more successful than food baskets in promoting dietary diversity (Taylor *et al.*, 2016). However, food aid may be more relevant in acute-emergency contexts and for highly food insecure rural households that do not operate in a cash-based economy and have little access to goods. The relative effectiveness of cash and in-kind food transfers, therefore, cannot be generalized as the longstanding debate "cash versus food" is far to be definitely closed (Gentilini, 2016; Ministerio de Cultura de Perú, 2020).

Our paper contributes understanding how different types of support affect refugees' livelihoods and productivity outcomes. The topic is paramount to develop optimal social protection strategies that help refugees on their path towards self-reliance. Despite the large number of social protection programmes dedicated to refugees in hosting countries, scarce evidence exists on the relative effectiveness of cash and food transfers on households' livelihoods and

agricultural outcomes. Moreover, little is known about the key factors or conditions that may enable (or impede) households to maximize their benefits from social transfers in regard to food security and self-reliance.

In this paper, we take advantage of a unique panel survey data on Ugandan refugee communities, the FAO Resilience Index Measurement and Analysis (RIMA) data, to investigate two interrelated issues. First, we study the effectiveness of different social transfer types (cash and food) as policy instruments to increase households' food security and improve their capacity for self-reliance in agriculture. Second, we examine how the impact of cash and food transfers varies along two main dimensions: the size of land available for the agricultural outcomes, and the time of permanence into the settlements for food security outcomes. We expect both land availability and time spent in the settlement to be crucial factors to the effectiveness of cash and food assistance. Indeed, any effect on households' agricultural activities may require a minimum land availability that refugees may not have access to, despite receiving plots of land to cultivate as part of their integration plan. Resulting from an increase in number of refugees, allocated plots may gradually become smaller and may be insufficient to allow households to engage in any agricultural activity even after the adoption of improved agronomic practices and technologies. Similarly, households' time of permanence in the settlement may strongly affect the impact of the transfers, as households may need more or less time to positively respond to the transfer's incentive, also depending on whether the outcome under consideration relies on impelling household food needs or on household capacity to build a longer-term pattern toward self-sufficiency.

This contribution aims to support policy makers in improving existing social transfer programmes and to help close the "humanitarian-development gap" within refugee communities. It does so by considering both the alternative (or complementary) role of different intervention modalities and key varying factors influencing the effectiveness of these interventions. The main objective of our findings is to provide further insights into better-targeted policies and action plans to enhance refugees' livelihoods, notably by identifying intervention modalities that would best promote refugee households' self-reliance and productivity.

The paper is organized as follows. Section 2 presents some background of Uganda and the Ugandan land-based self-reliance refugee policies. Sections 3 provides a review of recent contributions to the debate between cash and food transfers. Section 4 introduces the source of data used for this analysis and provides some descriptive statistics. Section 5 presents the identification strategy and the empirical approach implemented. Sections 6 puts forth and dives into the main results. Section 7 provides policy recommendations. Lastly, Section 8 concludes.

2 Background

Uganda is a land-locked Eastern-African country, sharing its borders with Kenya, South Sudan, the Democratic Republic of the Congo, Rwanda and the United Republic of Tanzania. Uganda's population reached an estimated 47 million people in 2021 and is expected to surpass 100 million people by 2050 if the annual population 3 percent growth rate persists as it has in the past decades (WPR, 2021). Yet, Uganda remains one of the poorest countries in the world, with more than a third of its population living on less than USD 1.90 a day (World Bank, 2020). A fast-growing population and persistently high poverty rates expose many Ugandans to the risk of experiencing hunger and food insecurity.

Agriculture in Uganda remains a critical component of the overall economy, contributing to approximately 23 percent of the country's GDP and providing livelihoods for a large share of the population (MAAIF, 2016). Around two thirds of the population are directly engaged in agricultural production, the majority of which takes place under small-scale rain-fed conditions (CIAT and BFS/USAID, 2017). UBOS (2019) estimates that subsistence agriculture involves about 39 percent of the working population, a figure that increases up to 47.2 percent in the rural areas. Maize and beans are the main food crops grown in the country (UBOS, 2020). They are both common in most parts of Uganda and mainly grown by smallholder farmers. Nevertheless, the decline in food production and nutritional diversity registered at the household level is significantly responsible for the spread of food insecurity across the country, especially in agriculture-dependent rural areas (Whitney *et al.*, 2018). Congruous with many East African countries, Ugandan agrifood patterns are characterized by persistently low harvest yields and small quantities stored for household consumption (Mbolanyi, Egeru and Mfitumukiza, 2017; Twongyirwe *et al.*, 2019).

Uganda is the hosting country of one of the largest refugee populations in sub-Saharan Africa and the third biggest refugee community of the world, with more than 1.4 million refugees (as of June 2021), mainly originating from South Sudan, the Democratic Republic of the Congo and Burundi (UNHCR, 2021a).[1] Refugee settlements are characterized by dramatically high levels of food insecurity and malnutrition. Supporting the continued influxes of refugees to ensure the sustainability of Uganda's refugee model, while addressing the root causes of poverty and food insecurity, is one of the key challenges of the country.

Uganda's land-based self-reliance model

Uganda has a long history of hosting refugees fleeing persecution and conflicts in the Great Lakes, East Africa and the Horn of Africa. Until 2010, Uganda's refugee population remained stable with voluntarily repatriations and refugee resettlements roughly emulating the number of new arrivals (Ruaudel and Morrison-Métois, 2017). However, from 2010 onward, renewed conflicts in the Democratic Republic of the Congo and Burundi, along with the recurrent occurrence of drought and other environmental stresses in certain regions of the country, led to a steady influx of refugees. As of early 2017, the UNHCR reported that Uganda was hosting over one million refugees and asylum seekers, nearly 74 percent of which were living in established settlements within eleven predominantly rural host districts in the northern and western part of the country (UNHCR, 2020).

[1] Data available at: https://data2.unhcr.org/en/country/uga

The country's policy framework is one of the most progressive and inclusive for refugees. The Uganda Refugee Act (2006) and the Refugee Regulations (2010) grant refugees with wide-ranging rights, making it widely considered as an exemplary model that supports refugees' integration within host communities and access to the same services as nationals.

The self-reliance model has three core elements that sets it apart from other refugee-hosting countries. First, its regulatory framework grants refugees the ability to work and decide on their place of residence. Second, its assistance model allocates plots of land for refugees to cultivate within their rural settlements. Third, it encourages refugee-host interaction through integrated social service provision and market access, allowing refugees to positively contribute not only to their own welfare, but also to and Uganda's economic and social development.

Despite these progressive measures, refugees remain vulnerable to internal conflict, widespread poverty and food insecurity. The majority remain within or near the official settlements and strongly depend on national and international agencies' social aid.

Several existing programmes and social protection initiatives aim to support refugees and host communities in Uganda. Amongst the most relevant is the Comprehensive Refugee Response Framework (CRRF) (UNHCR, 2017). Formally launched in 2017, the CRRF embraces existing initiatives, mechanisms and policies for refugees, including the implementation of both humanitarian assistance to support new arrivals and development-oriented interventions such as the Refugee and Host Populations Framework (ReHope) (UNHCR, 2020). Operating at the front line, the World Food Programme (WFP) also promotes refugees' early transition from food assistance to self-reliance. As such, the WFP has implemented a combination of cash and food assistance in refugee-hosting districts and offers technical support to strengthen existing systems. Additional initiatives include public works programmes, where beneficiaries are paid in cash or in-kind, with items such as food or food vouchers, in exchange of public work. World Vision, Oxfam and other international organizations, together with their local partners, have utilized this approach in Ugandan refugee settlements (National Population Council, 2020).

3 Cash vs food transfers: a longstanding debate

Social transfers, containing in-kind contributions or cash, have multiple effects on households' livelihoods (Betts *et al.*, 2019; Daidone *et al.*, 2019; Taylor *et al.*, 2016). While they aim to alleviate poverty in the short run – by improving food and income security – and in the longer run, their objective is to help break intergenerational transmission of poverty by increasing investments in health and education (Daidone *et al.*, 2019). However, heterogenous impacts of cash and food transfers have been observed across different household groups, suggesting that optimal intervention plans should take into account households' characteristics and contextual circumstances (Daidone *et al.*, 2019).

Existing evidence on cash and food transfers indicates that, while all transfer types improve welfare, cash transfers tend to promote dietary diversity and to be more cost effective (Taylor *et al.*, 2016). As food aid baskets offer a limited variety of foods, a substantial proportion beneficiaries sell their food allotments in local markets in exchange for cash, which will better enable them to diversify their diets. In contrast to food baskets, cash transfers provide households with the freedom to decide what to purchase without distorting consumption or production choices.

Yet, for highly food-insecure rural households, food aid may be a preferred option. When offered the opportunity to switch from obtaining food aid to receiving cash transfers, a proportion of households declined the offer, mainly for two reasons. On one hand, some beneficiaries considered the quality of items in the basket to be superior to what they would access without the food transfer, either due to poor quality in local markets or to a lack of market access (Hidrobo *et al*., 2014; Hoddinott *et al*., 2014). On the other hand, certain households believed they lacked the required knowledge to rightly benefit from cash transfers, caused by either a mobile cash transfer illiteracy or poor cash management skills (Gayfer *et al.*, 2012; Taylor *et al.*, 2016). Moreover, if the covariance between marginal utility of income and price is positive, beneficiaries may prefer food-transfers as they embed an insurance component. This allows to hedge against huge price variations that often affect countries characterized by low market integration (Gadenne *et al.*, 2021). In fact, localized cash injections in weakly integrated and low competitive markets may result in price spikes, which would leave consumers or net buyers worse off than they were before (Headey, 2014). Alternatively, preferences for food-transfers could also be shaped by gender considerations and intra-household decision-making processes. In several communities, women tend to favour food aid, which they are more likely to control, while men may prefer cash transfers (Doss, 2013).

Social transfer programmes affect agricultural activity investment patterns via different pathways. While cash transfers may relieve associated liquidity constraints, subsidized food provision may act as a form of insurance and prevent households from resolving to conservative income-generating strategies during volatile periods (Daidone *et al*., 2019; Phimister, 1995; Prifti, Daidone and Davis, 2019; Prifti *et al*., 2019; Schwab, 2018; Serra *et al.,* 2006). Evidence indicates that cash beneficiaries tend to spend more money on agricultural inputs, suggesting higher returns in agricultural productivity for households receiving cash transfers when compared to those receiving food aid (Hidrobo *et al*., 2014; Hoddinott *et al*., 2014). In other cases, however, agricultural outcomes have been found to benefit from both cash and food transfers, with cash transfers recipients investing more in higher liquidity requirements (such as livestock) and food recipients incorporating higher-return crops into their

agricultural portfolios (Schwab, 2018). Cash transfers have also been found to alter farmers labour allocation decisions, such as encouraging them to pull out of occasional paid labour and use the freed-up labour on their own farm to increase production (Daidone *et al.*, 2019; Karlan *et al.*, 2014). However, the occurrence and scope of these effects have been shown to vary depending on the studied transfer's design and features. Among these critical factors are the frequency and size of payments (Bastagli *et al*., 2018; Chambers and Spencer, 2008; Haushofer and Shapiro, 2016), targeted beneficiaries' geographic location, labour availability and agricultural potential (Baker and Grosh, 1994; Daidone *et al*., 2019; Elbers *et al.*, 2007), and intra-household allocation differences (Quisumbing, 2003).

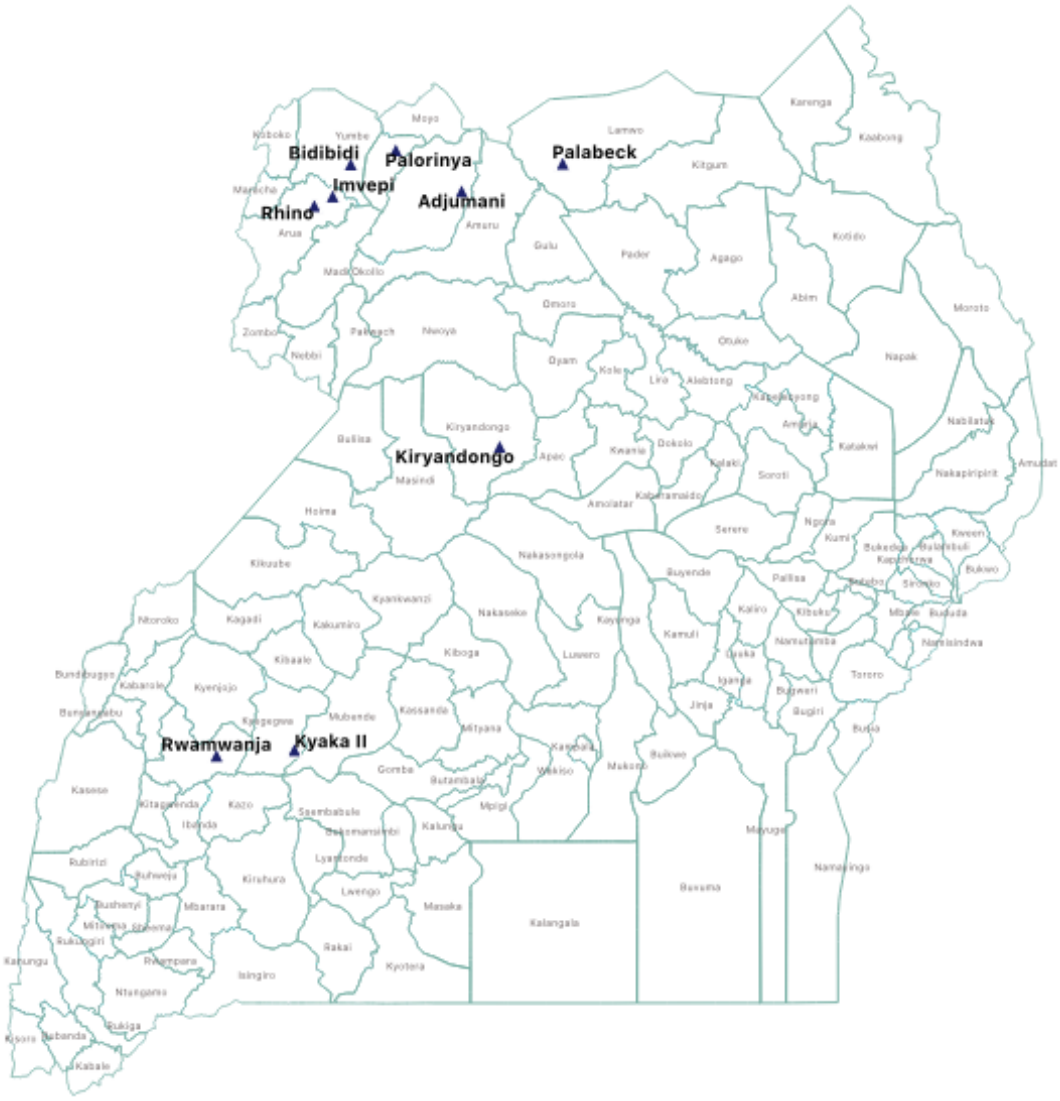
In the context of refugee settlements in Uganda, there has been increasing interest in switching from commodity-based aid to cash transfer modalities. However, the impact of such a switch in an emergency context remains quite ambiguous to this day, as scant empirical evidence exists to rightfully advocate for one option relative to the other. The effectiveness of different transfer types for the refugee community is also expected to vary across different sets of outcomes, ranging from food security to agriculture and self-reliance related outcomes. With food relief being one of the main objectives of social protection assistance, transfers are expected to improve food security. In parallel, the "land-based self-reliance model" aims to support refugees' integration through agricultural activity. A positive effect on households' agricultural engagement and productivity is therefore expected to ensure transfers' effectiveness on enhancing beneficiaries' capacity for self-reliance.

4 Sampling frame and data description

4.1 The sample

The data employed in this analysis comes from RIMA survey, which stems from the coordinated efforts of the Office of Prime Minister (OPM), the Uganda Bureau of Statistics (UBOS), FAO, WFP and the United Nations' Children Fund (UNICEF). The survey is representative of around 80 percent of the total refugees living in Uganda as of 2018 (Figure 1). The main objective of the survey is to monitor refugees' and host communities' living conditions to support policy design in refugee-hosting districts (FAO and OPM, 2018, 2019).

Figure 1. Uganda settlements and survey coverage



Notes: The survey covers the following settlements across eight districts: Palabeck settlement in Lamwo district; Palorinya in Moyo; Bidibidi in Yumbe, the namesake settlements in Adjumani and Kiryandongo districts; Imvepi and Rhino in Arua, Kyaka II in Kyegegwa and Rwamwania in Kamwenge. In each district, only one settlement and the closest host community are included in the sample, except for Arua and Adjumani districts, where respectively two (Imvepi and Rhino) and six settlements are sampled.

Source: Global Administrative Areas. 2018. Download GADM Data. In: *University of California.* Cited 9 December 2021. www.gadm.org/download_country.html modified by the authors.

The use of this data granted us with the unique opportunity of delving into the effects of adopting cash versus food transfers on different outcome variables and key varying factors influencing the effectiveness of these interventions. The dataset contains a wide range of information on household socio-demographic and economic indicators, including food security, shocks, assistance, perceived resilience capacity, coping strategies and aspirations, access to basic services, employment, agricultural and livestock production, besides the geolocation of the households. Moreover, the survey is one of the few covering both refugee and host communities, and represents the solo panel survey available in Uganda on both these communities to date.

The initial wave of data was collected in November–December 2017 in Northern districts, following the peak of arrivals from South Sudan, and in March 2018 in Southwest Uganda to cover the Congolese refugee-hosting districts. A second wave was fielded both in the North and Southwest in December 2019 to track all the households interviewed in the first wave. The households were selected using a stratified two-stage cluster sampling method. Within each district, the Primary Sampling Units (PSU) represent refugee households' settlement blocks (or the villages close to the settlement for host households), with the probability of selection being proportional to the size of the settlement or sub-county. Households are the Second Sampling Unit (SSU), randomly selected from either a list of households provided by the local authority or by walking through the village or settlement blocks.[2] The second wave design's purpose was to follow through with all households interviewed at the initial wave, including individuals who split to form a new household.

The initial sample consists of 3 799 households, including 2 107 refugee households and 1 632 host households living in proximity to the settlements. For the second wave, 2 256 households were reached and interviewed, including 1 283 refugee households and 973 host households. Since this paper aims to estimate cash and food transfers' impacts in the context of Uganda's self-reliance model, we have focused our analysis on refugees, resulting in a two-wave balanced panel (2017–18 and 2019) with a total of 2 566 observations (refugee households).

Given the logistical data collection difficulties in an emergency framework, the attrition rate for the full sample accounts for 39 percent of refugees' households, which represents the observation unit used for this analysis. The large attrition is unsurprising as it is aligned to similar surveys in refugee contexts (Ozler *et al.*, 2020). Some of the main reasons for attrition include moving back to the country of origin; moving to Kampala, other cities or districts not covered by the survey; moving to unknown places; and difficulty in finding household members during field activities. The high attrition rate represents an ex-ante threat for the consistency of our empirical results. However, these concerns have been relaxed by testing whether a correlation appeared between the households the survey was not able to trace forward and the treatment variables. In particular, in the spirit of Ahmed *et al.* (2020), the attrition indicator has been regressed in a linear probability model environment on a specific transfer-type indicator (cash and food), taking the value of one if the household received a transfer and zero if not (Ahmed *et al.*, 2020). The results, reported in Table A2 in the Annex, exclude the existence of a correlation between the treatment variables (either food or cash) and the attrition indicator, hence easing our concerns about the validity of our empirical results.

[2] The sample is self-weighing.

4.2 Main variables and descriptive evidence

In order to construct social assistance treatment measures, this paper relies on self-reported information on which transfers households did or did not receive. These transfers were delivered to the refugee population within the framework of the Uganda Refugee Response Plan[3] and were distributed by several national and international organizations. For each survey wave, the data provides information on whether the household has received formal assistance, on the type of the received transfer, and on the total amount of payments (in cash and in-kind) that the household acquired in the month preceding the survey.[4] Based on available information, we create two dichotomous variables as proxies of household participation in a specific social transfer programme: the first variable equals to 1 if the refugee household received cash transfers (both unconditional cash transfers and cash for work) in the last month preceding the survey; the second variable equals to 1 if the household received food transfers (both relief food and food for work) in the last month preceding the interview. It is worth noting that in the Ugandan refugee context the two transfer-types are considered alternative one to the other. Out of the 2090 refugee households receiving cash or food transfers, only 85 received both. One could be concerned that households, notably in fragile contexts, may report a lower amount of received assistance in order to benefit from future transfers. Given the data limitations, this concern cannot be ruled out. However, if this is the case, any estimated impact should be considered as a lower bound of assistance's real effect.

To investigate whether social assistance helps refugees reach self-reliance, we use two sets of outcome indicators: the first refers to coping strategies undermining households' capacity for self-reliance and food-security related outcomes, while the second relates to households' agricultural activities. More precisely, the first set of indicators includes: (i) the number of days the household purchases food on credit; (ii) the number of days the household harvests and consumes immature crops; (iii) the number of days the household consumes seed stock that will be needed for next season; (iv) the number of days the household sells small assets; (v) the number of days the household exchanges food for work; (vi) the household's food expenditure in the last month; and (vii) the Food Consumption Score (FCS), computed as the weighted sum of the number of days the household consumed different food groups. The variables (i)-(v) range from 0 to 7, as they refer to the last week preceding the interview. As for the second set of indicators, this paper investigates: (i) a dichotomous variable equal to 1 if the household harvested any maize-type crop during the last season; (ii) a dichotomous variable equal to 1 if the household harvested any beans-type crop during the last season; (iii) a continuous variable measuring maize yield; (iv) a continuous variable measuring bean yield; (v) a dichotomous variable equal to 1 if the household perceived any income from crop sale; (vi) a dichotomous variable equal to 1 if the household used any seed, seedling or inorganic

[3] The information on the Uganda Refugee Response Plan is available at: https://ugandarefugees.org/en/working-group/165?sv=0&geo=220

[4] The second wave of the survey also includes information on assistance received in the twelve months preceding the interview. However, this information is not available at the baseline by transfer-type. Therefore, to ensure comparability over time and to investigate the impact of assistance received as refugees in Uganda (at the baseline the twelve-month variable may be altered by information about other transfers received in the country of origin), this paper relies on the variable constructed using the last-month recalling period.

fertilizers; and (vii) a dichotomous variable equal to 1 if agricultural activity was carried on using small assets such as hoe, axe, shovel, rake, panga or similar.[5]

To account for other factors that may influence our two sets of outcomes, we control for several household-level indicators (see Table A1 in the Annex for the descriptive statistics of the controls). Specifically, we account for the socio-demographic structure of the household (household head gender, average education level and dependency ratio); wealth and assets ownership (land size and livestock holding); market availability (distance from the closest trade market); integration within the surrounding community (participation in a network); participation in training activities; experience of agriculture-related shock (drought, flood or crop pests); level of stress experienced in regard to food shortages (a general coping strategy index);[6] the time of permanence within the settlement (months living in the settlement).

Descriptive statistics of treatment and outcome variables indicate that during the first wave, 20 percent of households received cash assistance while 55 percent received food assistance. In the second wave, the percentages are respectively 34 and 60. Only very few households received both cash and food transfers: 4.7 percent at the first wave and 1.9 percent at the second (Table 1). About 15 and 16 percent of the households that were not receiving respectively cash or food transfer the baseline, started to receive it in the follow up; while 46 and 26 percent of the households receiving cash or food in the baseline, did not receive it in the follow up (Tables A2–A3 of the Annex). To further characterize the households receiving cash transfers and those receiving food transfers, we have computed the mean statistics of relevant variables in the first wave for: (i) only cash-transfers recipients vs. no-transfer recipients; (ii) only food-transfers recipients vs. no-transfer recipients; (iii) only cash-transfers vs. only food-transfer recipients. We have then performed a t-test to identify significant differences among the respective two categories (t-tests are reported in Tables A3–A5 of the Annex). The t-test results indicate that cash-transfer recipients differ from no-transfers recipient primarily because they have been living in the settlement from longer time (77 months vs. 46 months). This significant difference is confirmed when comparing cash-transfers recipients to food-transfers recipients. Other relevant differences of cash-transfer recipients as compared to no-transfer recipients are the higher incidence of shocks, the higher participation in networks and in training activities. Food-transfers recipients differ from no-transfer recipients because they have higher education, they live closer to trade market, they have a higher participation in trainings and are more exposed to shocks. Furthermore, cash-transfers recipients, as compared to food transfers recipients, have a smaller incidence of female-head households, are less educated, live further from trade markets and are more linked to other refugees through networks.

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[5] In particular, the information about the use of input and assets in the baseline year have been complemented with information on household expenditures on crop inputs and on the number of agricultural assets owned at follow-up, given the variation in questionnaire structure across survey waves. Given that, at the follow-up the variables related to the use of inputs and to the use of small assets have been respectively computed based on whether the household had any expenses on crop inputs (seed, seedling or inorganic fertilizer), and whether the household owned any small agricultural asset (hoe, axe, shovel, rake, panga or similar).

[6] For the creation of the Coping Strategy Index, we follow Maxwell and Caldwell (2008). This index is widely used by International Organizations for measuring food insecurity in fragile contexts. The index is calculated as the sum of the number of days in the past week during which the household adopted different strategies to cope with food shortages.

Table 1. Descriptive statistics of treatment and outcome variables

	2017/18		2019	
	mean	sd	mean	sd
Social transfer variables				
Cash transfers (1=Yes)	0.207	0.405	0.343	0.475
Food transfers (1=Yes)	0.549	0.498	0.597	0.491
Both cash and food transfers (1=Yes)	0.047	0.213	0.019	0.136
Formal transfers (1=Yes)	0.714	0.452	0.922	0.268
Outcome variables				
N. days [purchase food on credit]	0.679	1.325	0.836	1.449
N. days [harvest and consume immature crops]	0.440	1.115	0.509	1.204
N. days [consume seed stock that will be needed for next season]	0.433	1.256	0.625	1.529
N. days [sell (small) assets]	0.140	0.556	0.121	0.542
N. days [food for work (exchange labour for food)]	0.539	1.299	0.393	1.083
Food expenditure (USD)	14.58	19.06	13.97	13.52
Food Consumption Score	40.65	11.67	42.07	13.12
Engaged in maize production (1=Yes)	0.415	0.493	0.401	0.490
Engaged in beans production (1=Yes)	0.203	0.402	0.180	0.384
Maize yield (kg/acre)	1306	2345	1994	17 283
Beans yield (kg/acre)	857	2356	828	6 577
Crop sale as income source (1=Yes)	0.544	0.498	0.345	0.475
Crop inputs (1=Yes)	0.297	0.457	0.188	0.391
Agricultural assets (1=Yes)	0.952	0.212	0.988	0.105

Source: Authors' own elaboration.

5 Econometric framework and identification strategy

Taking advantage of the data's panel structure, the empirical association between receiving the transfer (either cash or food) and our set of food and agricultural outcomes is estimated using a two-way fixed effects (2FE) model. This model includes household and time fixed effects to control for unobserved time-invariant household heterogeneity and temporal changes or common shocks in a given year.

Our identification strategy, however, is not able to control for the existence of household specific time-variant heterogeneity, which may be a potential source of endogeneity for our treatment variables.[7] Nevertheless, the temporal proximity of the two waves analyzed and the fact that the outcomes trends in the sampled population of refugees are expected to be quite homogeneous (e.g. relatively to the host population) relax the concerns about the potential bias. Moreover, the estimated models allow to control for a wide range of time-variant factors that may affect our estimates. For instance, one may think that specific households could have developed entrepreneurial skills between the two analysed waves. However, the model controls for the participation in agricultural and business-related trainings and for inclusion within community networks, which are likely to explain most changes in households' entrepreneurial skills across the two waves. Similarly, the variable capturing the self-reported exposure to different kinds of shocks is likely to explain some potential change in the households' risks profiles over the short time frame characterizing this paper. Finally, to take targeting criteria into account, we control for key demographic characteristics, such as the gender of the household head and the ratio of dependents in the household, in addition to the arrival time at the settlement.

Should the unobserved household-specific time-variant heterogeneity determines pre-treatment differences in the outcomes trends between treated and controls, the causal interpretation of the results is biased. Otherwise, the proposed methodology allows to estimate the short-term average treatment effect of receiving the transfers on the considered set of outcomes.

The empirical relationship between receiving transfers and the different outcomes selected for this analysis can be formalized as follows:

$$Y_{it} = \beta_0 + \beta_1 Cash_{it} + \beta_2 Food_{it} + \beta_3 \mathbf{X}_{\mathrm{it}} + \mu_i + \Gamma_t + u_{it}, \qquad (1)$$

where Y_{it} is any of our outcome variables related to household i at time t, regressed in separated models against treatment variables and controls. Outcome variables include self-reliance related negative coping strategies, food security related outcomes and agricultural related outcomes. $Cash_{it}$ and $Food_{it}$ are two binary treatment variables taking value 1 if household i receives the respective transfer type at time t. They are both included in the same model in order to estimate the impact of receiving a specific transfer type conditional on the effect of receiving the other. $\boldsymbol{X}_{it}$ identifies a vector of control variables and potential confounders, including household sociodemographic characteristics, assets endowment,

[7] The possibility to find a valid time-variant exclusion restriction for an instrumental variable approach has been widely explored given the available information from different sources. However, given the number and the heterogenous nature of the treatment, no valid exclusion restrictions have been found to improve the identification strategy. Moreover, the treatment variables encompass mixed programmes implemented by different institutions or donors, which makes a correct specification of the selection equation not feasible.

institutional framework, access to infrastructure (distance from the nearest market), self-reported past exposure to shocks (including drought, flood and crop pests), the level of the stress within households in case of food shortages (coping strategy index),[8] and the time of permanence within the settlement. μ_i and Γ_t capture the households and the year fixed effects, respectively. u_{it} represents the household and time specific error component, that is assumed to be normal distributed.

After recovering the average impact of cash and food transfers on the considered outcomes, the objective of the analysis is to test the impacts' heterogeneity across the distribution of two relevant variables, namely land size and time of permanence within the settlement. Our interest is two-fold. First, we are interested in investigating how the impacts of cash and food transfers on household coping strategies and food related outcomes vary according to the time of permanence within the settlement. Households' time of permanence within the settlement may strongly affect the transfers' impact, as households may need time to positively respond to the transfers' incentives. This is particularly true for the self-reliance related outcomes, which entail that households are already somewhat engaged in a process towards self-sufficiency (they produce some agricultural output, own some assets and are integrated enough into the settlement community to offer labour or to buy on credit). In addition, the impacts on food security related outcomes could be heterogenous across time as households may relatively rely more on cash transfers when they are not well-established within the settlement. Second, we aim to test how transfers' impact on agricultural outcomes varies according to land size availability. We expect a high heterogeneity of impacts across land distribution. Land availability in Ugandan refugee communities is indeed limited and, as such, it may strongly affect both households' probability to get engaged in agriculture and possible productivity improvements for households that do cultivate.

To investigate our hypotheses, we interact cash or food transfers with: (i) the time of permanence, for the coping strategies and the food-related outcomes; and (ii) the size of the land, for the agricultural outcomes. For this purpose, the linear models can be formalized as follows:

$$Y_{it} = \beta_0 + \beta_1 T_{it}^1 + \beta_2 W_{it} + +\beta_3 T_{it}^1 * W_{it} + \beta_4 T_{it}^2 + \beta_5 \mathbf{X}_{\mathrm{it}} + \mu_i + \Gamma_t + u_{it}, \qquad (2)$$

where T_{it}^1 and T_{it}^2 are the two treatment variables (cash or food). W_{it} corresponds to either the time of permanence within the settlement when Y_{it} refers to adverse coping strategies and food indicators, or the land size, when Y_{it} refers to agricultural outcomes. Y_{it}, Γ_t, and u_{it} are the same as above; the vector $\mathbf{X}_{\mathrm{it}}$ is our vector of controls for household i at time t, that neither includes the time spent within the settlement nor the land size. Marginal effects at different quantiles of the interacted variables have been calculated as partial derivative of the outcome relative to the transfer interacted in the specific regression: $\frac{\Delta \mathrm{Y}}{\Delta \mathrm{T}^1} = \beta_1 + \beta_3 \overline{W}_{it}$, where $\overline{W}_{it}$ corresponds to the different quantile values of the interacted variables (land or time of permanence).

[8] Notice that we only include the coping strategy index in the regressions related to agricultural activities, and we exclude it from the regressions related to the adverse coping strategies and food indicators, as the adverse coping strategies employed as outcomes in this analysis are included in the computation of the coping strategy index.

6 Empirical results

The empirical results are described along two main findings; the first discusses transfers' impacts on adverse coping strategies and food-related indicators, while the second examines transfers' impact on agricultural outcomes. Estimated coefficients are reported in Tables 2 and 3 of the respective sub-sections.[9]

Impact of cash and food transfers on self-reliance coping strategies and food security-related outcomes

Both cash and food transfers are effective in reducing the adoption of adverse coping strategies due to food shortages. When receiving cash transfers, the number of days a household resorts to: (i) purchasing food on credit; (ii) harvesting and consuming immature crops; (iii) consuming seed stock that will be needed for next season; (iv) selling small assets; and (v) exchanging food for work, respectively decreases of 35, 37, 43, 133 and 76 percent relative to the average number of days in the sample.[10] Yet, receiving food transfers reduces by 48, 51, 52, 93 and 31 percent the average number of days a household recurs to each of the considered coping strategies.

Cash and food transfers, on average, also have a significant effect on household food expenditure although the sign of the empirical relationship is, as expected, opposite**.** When receiving cash transfers, a household's food expenditure increases of about 23 percent, while a household receiving food transfer decreases its food expenditure by 32 percent. Notwithstanding the opposite sign of the coefficient, in both cases the empirical results point out that the households receiving the transfers are more food secure regardless of transfer-type. The households receiving cash transfers have more resources available to satisfy their food needs through the market, while the households receiving food transfers directly satisfy their food needs with the in-kind transfer.

Diet quality, as proxied by Food Consumption Score (FCS), increases with food transfers. Cash transfers, instead, show no significant effects on FCS. Households receiving food transfers register an increase in their FCS of 8.5 percent, while those receiving cash transfers are not statistically different from non-beneficiaries. This result suggests that receiving food transfers contributes to ensure better diet quality, while this is not the case for cash transfer beneficiaries. These results are aligned with previous contributions pointing out that in secluded, poorly connected-to-market areas, beneficiaries may prefer food transfers as the quality of items in the basket may be superior to what they would access locally (Hoddinott, Sandström and Upton, 2014).

Moreover, the time spent within the settlement is an important indicator of whether transfers will have an impact on coping strategies; the longer the residents stay in the settlement, the better the transfers' effects. In fact, both cash and food transfers have a significant impact on coping strategies only for households who have been residing within their settlement for at least 10–16 months. There are two possible explanations of these results. First, psychological conditions may play a role. Arriving from conflict-affected contexts, refugees may need time to adjust to their new environment before the assistance can have any effect. Second, the results

[9] Full results are reported in Tables A8–A13 of the Annex.

[10] The impacts in percentage $\hat{\beta}$ have been calculated as the decrease in percentage from the average value of the respective dependent variables, that is $\hat{\beta} = {}^{\beta}/_{mean}$ *100, where β is the coefficient reported in Table 2.

may be due to the nature of our selected coping strategies, which may only appear as feasible options for households after a certain period of time (for instance, households should own next season's seed stock in order to prematurely consume it).

Similarly, permanence within the settlements has a positive effect on food security as measured by the FCS index. However, this effect only applies to food transfers. The positive impact on food transfers is visible for households that have lived within the settlement for more than ten months and linearly increases with the time of permanence. Conversely, cash transfers' impact on the FCS across the time of permanence distribution is never significantly different from zero, consistent with the average impact. The differences between transfer types are likely to be due to their complex interaction with households' budget constraints, households' risk profiles and local markets' characteristics. In particular, we conjecture that the households residing longer in the settlement tend to rely more on the stability of the food obtained from transfers. This evolving perception may allow longer term residents to be more likely to divert money from food consumption expenditure to alternative uses after having received the food transfer. Moreover, assuming a higher diversity of the food received through the aid basket (compared to that accessible on the market), the same explanation applies for the heterogenous impacts of food transfers on FCS across the time of permanence distribution.

On the other hand, transfers' (both cash and food) benefits on food expenditure accrue for almost all transfer recipients, regardless of their time of permanence within the settlements.[11] Our results, indeed, indicate a significant impact of cash transfers across a wide range of the time of permanence distribution (with the only exception of households who have been residing for more than six years within their settlement), and a significant impact of food transfers across the entire distribution.

Table 2. Marginal Impact of cash and food transfers on self-reliance related coping strategies and on food-related outcomes, average and across different time periods of permanence within the settlement

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	# days HH purchases food on credit	**# days HH harvests & consumes immature crops**	**# days HH consumes seed stock of next season**	**# days HH sells (small) assets**	**# days HH sells food for work**	**Food expenditure (log)**	**FCS (log)**
Impact of cash transfers							
Average impact	-0.262**	-0.191*	-0.262*	-0.154***	-0.357***	0.228**	0.041
Impact for different time periods of permanence							
≃ 7 months	-0.321	-0.0599	-0.256	-0.165*	0.0632	0.729***	0.0422
≃ 10 months	-0.310*	-0.086	-0.257	-0.162**	-0.0206	0.629***	0.042
≃ 16 months	-0.294*	-0.12	-0.259	-0.160**	-0.131	0.497***	0.0417
≃ 37 months	-0.266**	-0.182*	-0.262**	-0.154***	-0.328***	0.262***	0.0411
≃ 73 months	-0.244*	-0.232*	-0.264	-0.150***	-0.488***	0.0718	0.0407
≃ 157 months	-0.218	-0.288	-0.267	-0.145**	-0.668***	-0.143	0.0402
N	2 525	2 525	2 525	2 525	2 525	2 525	2 525

[11] Although food transfer's impacts tend to decrease over time and is not statistically different from zero for households who have been residing within their settlements for more than six years.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	# days HH purchases food on credit	# days HH harvests & consumes immature crops	# days HH consumes seed stock of next season	# days HH sells (small) assets	# days HH sells food for work	Food expenditure (log)	FCS (log)
Impact of food transfers							
Average impact	-0.354***	-0.264***	-0.311***	-0.108**	-0.149*	-0.318***	0.085**
Impact for different time periods of permanence							
≃ 7 months	-0.164	-0.0925	-0.254	-0.0177	-0.14	-0.250**	0.0728
≃ 10 months	-0.214	-0.138	-0.269*	-0.0417	-0.142	-0.268***	0.0760*
≃ 16 months	-0.280***	-0.197**	-0.289**	-0.0732	-0.145	-0.291***	0.0803**
≃ 37 months	-0.398***	-0.303***	-0.325***	-0.129***	-0.151*	-0.333***	0.0879**
≃ 73 months	-0.494***	-0.389***	-0.353*	-0.175***	-0.155	-0.367***	0.0940**
≃ 157 months	-0.601***	-0.486***	-0.386	-0.226**	-0.16	-0.406***	0.101**
N	2 525	2 525	2 525	2 525	2 525	2 525	2 525

Notes: Household and time fixed effects, and controls (except the coping strategy index) are included in the regressions. Significance: * p<0.1, ** p<0.05, *** p<0.01. Standard errors are clustered at household level.

Source: Authors' own elaboration.

Impact of cash and food transfers on agricultural outcomes

The impact of receiving cash transfers on the probability to engage in maize or bean production is highly heterogeneous across households' land availability for cultivation. On average, receiving cash transfers is associated with a lower probability to engage in maize production. Nevertheless, the negative impact concerns households with no more than 1.5 acre of land available for agricultural activity. Vice versa, households having at least 5 acres of land available for cultivation are between 25 to 31 percent more likely to produce maize after receiving cash transfers. Similarly, larger households – of at least 3 acres – are more likely to produce beans by about 25 to 51 percent.

Contrastingly, receiving food transfers decreases the probability of engaging in agricultural activity. These results persist across all levels of land availability for agriculture activities and highlight food transfers' crowding-out effect relative to participation in agricultural economic activities.

Among households involved in agriculture, those receiving cash transfers are more likely to use small agricultural assets and to have higher maize productivity compared to those who do not receive the transfer. This holds on average and across the distribution of agricultural land availability, provided that households potentially operate on more than 1.5 acres of land. Conversely, cash transfers have no statistical impact on bean productivity, both on average and across different levels of land available for agriculture. This is likely due to maize's higher profitability when compared to bean production. Moreover, households involved in agriculture that receive cash transfers are more likely to use crop inputs as compared to those non-receiving the transfers. This holds on average and for households operating on small portions of land (less than 1.5 acres). While this result could seemingly not be aligned with our previous findings, it can be explained in the light of two main considerations. First, we observe an increase in crop inputs not within the overall sample, but within the sample of households that

were already involved in agriculture. Second, our "crop input" variable is a binary measure of whether households use inputs, but it does not provide information on the quantity and quality of the inputs used. Given these considerations, the lack of statistical significance of the impact of cash transfers on the use of crop inputs for households operating larger lands may be due to the fact that these households are already using crop inputs. Nevertheless, the identified productivity gain in maize production for households cultivating lands greater than 1.5 acres suggests that these households have invested cash transfers in increasing the quality and/or quantity of inputs used. Conversely, for households operating on smaller lands, the observed increase in the use of crop inputs is the major gain of receiving cash transfers.

Similarly, households that are already involved in agricultural activities and that receive food transfers are, on average, more likely to use crop inputs. This positive effect on the probability to use inputs holds, regardless the size of land cultivated. Considering that agricultural households receiving food transfers are relatively poorer when compared to those who do not receive food, the transfer's positive effect on the probability of using inputs is explained by the fact that these households, in the absence of transfers, would have recycled seeds and would not have used any inorganic fertilizer. Yet, in our sample, the higher probability to use crop inputs does not translate into any statistically significant productivity enhancement. Again, this is not entirely surprisingly as this paper uses information on input use probability and not on the quality and/or quantity of inputs used. Further studies are needed to understand whether the lack of productivity improvement is due to the quantity, the quality or the agronomic suitability of applied inputs.

Lastly, households receiving transfers (both cash and food) are never more likely to earn income from crop sale, on average and regardless of operated land size.[12] This means that neither cash nor food transfers are effective in improving households' capacity to gain income from agricultural activities and market participation.

[12] We only observe food transfers' positive impact (+12.9 percent) on the probability to sell crops for households cultivating very small land plots (i.e., smaller than 1.22 acres). This is probably due to households' novel possibility of selling some crops that were previously used for self-subsistence once they have received the transfer's basket of food items.

Table 3. Marginal Impact of cash and food transfers on agricultural average overall and across different sizes of land cultivated

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	HH is engaged in maize production (1=Yes)	HH is engaged in bean production (1=Yes)	HH use commercial crop inputs (1=Yes)	HH owns ag. assets (1=Yes)	HH gets income from crop sale (1=Yes)	Maize yield (log)	Beans yield (log)
Impact of cash transfers							
Average impact	-0.158***	-0.021	0.254***	0.036*	-0.070	0.497***	0.094
Impact at different land values							
≃ 1.22 acre	-0.210***	-0.0802***	0.295***	0.0113	-0.12	0.293	-0.0206
≃ 1.50 acre	-0.144***	-0.00451	0.265***	0.0295	-0.0836	0.441**	0.0596
≃ 3.00 acre	0.0829	0.255***	0.163	0.0918*	0.0392	0.948***	0.334
≃ 5.00 acre	0.250**	0.445***	0.088	0.138*	0.13	1.321**	0.536
≃ 6.00 acre	0.310***	0.514***	0.0612	0.154*	0.162	1.455**	0.609
N	2 525	2 525	1 068	1 068	1 068	1 027	478
Impact of food transfers							
Average impact	-0.037	-0.019	0.227***	-0.043**	0.034	0.222	-0.186
Impact at different land values							
≃ 1.22 acre	-0.00814	0.0121	0.180**	-0.0272	0.129*	0.12	-0.124
≃ 1.50 acre	-0.0723***	-0.0582**	0.214***	-0.0396**	0.0556	0.201	-0.161
≃ 3.00 acre	-0.292***	-0.299***	0.333***	-0.0823	-0.195	0.48	-0.29
≃ 5.00 acre	-0.453***	-0.476***	0.420*	-0.114	-0.38	0.686	-0.385
≃ 6.00 acre	-0.511***	-0.539***	0.451*	-0.125	-0.446	0.759	-0.419
N	2 525	2 525	1 068	1 068	1 068	1 027	478

Notes: Household and time fixed effects, and controls are included in the regressions. Significance: * p<0.1, ** p<0.05, *** p<0.01. Standard errors are clustered at household level.

Source: Authors' own elaboration.

7 Policy discussion

The empirical results of this analysis prompt a policy discussion on the self-reliance through the agriculture model to support refugees' integration within the country.

Our analysis supports the idea that social transfers (regardless of their nature) contribute to improving beneficiaries' food security and to reducing their recourse to adverse coping strategies in times of emergency. However, our results suggests that these same transfers are unlikely to support refugees' self-reliance in the longer-term. As resources are limited, international organizations and governments should consider both short and long-term development goals that humanitarian and social safety nets may support. Our analysis highlights the different ways in which cash and food transfers contribute to reaching short-term food security objectives. However, our results also highlight adjustment opportunities, which would better help reach the more holistic objective of promoting refugees' integration while simultaneously supporting Uganda's economic growth.

The transfers' effectiveness, in the context of refugees living in Ugandan settlements, depends on beneficiaries' characteristics (i.e. land holding, and time spent living in the settlements, cash transfer literacy and management skills), on contextual features (i.e. market structure), and on the outcomes against which the transfers' effects are assessed.

In this paper, food transfers contribute to an increase in households' diet quality, as measured through the FCS index. This suggests that food transfers, even though these baskets' food items are locally sourced by international organizations, seem to better benefit refugees' food security than cash transfers. It is most likely that, in the context of Ugandan refugee camps, the food market fragmentation and the food price fluctuations limit the diversity and availability of better-quality food. Moreover, the poorest refugees may have limited cash-management skills and providing them with a food basket ensures they receive enough and sufficient quality nutrition.

Therefore, it is advisable to pursue food transfer assistance to less cash-literate refugees, especially to those located in secluded areas with poor market access. Simultaneously, policy makers may pursue economic development and market integration policies in order to ease refugees' integration within local communities.

Cash transfers are effective in relaxing households' budget constraint. They allow beneficiaries to reduce household indebtedness and asset sale to buy food, and to limit the exchange of labour for food. Moreover, cash transfers may increase beneficiaries' probability to engage in agricultural activities and to achieve productivity gains, but only for households who have access to a sizable piece of productive land. Agricultural land availability is indeed a crucial limiting factor to obtaining these advantages. Contrary to current practices of dividing plots currently allocated to refugees into smaller parcels, policy makers should prevent further land fragmentation activities. Obtaining some, even temporary, land rights may encourage refugees to invest in agricultural activities and to learn and apply various improvements to stimulate productivity.

Importantly, policy makers should improve social support targeting, for instance by selectively providing land and cash to households able to obtain greater returns in agricultural productivity. Cash/food transfers, combined with other business opportunities, should be promoted for the other household profiles. The transition from a model primarily based on agricultural production to one that focuses on the larger food value chain development is crucial to reach both short-

and long-term development. Indeed, focusing more broadly on training refugees on targeted off-farm activities (e.g. storage, processing, transports) and business skills may better promote overall regional development.

Policy makers should also invest in improving agricultural and food markets to increase the entire food supply chain's efficiency (*i.e.* investments in extension and research development, agricultural infrastructure, storage and marketing). These interventions limit food price volatility and increase better quality and more diverse foods' availability, which benefits both refugee and host communities.

Facilitating refugees' involvement in the value chain's development and allowing them to engage in other economic activities will support all households' food security objectives, regardless their status and the type of transfer they received. Concomitantly, it would incentivize refugees' integration within the local economy. In fact, the transformation from subsistence farming to commercial agriculture is necessary to ensure the Ugandan self-reliance agricultural model's long-term success. However, it is not sufficient: alternative functional markets are fundamental for the development of other economic activities to improve household livelihoods and incomes and to lead the country towards long-term development and sustainable growth.

8 Conclusions

By the end of 2019, up to 79.5 million people had been forcibly displaced across the world (UNHCR, 2021b). Yet the growing threats of climate change, conflict, hunger, poverty, persecution and other covariate shocks are set to increase this population; a growth that will particularly exacerbate the already overstretched emergency situations in developing and Least Developed countries, which respectively host 85 and 27 percent of the world's refugee population.

With 1.4 million refugees mainly coming from Burundi, the Democratic Republic of the Congo and South Sudan, Uganda counts itself amongst these countries. Its fast growing population density continues to increase pressure on land use and food security, and most notably within refugee settlements (UNHCR, 2021a). By progressively shifting its refugee response paradigm from providing care and maintenance to supporting inclusion and self-reliance, the country aims to invest in the development of both refugees' and hosts' capacities to create new livelihood opportunities and to promote economic growth.

Social protection interventions are key to implement this approach and provide refugees with both the necessary humanitarian and developmental assistance. Our paper investigates social protection's efficiency potential by contributing to the debate on the impacts of cash versus food transfers for refugee assistance. Using a unique panel database, we examined how the effect of these two transfers type differs on refugees' food security and self-reliance capacities considering the current land-based model. More precisely, we investigated transfers' impacts on households' likelihood to adopt adverse coping strategies, on households' food-related indicators and on agricultural outcomes. We also examine how transfers potential benefits vary along two main dimensions: available agricultural land size and time of permanence within their settlements.

Our analysis indicates that receiving social transfers contributes to both improving refugees' food security and reducing their likelihood to resort to negative coping strategies. Food transfers contribute to increase the quality and variety of households' diet, while cash transfers are more suitable to support the refugees' agricultural self-reliance, when operating on a sufficient extent of agricultural land. Our results highlight the importance of taking beneficiaries' characteristics (i.e. available land size for cultivation, time spent living within their settlement, cash transfer literacy and management skills) and contextual features (i.e. market structure) into account when selecting a transfer type over the other to ensure their optimal efficiency. As such, food transfers may be prioritized for refugees that are less cash-literate and/or located in secluded areas with poor market access, while cash transfers may be preferred for households that have access to relatively large productive land assets.

Yet, the size of refugees' allocated plots has become smaller and smaller as the refugee population increases in Uganda. While a substantial proportion of refugees already do not have access to enough land, the predicted increase in refugee influxes poses a greater threat to the country's already unstable land-based self-reliance model. Our results highlight not only the need to improve targeting for social protection, but also the need to adapt and diversify Uganda's current agriculture-focused Refugee Response Plan. On one hand, land fragmentation activities should be restrained to provide larger, productive land areas and their associated social support for refugees willing to engage in agricultural activities. On the other hand, alternative business opportunities along the entire value chain, along with their related support, should be considered and promoted for other household profiles. Bearing these

considerations in mind, the national government, international agencies, donors and local NGOs should work closely together to optimally adapt the Response Plan. We are confident that our results can help fine-tune the response mechanisms and leverage an integrated, targeted assistance model to sustainably support refugee's integration and promote Uganda's long-term economic growth.

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Annex

Table A1. Descriptive statistics

	2017/18		2019	
	mean	sd	mean	sd
Social transfer variables				
Cash transfers (1=Yes)	0.207	0.405	0.343	0.475
Food transfers (1=Yes)	0.549	0.498	0.597	0.491
Both cash and food transfers (1=Yes)	0.047	0.213	0.019	0.136
Formal transfers (1=Yes)	0.714	0.452	0.922	0.268
Outcome variables				
N. days [purchase food on credit]	0.679	1.325	0.836	1.449
N. days [harvest and consume immature crops]	0.440	1.115	0.509	1.204
N. days [consume seed stock that will be needed for next season]	0.433	1.256	0.625	1.529
N. days [sell (small) assets]	0.140	0.556	0.121	0.542
N. days [food for work (exchange labour for food)]	0.539	1.299	0.393	1.083
Food expenditure (USD)	14.58	19.06	13.97	13.52
Food Consumption Score	40.65	11.67	42.07	13.12
Engaged in maize production (1=Yes)	0.415	0.493	0.401	0.490
Engaged in beans production (1=Yes)	0.203	0.402	0.180	0.384
Maize yield (kg/acre)	1 306	2 345	1 994	17 283
Beans yield (kg/acre)	857	2356	828	6577
Crop sale as income source (1=Yes)	0.544	0.498	0.345	0.475
Crop inputs (1=Yes)	0.297	0.457	0.188	0.391
Agricultural assets (1=Yes)	0.952	0.212	0.988	0.105
Controls				
Female head (1=Yes)	0.464	0.499	0.508	0.500
Dependency ratio	0.469	0.205	0.472	0.216
Average education	4.348	3.531	6.263	3.244
TLU	0.097	0.357	0.203	0.531
Land	0.326	0.459	0.494	0.446
Participation in training (1=Yes)	0.350	0.477	0.600	0.490
Distance from trade market	1.246	1.756	1.176	1.132
Shock (1=Yes)	0.540	0.499	0.527	0.499
Participation in network (1=Yes)	0.521	0.500	0.497	0.500
Coping strategy index	28.599	18.426	22.894	20.633
Months living in the settlement	34.361	52.254	53.819	46.179

Source: Authors' own elaboration.

Table A2. Transition matrix for cash transfers

Cash transfers (1=Yes)	Cash transfers (1=Yes)		Total
	0	1	
0	1 624 (84.89%)	289 (15.11%)	1 913 (100%)
1	158 (46.06%)	185 (53.94%)	343 (100%)
Total	1 782 (78.99%)	474 (21.01%)	2 256 (100%)

Note: Number and percentage of households receiving and not receiving cash in the baseline and follow-up are respectively in rows and in columns.

Source: Authors' own elaboration.

Table A3. Transition matrix for food transfers

Food transfers (1=Yes)	Food transfers (1=Yes)		Total
	0	1	
0	1 292 (83.52%)	255 (16.48%)	1 547 (100%)
1	186 (26.23%)	523 (73.77%)	709 (100%)
Total	1 478 (65.51%)	778 (34.49%)	2 256 (100%)

Note: Number and percentage of households receiving and not receiving food transfers in the baseline and follow-up are respectively in rows and in columns.

Source: Authors' own elaboration.

Table A4. Correlation of attrition with cash and food transfers

Variables	Attritor (1=Yes)
Cash transfers (1=Yes)	-0.040 (0.028)
Food transfers (1=Yes)	0.021 (0.023)
Constant	0.387*** (0.019)
Observations	2 107
R-squared	0.002

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' own elaboration.

Table A5. Two-sample t test with equal variances for no-transfer recipient households (obs1) and cash-transfers recipient households (obs2)

	Num. controls	Num. recipients	Mean controls	Mean recipients	Diff.	T-test	P-value
Female head (1=Yes)	476	620	0.473	0.445	0.028	0.900	0.365
Average education	476	620	4.827	5.096	-0.269	-1.300	0.198
Dependency ratio	476	620	0.463	0.469	-0.006	-0.500	0.627
TLU	476	620	0.147	0.161	-0.013	-0.500	0.614
Land	476	620	0.402	0.556	-0.154	-5.150	0.000
Distance from trade market	473	618	1.321	1.387	-0.066	-0.650	0.516
Shock (1=Yes)	476	620	0.465	0.571	-0.106	-3.500	0.001
Participation in network (1=Yes)	476	620	0.489	0.555	-0.066	-2.150	0.032
Participation in training (1=Yes)	476	620	0.391	0.479	-0.088	-2.950	0.004
Months living in the settlement	471	613	46.051	76.924	-30.873	-8.450	0.000
CSI	476	620	26.345	26.338	0.006	0.000	0.996

Source: Authors' own elaboration.

Table A6. Two-sample t test with equal variances for no-transfer recipient households (obs1) and food-transfers recipient households (obs2)

	Num. controls	Num. recipients	Mean controls	Mean recipients	Diff.	T-test	P-value
Female head (1=Yes)	476	1 385	0.473	0.511	-0.038	-1.400	0.155
Average education	476	1 385	4.827	5.567	-0.739	-3.900	0.000
Dependency ratio	476	1 385	0.463	0.474	-0.011	-1.000	0.308
TLU	476	1 385	0.147	0.145	0.002	0.050	0.952
Land	476	1 385	0.402	0.348	0.054	2.300	0.021
Distance from trade market	473	1 374	1.321	1.088	0.233	3.050	0.003
Shock (1=Yes)	476	1 385	0.465	0.536	-0.072	-2.700	0.007
Participation in network (1=Yes)	476	1 385	0.489	0.490	-0.001	-0.050	0.978
Participation in training (1=Yes)	476	1 385	0.391	0.509	-0.118	-4.450	0.000
Months living in the settlement	471	1 376	46.051	29.069	16.983	7.650	0.000
CSI	476	1 385	26.345	25.192	1.153	1.100	0.272

Source: Authors' own elaboration.

Table A7. Two-sample t test with equal variances for cash-transfers recipient households (obs1) and food-transfers recipient households (obs2)

	Num. controls	Num. recipients	Mean controls	Mean recipients	Diff.	T-test	P-value
Female head (1=Yes)	620	1 385	0.445	0.511	-0.066	-2.700	0.007
Average education	620	1 385	5.096	5.567	-0.470	-2.750	0.006
Dependency ratio	620	1 385	0.469	0.474	-0.005	-0.500	0.614
TLU	620	1 385	0.161	0.145	0.015	0.700	0.491
Land	620	1 385	0.556	0.348	0.208	9.800	0.000
Distance from trade market	618	1 374	1.387	1.088	0.298	4.350	0.000
Shock (1=Yes)	620	1 385	0.571	0.536	0.035	1.450	0.152
Participation in network (1=Yes)	620	1 385	0.555	0.490	0.065	2.700	0.007
Participation in training (1=Yes)	620	1 385	0.479	0.509	-0.030	-1.200	0.226
Months living in the settlement	613	1 376	76.924	29.069	47.855	24.400	0.000
CSI	620	1 385	26.338	25.192	1.147	1.150	0.242

Source: Authors' own elaboration.

Table A8. Impact of cash and food transfers on self-reliance coping strategies and food-related outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	# days household purchases food on credit	# days household harvests and consumes immature crops	# days household consumes seed stock of next season	# days household sells (small) assets	# days household sells food for work	Food expenditure (log)	Food consumption score (log)
Cash transfers (1=Yes)	-0.262**	-0.191*	-0.262*	-0.154***	-0.357***	0.228**	0.041
	(0.127)	(0.112)	(0.136)	(0.044)	(0.117)	(0.091)	(0.036)
Food transfers (1=Yes)	-0.354***	-0.264***	-0.311***	-0.108**	-0.149*	-0.318***	0.085**
	(0.096)	(0.085)	(0.109)	(0.042)	(0.080)	(0.069)	(0.034)
Female head (1=Yes)	0.206	0.043	0.299**	-0.037	0.132	0.013	0.041
	(0.132)	(0.109)	(0.130)	(0.059)	(0.100)	(0.087)	(0.035)
Average education	0.016	-0.011	0.002	-0.008	0.006	0.012	0.009***
	(0.014)	(0.012)	(0.013)	(0.006)	(0.012)	(0.009)	(0.003)
Dependency ratio	0.135	-0.291	-0.052	-0.044	0.285	-0.160	-0.027
	(0.294)	(0.224)	(0.261)	(0.097)	(0.228)	(0.192)	(0.072)
TLU (in log)	-0.021	-0.037	-0.321	-0.168**	-0.156	0.287**	0.172***
	(0.163)	(0.142)	(0.201)	(0.070)	(0.127)	(0.124)	(0.041)
Land (in log)	-0.242	-0.041	0.616***	0.144***	-0.031	0.240**	-0.025
	(0.154)	(0.128)	(0.176)	(0.050)	(0.139)	(0.107)	(0.038)
Distance from trade market (in log)	0.149	0.188*	0.077	0.069	-0.120	-0.153**	-0.066**
	(0.107)	(0.106)	(0.115)	(0.047)	(0.091)	(0.073)	(0.026)
Shock (1=Yes)	-0.156**	-0.064	-0.017	-0.089***	0.042	0.072	-0.036*
	(0.077)	(0.065)	(0.079)	(0.033)	(0.066)	(0.053)	(0.019)
Participation in network (1=Yes)	-0.262***	-0.160**	-0.104	-0.066**	-0.342***	0.214***	0.036*
	(0.079)	(0.069)	(0.076)	(0.030)	(0.074)	(0.058)	(0.020)
Participation in training (1=Yes)	0.053	-0.125**	0.070	-0.066**	-0.012	-0.007	-0.034*
	(0.075)	(0.062)	(0.077)	(0.033)	(0.065)	(0.052)	(0.019)
Months living in the settlement (in log)	-0.051	-0.022	0.088	-0.010	0.154**	0.054	0.017
	(0.071)	(0.058)	(0.098)	(0.026)	(0.067)	(0.053)	(0.017)
Year 2019	0.220**	0.189***	0.101	0.045	-0.229***	0.057	-0.030
	(0.088)	(0.073)	(0.110)	(0.032)	(0.083)	(0.063)	(0.020)
Constant	1.018***	0.896***	0.120	0.364***	0.267	1.914***	3.590***
	(0.290)	(0.261)	(0.359)	(0.115)	(0.249)	(0.209)	(0.073)
Observations	2 525	2 525	2 525	2 525	2 525	2 525	2 525
R-squared	0.040	0.025	0.042	0.035	0.050	0.084	0.043
Number of unique households	1 278	1 278	1 278	1 278	1 278	1 278	1 278

Note: Standard errors are clustered at household level. Significance: *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' own elaboration.

Table A9. Impact of cash and food transfers on agricultural outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Household is engaged in maize production (1=Yes)	Household is engaged in bean production (1=Yes)	Household use commercial crop inputs (1=Yes)	Household owns agricultural assets (1=Yes)	Household gets income from crop sale (1=Yes)	Maize yield (log)	Beans yield (log)
Cash transfers (1=Yes)	-0.158***	-0.021	0.254***	0.036*	-0.070	0.497***	0.094
	(0.030)	(0.028)	(0.058)	(0.020)	(0.064)	(0.181)	(0.253)
Food transfers (1=Yes)	-0.037	-0.019	0.227***	-0.043**	0.034	0.222	-0.186
	(0.025)	(0.020)	(0.052)	(0.020)	(0.059)	(0.169)	(0.276)
Female head (1=Yes)	-0.010	0.002	0.113	-0.051	0.005	-0.133	0.083
	(0.034)	(0.024)	(0.085)	(0.034)	(0.077)	(0.161)	(0.313)
Averaged education	0.006	0.002	0.016*	-0.001	0.013	-0.002	-0.019
	(0.004)	(0.003)	(0.008)	(0.003)	(0.009)	(0.026)	(0.036)
Dependency ratio	-0.031	-0.043	0.226	-0.002	0.025	0.799*	0.422
	(0.080)	(0.056)	(0.165)	(0.109)	(0.182)	(0.411)	(0.581)
TLU (in log)	0.074	0.060	0.120	-0.021	0.255***	-0.359	0.434
	(0.056)	(0.041)	(0.103)	(0.029)	(0.094)	(0.232)	(0.330)
Land (in log)	0.308***	0.259***	0.219**	-0.020	0.378***	-0.842***	-1.831***
	(0.043)	(0.038)	(0.087)	(0.032)	(0.089)	(0.295)	(0.402)
Distance from trade market (in log)	-0.008	-0.007	0.122*	0.013	0.048	0.248	0.256
	(0.026)	(0.017)	(0.071)	(0.021)	(0.062)	(0.159)	(0.231)
Shock (1=Yes)	0.038*	0.018	-0.033	-0.011	0.064	0.206	-0.138
	(0.021)	(0.014)	(0.050)	(0.018)	(0.048)	(0.163)	(0.179)
Participation in network (1=Yes)	0.055**	0.045***	-0.032	0.044**	-0.011	0.124	0.255
	(0.022)	(0.017)	(0.046)	(0.020)	(0.048)	(0.139)	(0.197)
Participation in training (1=Yes)	-0.024	-0.053***	-0.130***	-0.021	-0.041	-0.143	-0.121
	(0.021)	(0.015)	(0.043)	(0.015)	(0.045)	(0.124)	(0.154)
Months living in the settlement (in log)	0.045**	0.013	0.048	-0.007	0.019	0.054	0.083
	(0.019)	(0.015)	(0.034)	(0.011)	(0.037)	(0.104)	(0.132)
Coping strategy index (in log)	0.023***	0.015**	-0.028	0.019*	-0.019	-0.008	-0.007
	(0.009)	(0.007)	(0.023)	(0.010)	(0.023)	(0.054)	(0.062)
Year 2019	-0.062***	-0.047**	-0.235***	0.016	-0.217***	-0.214**	-0.543***
	(0.024)	(0.022)	(0.040)	(0.014)	(0.044)	(0.106)	(0.128)
Constant	0.143*	0.067	-0.298	0.958***	0.228	5.695***	6.083***
	(0.083)	(0.062)	(0.196)	(0.077)	(0.210)	(0.515)	(0.658)
Observations	2 525	2 525	1 068	1 068	1 068	1 027	478
R-squared	0.106	0.099	0.181	0.079	0.201	0.094	0.223
Number of unique households	1 278	1 278	707	707	707	693	340

Note: Standard errors are clustered at household level. Significance: *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' own elaboration.

Table A10. Impact of cash transfers on self-reliance coping strategies and food-related outcomes, interactions with months of performance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	# days household purchases food on credit	# days household harvests and consumes immature crops	# days household consumes seed stock of next season	# days household sells (small) assets	# days household sells food for work	Food expenditure (log)	Food consumption score (log)
Cash transfers (1=Yes)	-0.386	0.083	-0.249	-0.177	0.521	1.275***	0.043
	(0.392)	(0.330)	(0.548)	(0.176)	(0.428)	(0.303)	(0.148)
Months living in the settlement (in log)	-0.057	-0.010	0.089	-0.011	0.192***	0.099**	0.017
	(0.073)	(0.061)	(0.098)	(0.026)	(0.064)	(0.050)	(0.017)
Cash transfers * months living in settlement	0.033	-0.073	-0.004	0.006	-0.235**	-0.280***	-0.001
	(0.103)	(0.090)	(0.155)	(0.044)	(0.114)	(0.077)	(0.035)
Food transfers (1=Yes)	-0.352***	-0.268***	-0.312***	-0.108**	-0.163**	-0.335***	0.085**
	(0.097)	(0.085)	(0.111)	(0.043)	(0.081)	(0.068)	(0.034)
Female head (1=Yes)	0.208	0.040	0.299**	-0.037	0.121	0.001	0.041
	(0.132)	(0.108)	(0.131)	(0.058)	(0.099)	(0.086)	(0.035)
Averaged education	0.016	-0.011	0.002	-0.008	0.006	0.011	0.009***
	(0.014)	(0.012)	(0.013)	(0.006)	(0.012)	(0.009)	(0.003)
Dependency ratio	0.136	-0.293	-0.052	-0.044	0.277	-0.169	-0.027
	(0.294)	(0.223)	(0.261)	(0.097)	(0.228)	(0.192)	(0.072)
TLU (in log)	-0.024	-0.030	-0.320	-0.168**	-0.134	0.313**	0.172***
	(0.162)	(0.142)	(0.201)	(0.070)	(0.125)	(0.125)	(0.041)
Land (in log)	-0.235	-0.058	0.615***	0.146***	-0.086	0.175	-0.026
	(0.153)	(0.127)	(0.177)	(0.049)	(0.138)	(0.108)	(0.040)
Distance from trade market (in log)	0.149	0.186*	0.077	0.070	-0.125	-0.160**	-0.066**
	(0.106)	(0.106)	(0.115)	(0.047)	(0.091)	(0.073)	(0.026)
Shock (1=Yes)	-0.155**	-0.066	-0.018	-0.089***	0.035	0.063	-0.036*
	(0.077)	(0.065)	(0.080)	(0.033)	(0.066)	(0.053)	(0.019)
Participation in network (1=Yes)	-0.261***	-0.162**	-0.104	-0.066**	-0.350***	0.205***	0.036*
	(0.080)	(0.069)	(0.076)	(0.030)	(0.074)	(0.058)	(0.021)
Participation in training (1=Yes)	0.054	-0.127**	0.070	-0.066**	-0.019	-0.016	-0.034*
	(0.074)	(0.062)	(0.076)	(0.033)	(0.065)	(0.052)	(0.019)
Year 2019	0.218**	0.193***	0.101	0.045	-0.215**	0.073	-0.030
	(0.088)	(0.072)	(0.112)	(0.033)	(0.084)	(0.060)	(0.020)
Constant	1.028***	0.875***	0.119	0.366***	0.198	1.832***	3.590***
	(0.293)	(0.263)	(0.353)	(0.115)	(0.239)	(0.203)	(0.073)
Observations	2 525	2 525	2 525	2 525	2 525	2 525	2 525
R2o	0.0181	0.0235	0.0307	0.0317	0.0163	0.214	0.0216
R2w	0.0401	0.0253	0.0421	0.0354	0.0551	0.0951	0.0426
R2b	0.00500	0.0213	0.0233	0.0278	0.000699	0.298	0.0110
Number of unique households	1 278	1 278	1 278	1 278	1 278	1 278	1 278

Note: Standard errors are clustered at household level. Significance: *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' own elaboration.

Table A11. Impact of food transfers on self-reliance coping strategies and food-related outcomes, interactions with months of permanence

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	# days household purchases food on credit	# days household harvests and consumes immature crops	# days household consumes seed stock of next season	# days household sells (small) assets	# days household sells food for work	Food expenditure (log)	Food consumption score (log)
Food transfers (1=Yes)	0.109	0.154	-0.171	0.113	-0.127	-0.152	0.055
	(0.330)	(0.265)	(0.405)	(0.159)	(0.278)	(0.224)	(0.082)
Months living in the settlement (in log)	0.036	0.057	0.114	0.031	0.159	0.085	0.012
	(0.094)	(0.081)	(0.136)	(0.046)	(0.101)	(0.068)	(0.020)
Food transfer * months living in settlement	-0.140	-0.127*	-0.042	-0.067	-0.007	-0.050	0.009
	(0.096)	(0.074)	(0.126)	(0.047)	(0.081)	(0.065)	(0.022)
Cash transfers (1=Yes)	-0.302**	-0.227**	-0.274*	-0.172***	-0.359***	0.214**	0.044
	(0.133)	(0.112)	(0.144)	(0.047)	(0.118)	(0.092)	(0.037)
Female head (1=Yes)	0.214	0.050	0.302**	-0.033	0.132	0.016	0.040
	(0.132)	(0.109)	(0.130)	(0.058)	(0.100)	(0.086)	(0.035)
Averaged education	0.017	-0.010	0.002	-0.007	0.006	0.012	0.009***
	(0.014)	(0.012)	(0.013)	(0.006)	(0.012)	(0.009)	(0.003)
Dependency ratio	0.156	-0.271	-0.046	-0.034	0.286	-0.153	-0.028
	(0.293)	(0.225)	(0.262)	(0.096)	(0.230)	(0.192)	(0.072)
TLU (in log)	-0.018	-0.035	-0.320	-0.166**	-0.156	0.288**	0.172***
	(0.163)	(0.141)	(0.201)	(0.070)	(0.128)	(0.124)	(0.041)
Land (in log)	-0.252	-0.050	0.613***	0.140***	-0.031	0.237**	-0.025
	(0.154)	(0.129)	(0.175)	(0.050)	(0.140)	(0.106)	(0.038)
Distance from trade market (in log)	0.148	0.187*	0.077	0.069	-0.120	-0.153**	-0.066**
	(0.106)	(0.106)	(0.115)	(0.047)	(0.091)	(0.073)	(0.026)
Shock (1=Yes)	-0.147*	-0.056	-0.015	-0.085***	0.043	0.075	-0.037**
	(0.077)	(0.065)	(0.079)	(0.032)	(0.066)	(0.053)	(0.019)
Participation in network (1=Yes)	-0.259***	-0.157**	-0.103	-0.065**	-0.342***	0.215***	0.036*
	(0.080)	(0.069)	(0.076)	(0.030)	(0.074)	(0.058)	(0.021)
Participation in training (1=Yes)	0.048	-0.129**	0.069	-0.069**	-0.012	-0.009	-0.034*
	(0.075)	(0.063)	(0.077)	(0.033)	(0.065)	(0.052)	(0.019)
Year 2019	0.232***	0.200***	0.104	0.051	-0.229***	0.061	-0.031
	(0.089)	(0.073)	(0.109)	(0.031)	(0.082)	(0.063)	(0.021)
Constant	0.691*	0.602*	0.021	0.208	0.252	1.797***	3.611***
	(0.368)	(0.334)	(0.477)	(0.161)	(0.371)	(0.261)	(0.082)
Observations	2 525	2 525	2 525	2 525	2 525	2 525	2 525
R2o	0.0200	0.0283	0.0310	0.0301	0.0179	0.243	0.0215
R2w	0.0418	0.0268	0.0422	0.0378	0.0502	0.0848	0.0427
R2b	0.00619	0.0293	0.0236	0.0235	0.00266	0.347	0.0108
Number of unique households	1 278	1 278	1 278	1 278	1 278	1 278	1 278

Note: Standard errors are clustered at household level. Significance: *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' own elaboration.

Table A12. Impact of cash transfers on agricultural outputs, interactions with land

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Household is engaged in maize production (1=Yes)	Household is engaged in bean production (1=Yes)	Household use commercial crop inputs (1=Yes)	Household owns agricultural assets (1=Yes)	Household gets income from crop sale (1=Yes)	Maize yield (log)	Beans yield (log)
Cash transfers (1=Yes)	-0.276***	-0.156***	0.325***	-0.007	-0.155	0.144	-0.101
	(0.043)	(0.037)	(0.098)	(0.032)	(0.104)	(0.282)	(0.424)
Land (in log)	0.207***	0.145***	0.299***	-0.068	0.282**	-1.252***	-2.088**
	(0.048)	(0.036)	(0.114)	(0.052)	(0.135)	(0.417)	(0.845)
Cash transfers * land	0.327***	0.374***	-0.147	0.090	0.177	0.731	0.396
	(0.077)	(0.080)	(0.161)	(0.063)	(0.169)	(0.474)	(0.867)
Female head (1=Yes)	-0.007	0.006	0.111	-0.050	0.007	-0.119	0.078
	(0.034)	(0.025)	(0.085)	(0.033)	(0.077)	(0.162)	(0.316)
Average education	0.006	0.002	0.017**	-0.002	0.011	-0.007	-0.020
	(0.004)	(0.003)	(0.008)	(0.003)	(0.009)	(0.026)	(0.035)
Dependency ratio	-0.022	-0.033	0.215	0.004	0.037	0.845**	0.435
	(0.079)	(0.055)	(0.165)	(0.108)	(0.181)	(0.410)	(0.574)
TLU (in log)	0.078	0.065	0.113	-0.016	0.263***	-0.319	0.437
	(0.056)	(0.041)	(0.103)	(0.029)	(0.094)	(0.233)	(0.335)
Distance from trade market (in log)	-0.010	-0.009	0.124*	0.011	0.046	0.237	0.252
	(0.026)	(0.017)	(0.071)	(0.021)	(0.062)	(0.160)	(0.232)
Shock (1=Yes)	0.040*	0.020	-0.037	-0.009	0.069	0.226	-0.125
	(0.021)	(0.014)	(0.050)	(0.019)	(0.049)	(0.161)	(0.173)
Participation in network (1=Yes)	0.053**	0.043**	-0.031	0.043**	-0.012	0.112	0.242
	(0.022)	(0.017)	(0.047)	(0.020)	(0.048)	(0.141)	(0.204)
Participation in training (1=Yes)	-0.016	-0.044***	-0.137***	-0.016	-0.033	-0.114	-0.106
	(0.021)	(0.015)	(0.044)	(0.015)	(0.045)	(0.126)	(0.164)
Months living in the settlement (in log)	0.048**	0.017	0.048	-0.007	0.019	0.052	0.092
	(0.019)	(0.015)	(0.034)	(0.011)	(0.037)	(0.106)	(0.129)
Food transfers (1=Yes)	-0.028	-0.010	0.227***	-0.043**	0.034	0.214	-0.153
	(0.025)	(0.020)	(0.052)	(0.020)	(0.059)	(0.168)	(0.293)
Coping strategy index (in log)	0.022**	0.014**	-0.031	0.021**	-0.015	0.002	0.002
	(0.009)	(0.007)	(0.023)	(0.010)	(0.023)	(0.054)	(0.064)
Year 2019	-0.058**	-0.042*	-0.239***	0.018	-0.213***	-0.201*	-0.533***
	(0.024)	(0.022)	(0.040)	(0.013)	(0.043)	(0.108)	(0.130)
Constant	0.146*	0.070	-0.318	0.970***	0.253	5.829***	6.134***
	(0.084)	(0.061)	(0.197)	(0.077)	(0.213)	(0.523)	(0.713)
Observations	2 525	2 525	1 068	1 068	1 068	1 027	478
R2o	0.0855	0.109	0.0484	0.0225	0.119	0.0405	0.0971
R2w	0.118	0.126	0.183	0.0839	0.204	0.101	0.224
R2b	0.0700	0.107	0.0142	0.00500	0.0928	0.0306	0.0685
Number of unique households	1 278	1 278	707	707	707	693	340

Note: Standard errors are clustered at household level. Significance: *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' own elaboration.

Table A13. Impact of food transfers on agricultural outputs, interactions with land

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Household is engaged in maize production (1=Yes)	Household is engaged in bean production (1=Yes)	Household use commercial crop inputs (1=Yes)	Household owns agricultural assets (1=Yes)	Household gets income from crop sale (1=Yes)	Maize yield (log)	Beans yield (log)
Food transfers (1=Yes)	0.056*	0.082***	0.145	-0.015	0.202**	0.038	-0.086
	(0.032)	(0.022)	(0.103)	(0.037)	(0.102)	(0.275)	(0.486)
Land (in log)	0.465***	0.432***	0.249**	-0.004	0.473***	-0.939***	-1.799***
	(0.054)	(0.059)	(0.102)	(0.030)	(0.098)	(0.337)	(0.482)
Food transfers * land	-0.317***	-0.347***	0.171	-0.061	-0.362*	0.403	-0.186
	(0.068)	(0.066)	(0.183)	(0.075)	(0.195)	(0.507)	(0.817)
Female head (1=Yes)	-0.009	0.005	0.046	-0.047	0.027	-0.152	0.082
	(0.034)	(0.025)	(0.092)	(0.033)	(0.077)	(0.167)	(0.315)
Averaged education	0.006	0.002	0.018**	-0.002	0.010	0.001	-0.019
	(0.004)	(0.002)	(0.009)	(0.003)	(0.009)	(0.025)	(0.036)
Dependency ratio	-0.021	-0.032	0.073	0.006	0.070	0.760*	0.437
	(0.080)	(0.055)	(0.184)	(0.108)	(0.180)	(0.420)	(0.566)
TLU (in log)	0.088	0.076*	0.090	-0.015	0.286***	-0.392*	0.437
	(0.057)	(0.042)	(0.113)	(0.031)	(0.093)	(0.233)	(0.332)
Distance from trade market (in log)	-0.014	-0.013	0.124*	0.012	0.045	0.252	0.258
	(0.026)	(0.017)	(0.075)	(0.022)	(0.062)	(0.160)	(0.233)
Shock (1=Yes)	0.041*	0.021	-0.022	-0.011	0.063	0.208	-0.134
	(0.021)	(0.014)	(0.052)	(0.018)	(0.048)	(0.162)	(0.186)
Participation in network (1=Yes)	0.056**	0.047***	-0.055	0.044**	-0.009	0.126	0.255
	(0.022)	(0.016)	(0.049)	(0.020)	(0.048)	(0.139)	(0.197)
Participation in training (1=Yes)	-0.019	-0.048***	-0.093*	-0.018	-0.027	-0.159	-0.118
	(0.021)	(0.015)	(0.048)	(0.015)	(0.045)	(0.122)	(0.155)
Months living in the settlement (in log)	0.041**	0.009	0.045	-0.008	0.016	0.058	0.086
	(0.019)	(0.015)	(0.035)	(0.011)	(0.037)	(0.103)	(0.134)
Cash transfers (1=Yes)	-0.168***	-0.031	0.275***	0.035*	-0.080	0.505***	0.092
	(0.030)	(0.028)	(0.062)	(0.020)	(0.064)	(0.182)	(0.256)
Coping strategy index (in log)	0.024***	0.016**	-0.012	0.020*	-0.012	-0.013	-0.003
	(0.009)	(0.007)	(0.025)	(0.010)	(0.023)	(0.055)	(0.068)
Year 2019	-0.048**	-0.032	-0.294***	0.018	-0.202***	-0.227**	-0.539***
	(0.024)	(0.022)	(0.044)	(0.013)	(0.044)	(0.105)	(0.130)
Constant	0.087	0.005	-0.202	0.942***	0.137	5.775***	6.028***
	(0.084)	(0.061)	(0.212)	(0.078)	(0.206)	(0.537)	(0.729)
Observations	2 525	2 525	1 068	1 068	1 068	1 027	478
R2o	0.0973	0.124	0.0756	0.0216	0.0990	0.0345	0.0996
R2w	0.120	0.128	0.200	0.0807	0.210	0.0952	0.223
R2b	0.0864	0.129	0.0265	0.00465	0.0677	0.0220	0.0711
Number of unique households	1 278	1 278	707	707	707	693	340

Note: Standard errors are clustered at household level. Significance: *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' own elaboration.

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