THE REPUBLIC OF UGANDA
Ministry of Gender, Labour and Social Development

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EXPANDING SOCIAL PROTECTION

Quantitative Impact Analysis of Uganda's Senior Citizens Grant

QUANTITATIVE IMPACT ANALYSIS OF UGANDA'S SENIOR CITIZENS GRANT

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January 2019

ACKNOWLEDGMENTS

This report was written by Bjorn Gelders and Diloá Athias from Development Pathways.

Special thanks are due to staff from the Expanding Social Protection (ESP) programme and the Ugandan Bureau of Statistics (UBOS) for their support in accessing the datasets used in the study, including: Bernie Wyler, David Tumwesigye, Pius Okello, Augustine Wandera, Peter Need, and Vincent Fred Ssennono.

Members of the Steering Committee provided helpful comments on earlier drafts of the report. They include: Clare Winton and Christopher Root from the Department for International Development (DFID); Sarah Ssewanyana from the Economic Policy Research Centre (EPRC); Margaret Kakande and Joseph Enyimu from the Ministry of Finance, Planning and Economic Development (MFPED); and Michele Binci and Fred Merttens from Oxford Policy Management Limited (OPML).

Funding for the study was provided by DFID through the ESP programme.

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FOREWORD

The Ministry of Gender, Labour & Social Development, on behalf of the Government of Uganda, and in collaboration with development partners including the Department for International Development (DFID/UKAID) and Irish Aid, has pioneered the implementation of social cash transfers, under the Social Assistance Grants for Empowerment (SAGE), of the Expanding Social Protection Programme. The purpose of this intervention is to establish the national social protection system that addresses risk and vulnerability among all age sections of the population.

As a foundation to realise this, the ESP Programme from the onset generated evidence as a key ingredient for creating awareness and generating buy-in from other stakeholders. To this end, a baseline, midline and end line evaluation of Phase I were done. All of these point to evidence of positive impacts.

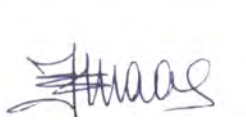
In the course of implementing Phase II of the Programme, the first evaluations have also been complemented by several other independent impact studies such as the Economic Policy Research Institute (EPRI)'s Business Case for Social Protection in Uganda which compared districts that benefit from the Senior Citizens Grant, and those that do not. This assessment showed a clear contribution of the Senior Citizens Grant to food security, nutrition, education and employment in districts where it was being implemented.

Some studies have also been conducted by the Dutch research organisation, WOTRO in collaboration with the University of Maastricht, Makerere University and University of Manchester. These studies looked at the economic impact of social cash transfers in integrated and remote areas in Uganda; rates of return to social protection in Uganda; social protection investments on human capital and income growth, the relevance of local structures for economic multiplier effects of social pensions in Uganda, among others.

This impact assessment is the most recent. It takes a longer scope of time from 2012-2017, and uses the most recent national data – Population & Housing Census 2014 and UBOS Household Surveys up to 2017. This study focussed on assessing wellbeing among beneficiaries of the Senior Citizens Grant and their households. It assessed four parameters of wellbeing including: poverty and material deprivation, livelihoods and productive assets, food nutrition, and education. And all the parameters demonstrated remarkable impacts. For example, it showed that the grant brought about a reduction in poverty by 19 percentage points and improvement in consumption of 33 per cent.

All these impacts demonstrate that social protection can contribute to faster socio-economic transformation for Uganda. These impacts also point to the need to scale up and roll out grants to the whole country so that the benefits to the whole economy are multiplied.

I therefore urge academicians, researchers, policy-makers, media, development practitioners and the general public to take keen interest in reading this report and use the findings to further the debate on social protection in the country.



Pius Bigirimana
Permanent Secretary

ABSTRACT

This paper assesses the causal effects of Uganda's Senior Citizens Grant (SCG) on the well-being of older people and their families. It employs a combination of evaluative approaches to develop statistically comparable groups of older people and impact estimators based on Uganda's latest census and four national household survey datasets between 2011 and 2017.

The SCG is associated with a strong increase in household expenditure and it reduced the poverty rate among recipients by an estimated 19 percentage points. It generated a significant increase in recipients' ability to purchase clothing, personal hygiene items, and other goods such as mobile phones. We also detected improvements in the intake of food, with an increase in the share of recipients eating at least two meals per day.

The SCG enabled older persons to invest in productive assets: it increased the probability that older persons would live in a household owning any livestock by around 5 percentage points, and enhanced livestock diversification. We find evidence that the SCG has enabled some older persons to stay active for longer, while others reduced their involvement in paid labour in favour of working for themselves. The net effect was an increase in the share of older persons working by nearly 5 percentage points, on average. Moreover, the scheme is associated with a small increase in the supply of labour among working-age adults living with pensioners.

The SCG has brought positive benefits to children co-residing with older people. It has reduced the probability of child labour by an estimated 5 percentage points, on average. The scheme has helped to improve education outcomes: we detected a reduction in the share of children who never attended school, as well as increases in school attendance and the number of grades completed. Finally, our analysis points to improvements in measures of childhood malnutrition, but the effects are not statistically significant, possibly because of the low number of households with both an older person over 65 and young children under age five in the datasets.

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ACRONYMS

ATET	Average effect of treatment on the treated
DFID	Department for International Development
DID	Difference-in-differences
EBAL	Entropy balancing
EPRC	Economic Policy Research Centre
EPRI	Economic Policy and Research Institute
ESP	Expanding Social Protection
FEWS	Famine and Early Warning Network
ITT	Intention-to-treat
MFPED	Ministry of Finance, Planning and Economic Development
MIS	Management Information System
OLS	Ordinary least squares
OPML	Oxford Policy Management Limited
PSM	Propensity score matching
SAGE	Social Assistance Grants for Empowerment
SCG	Senior Citzens Grant
TLU	Tropical livestock units
UBOS	Ugandan Bureau of Statistics
UDHS	Uganda Demographic and Health Survey
UGX	Ugandan Shilling
UNHS	Uganda National Household Survey
UNICEF	United Nations Children's Fund
VFSG	Vulnerable Families Support Grant

1

INTRODUCTION

This paper examines the causal effects of Uganda's Senior Citizens Grant (SCG) on the well-being of older persons and their families. The SCG is a non-contributory social pension currently reaching around 150 thousand beneficiaries across the country. The impact analysis was carried out with quasi-experimental methods using observational data from the latest census and national household surveys. It focused on the pilot districts where the SCG was first introduced and made available to all older persons meeting the age-eligibility criteria.

There is a significant body of international evidence on the impact of social pensions and other cash transfer schemes on poverty and different forms of vulnerability. Regular and predictable cash transfers directly increase household income and the additional resources are either spent on food or other goods and services or saved. As a result, they are associated with reductions in poverty and material deprivation. The additional resources can help reduce financial barriers to essential services such as education and health care, and stimulate local demand and supply of such services. Cash transfers can improve economic security indirectly, too, by enabling households to invest in productive assets, reallocate household labour and time and/or diversify their economic activities (livelihoods). A growing number of studies have also explored effects on recipients' psychosocial wellbeing and social capital.[1]

Several attempts have been made to assess the impacts of the SCG in Uganda. The first one was carried out by Oxford Policy Management (OPML) between 2012 and 2014, using a mixed methods approach that combined quantitative and qualitative research.[2] The quantitative impact information was collected from treatment and comparison households using a longitudinal household panel survey across 48 sub-counties in eight of the programme districts. The panel survey was conducted over three rounds (baseline in 2012, follow up 1 in 2013 and follow up 2 in 2014). The study concluded that the scheme achieved its core objectives of supporting beneficiary households' basic consumption, alleviating poverty, and improving ownership of productive assets. However, it detected few or no impacts in other

1 For a comprehensive overview, see, for example: Bastagli, F., Hagen-Zanker, J., Harman, L., Sturge, G., Barca, V., Schmidt, T., & Pellerano, L. (2016). *Cash transfers: what does the evidence say? A rigorous review of impacts and the role of design and implementation features*. London: ODI.

2 Merttens et al. (2016). *Evaluation of the Uganda Social Assistance Grants for Empowerment (SAGE) Programme, Impact after two years of programme operations 2012-2014 – Final report*. Oxford Policy Management and Economic Policy Research Centre, Department of Anthropology and Sociology, University of Makerere.

areas such as health and education. It is worth noting, however, that the SCG recipients in the sample had received only seven payments, on average, at the time of the end-line survey. This short time period may not have been long enough to capture impacts.[3]

Another impact assessment, produced by the Economic Policy and Research Institute (EPRI), used national household surveys conducted in 2009 and 2012/13 to compare districts where the SAGE programme was implemented with similar districts where it was not.[4] The authors estimated the aggregate effect at district level on five indicators relating to food security and nutrition, education, and the labour market. Although the authors attributed large impacts to the programme, the paper appears to have been over-ambitious in its claims in view of the very short time span between the introduction of the programme and data collection for the 2012/13 survey, and the fact that the surveys used were not designed to be representative at the district level, which could have led to imprecise aggregate measures.

In this paper, we estimated the effects of the SCG on a range of common indicators across four dimensions of well-being: poverty and material deprivation; livelihoods and productive assets; food and nutrition; and education. Our approach differs from previous studies in a number of ways. First, we used the 2014 census and four national household surveys conducted between 2011 and 2017 by the Uganda Bureau of Statistics (UBOS) to construct counterfactuals that enabled us to estimate what would have happened to SCG recipients and their families if they had not accessed the scheme. Second, whereas the studies by OPML and EPRI described short-term effects, we used a longer time horizon and analysed the medium- to longer-term effects of the SCG. By linking the 2014 Census with administrative data from SAGE's Management Information System (MIS), we were able to construct a sample of recipients who had been receiving the SCG for between two to three years. In another setup, we contrasted changes over a period of around four to five years between older people living in the pilot districts with older people living in comparable non-SCG districts.

To preview the findings, the SCG has been effective in increasing household expenditure and reducing monetary poverty among recipients. On average, household expenditure increased by a third and poverty reduced by 19 percentage points among recipients. The pension had a positive impact on the ownership of productive assets

3 The study also suffered from methodological challenges. It was originally set up as a regression discontinuity design, but during the implementation it became apparent that the RDD was not viable and the evaluation team had to use a backup methodology based on propensity score matching. As a result, the treatment and control group were not balanced on a few key covariates, which may have biased the impact estimators.

4 EPRI (2017). Social Protection Investment Case. Kampala: UNICEF and Government of Uganda

such as livestock and appears to have led to a small increase in the supply of labour among working-age adults living with a pensioner. We also detect positive benefits for children, with improved education outcomes and a reduction in child labour. The impact of the SCG on the nutritional status of young children, however, remains unclear.

The rest of the paper is structured as follows: Section 2 describes in detail the Senior Citizens Grant and its recent history. Section 3 discusses the datasets and the different evaluative approaches used to assess the causal effects of the SCG. Next, Section 4 presents the results of our analysis. Our main impact estimator is the average treatment effect on the treated (ATET), which is the difference between the average outcome for SCG recipients and the counterfactual group. Section 5 provides a summary overview of headline findings and concluding remarks. Finally, the Annexes contain more information on the methodology, tables with variable descriptions, and detailed impact estimators including other relevant statistics.

2

THE SENIOR CITIZENS GRANT

The Senior Citizens Grant (SCG) is part of the Government of Uganda's Expanding Social Protection (ESP) programme, which started in 2010 in partnership with the United Kingdom's Department for International Development (DFID), Irish Aid and the United Nations Children's Fund (UNICEF). The ESP programme provides financial and technical assistance to strengthen and expand the reach of social protection policy and build robust delivery systems.

During the first phase of ESP until 2015, the SCG was rolled out in 15 pilot districts across the country.[5] These pilot districts were selected based on a vulnerability index constructed in 2009 using data from the 2002 Population and Housing Census.[6] The composite vulnerability index took into consideration the share of children, orphans, and older persons in the population; share of risky births; share of households living more than five km from a health facility; and school enrolment rate. The index comprises a composite score by summing these various indicators, with final scores ranging from 125 to 277. Within each of the country's four main regions, districts were ranked based on their score and those with the highest scores were selected for the pilot.

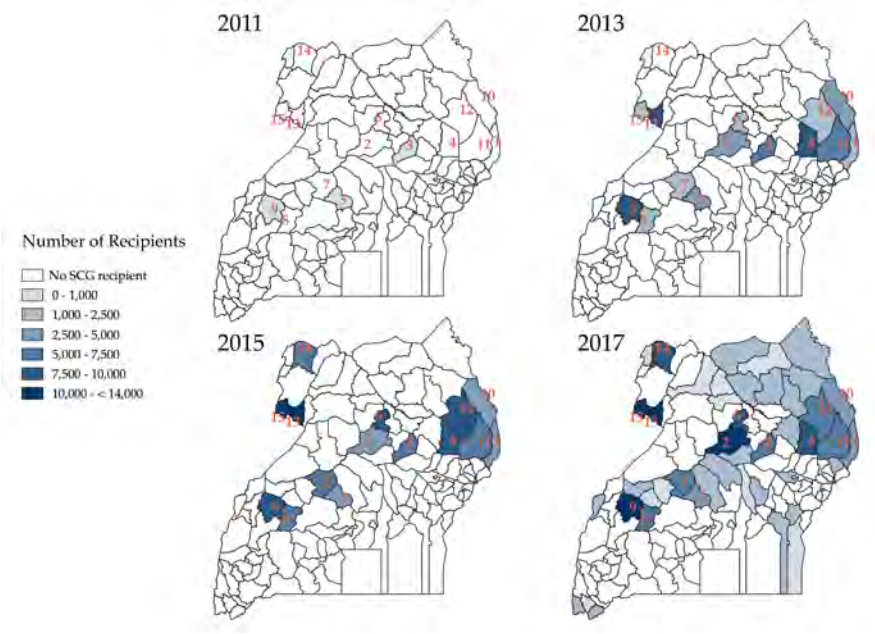
In the areas where the SCG was piloted, all older people above the age of 65 were eligible for the scheme, except in Karamoja region where the age of eligibility was lowered to 60 years. Cash disbursement commenced in 3 districts in September 2011 and gradually expanded to 15 districts by mid-2014, following a pre-defined operational schedule. Figure 2.1 shows the distribution of beneficiaries of the SCG across districts and by years. The scheme started in 2011 with less than 2,000 recipients and grew to reach over 100 thousand older persons by the end of the pilot in 2015.

Beneficiaries receive a cash transfer every two months, although there have been delays due to operational challenges. Initially, the transfer value was set at UGX 23,000 per month. In 2012, the monthly transfer value was increased to UGX 24,000 and, in 2013, to its current value of UGX 25,000. This is equivalent to nearly US$7 at current exchange rates.

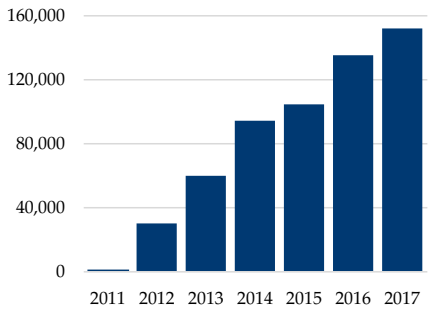
5 The programme piloted the implementation of two types of cash transfers schemes – the Senior Citizens Grant and the Vulnerable Families Support Grant (VFSG). However, the Government of Uganda discontinued the VFSG in 2016 in favour of the SCG, which is being rolled out nationwide. The two schemes did not operate in the same localities and, as explained in the methodology section, VFSG areas were dropped from the analytical samples used on the impact analysis.

6 Personal communication with programme staff.

Figure 2.1: Number of older persons receiving the Senior Citizens Grant, 2011-2017



(a) by district and year



(b) by year

Notes: Based on administrative data. The figures reflect the sum of recipients in the last disbursement of each year across villages by district. The pilot districts are, in alphabetical order: 1 - Amudat, 2 - Apac, 3 - Kaberamaido, 4 - Katakwi, 5 - Kiboga, 6 - Kole, 7 - Kyankwanzi, 8 - Kyegegwa, 9 - Kyenjojo, 10 - Moroto, 11 - Nakapiripirit, 12 - Napak, 13 - Nebbi, 14 - Yumbe and 15 - Zombo

Following the completion of the pilot, the Government of Uganda took a decision to start rolling out the SCG to an additional 40 districts. In the new programme areas, eligibility for the SCG is more restricted – only the 100 oldest persons in each subcounty are registered. By 2018, some 150,000 older people are enrolled onto the scheme. Uganda's parliament has requested the Government to speed up the roll-out of the programme in order to achieve universal coverage.

3 DATA AND METHODS

This section describes the data and methods used to assess the causal effects of the Senior Citizens Grant. The main challenge in an impact evaluation is to find a good counterfactual – namely, the situation that a recipient of the SCG would have experienced had he or she not been exposed to the programme. We used quasi-experimental methods and observational data from Uganda's census and national household surveys to create statistical comparison groups, in which the individuals resemble the SGC recipients as closely as possible. Our first approach involved 'pre-processing' census data with balancing methods followed by regression adjustment. The second approach relied on difference-in-differences methods using multiple cross-sectional survey datasets. We also implemented a third evaluative method based on a regression discontinuity design, but the approach was discarded as it did not yield a valid comparison group (see Annex A).

3.1 DATA

3.1.1 *Data sources*

Our analysis used Uganda's National Population and Housing Census 2014, along with four national household survey datasets collected by the Ugandan Bureau of Statistics (UBOS) between 2011 and 2017 that offer a range of useful outcome variables:

- *National Population and Housing Census*: Uganda's latest population count was conducted in August and September of 2014. The Census collected information on socio-economic characteristics, housing conditions, community services, agricultural activities, and deaths in the household in the preceding 12 months. The publicly available dataset used in our analysis consists of a 10 percent sample of the full census with information on approximately 3.6 million individuals.
- *Uganda National Household Survey* (UNHS): The UNHS collects information on socio-economic characteristics at both household and community levels, including: education, health, household expenditure, poverty, food security, labour force characteristics, income sources and access to financial services, housing and dwelling characteristics. The latest round of the UNHS in 2016/17 interviewed some 15,600 households across the country,

while the 2012/13 dataset has a smaller sample size of approximately 6,500 households.

- *Uganda Demographic and Health Survey* (UDHS): The UDHS aims to provide estimates of basic demographic and health indicators, and covers a wide range of topics, including: housing characteristics, fertility and reproductive behaviour, child and maternal health, nutrition of children and adults, HIV and AIDS, women's empowerment and domestic violence. The latest round of the UDHS in 2016 interviewed 19,600 households and the 2011 UDHS dataset has information on 10,100 households around the country.

We also imported additional information from external sources related to 'baseline' (pre-intervention) characteristics before the start of the SCG, which could have potentially affected programme outcomes and which we wanted to control for in our matching and regression algorithms:

- Tatem *et al.* (2013) produced high-resolution spatial data on the proportion of people living below $1.25 a day and the proportion classified as poor according to a Multidimensional Poverty Index in 2011, by applying Bayesian modelling techniques to the LSMS 2010 and UDHS 2011 (see Figure 3.1 for an illustration).[7] We used their maps to compute average levels of poverty in each subcounty of Uganda and linked this information to the census and survey datasets.

- Information on livelihood zones was extracted from shapefile maps produced by the Famine and Early Warning Network (FEWS).[8] These zones delineate areas where people generally have the same options for obtaining food and income and engaging in trade.

- Our impact estimates also control for rainfall patterns across Uganda using high-resolution estimates of daily precipitation and historical trends from the African Rainfall Climatology dataset, made available by Ssentongo *et al.* (2018).[9] IIn particular, we constructed proxies for the climate conditions experienced in each subcounty in the 12 months preceding the census and the national surveys, by comparing levels of precipitation with their long-term historical average and splitting the data into deciles

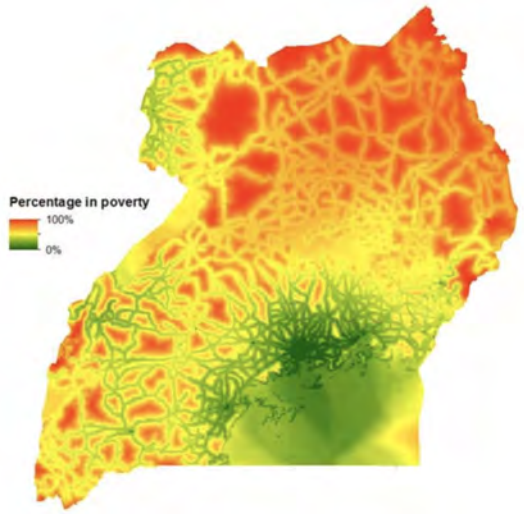
7 Tatem A.J, Gething PW, Bhatt S, Weiss D and Pezzulo C (2013) Pilot high resolution poverty maps, University of Southampton/Oxford.

8 http://fews.net/east-africa/uganda/livelihood-zone-map/march-2010

9 Paddy Ssentongo, Abraham J. B. Muwanguzi, Uri Eden, Timothy Sauer, George Bwanga, Geoffrey Kateregga, Lawrence Aribo, Moses Ojara, Wilberforce Kisamba Mugerwa, Steven J. Schiff. Changes in Ugandan Climate Rainfall at the Village and Forest Level. *Scientific Reports*, 2018; 8 (1).

ranging from 1 (much below normal rainfall, i.e. severe drought) to 10 (much above normal).

Figure 3.1: High resolution poverty map of Uganda, 2011



3.1.2 *Identification of SCG recipients*

Geographically, the analysis was limited to the pilot districts where the SCG is universally implemented, i.e. where all older people above the age thresholds are eligible for the SCG. In the roll-out districts added after 2015, eligibility for the SCG is more restricted: only the hundred oldest people are enrolled in new sub-counties. As a result, it is not feasible to identify sufficient SCG recipients in non-pilot districts in our datasets. Due to the relatively low coverage, the likelihood that a recipient household in a roll-out district ends up being selected in a random national survey is very small.

Moreover, the Census and household surveys did not include questions that can be used to directly identify SCG recipients. We therefore merged the Census and survey datasets with administrative data derived from *SAGE's Management Information System* (MIS) to assist in the identification of programme recipients. The process involved extensive cleaning and processing of the geographical markers used in the administrative data to ensure that the names of parishes, sub-counties and districts followed the same spellings as those used in the Census and survey dataset. We also had to take into account changes in administrative boundaries, as the Government of Uganda created a significant number of new districts and (sub)counties in recent years.

Because coverage of the SCG in pilot districts was not homogeneous across lower administrative levels (such as sub-counties and parishes within districts), we tried to use the lowest possible administrative level when constructing our samples of recipients. Village-level data

on the number of beneficiaries and payment dates in the MIS was aggregated up to parish level (for use with the Census dataset), sub-county level (for use with the UDHS), and district level (for use with the UNHS).[10] In the UNHS, the districts themselves where used to identify programme participation, because it was not feasible to identify parishes or sub-counties in the 2012/13 UNHS. For this reason, the analysis of the UNHS excludes six of the pilot districts that had both SCG and VFSG recipients.

After the datasets were linked, it was assumed that all older persons who met the age-eligibility criteria at the time of the first payment in a programme area were enrolled onto the scheme. However, to help correct for (unobserved) delays in enrolment and cash disbursements, as well as inaccuracies in reported ages, we focused on a subsample of older people aged 68 years and above, i.e. those who were 3 or more years above the age- eligibility threshold. In the census dataset, we remove those older people who lived in the area for less than 3 years at the time of the interview, as they are unlikely to have been enrolled on the programme. Our analytical sample is further restricted to programme areas that had received at least 18 payments at the time of the census. In other words, we are examining the impacts of the programme on older people who, in all likelihood, had been receiving the SCG for a period of between two to three years. Below we summarise for each of the datasets the criteria used to identify recipients of the SCG.

Table 3.1: Treatment assignment across the datasets

Dataset	Administrative level	Age-eligibility
2014 Census	Parishes in pilot districts	68 years or older
UNHS 2012/13 (baseline)	Pilot districts	65 (or 60, in Karamoja) years or older
UNHS 2016/17	Pilot districts	68 (or 63, in Karamoja) years or older
UDHS 2011 (baseline)	Sub-counties in pilot district	65 (or 60, in Karamoja) years or older
UDHS 2016	Sub-counties in pilot district	68 (or 63, in Karamoja) years or older

3.1.3 *Outcome indicators*

We estimated the effects of the SCG on a range of indicators across four dimensions of well-being: poverty and material deprivation; livelihoods and productive assets; food and nutrition; and education. Table 3.2 provides an overview of the indicators, data source and unit of analysis. During the research design, indicators commonly used in previous studies and the literature on cash transfers were prioritised, with the caveat that we were restricted to indicators that could be

10 Although public UDHS dataset does not include geo-markers for sub-counties, we were able to retrieve the subcounty of the cluster by combining GPS coordinates of the clusters with subcounty boundaries using GIS.

constructed with the existing census and survey datasets. Because of statistical power, indicators in the Census were given priority over those in the household surveys. Household expenditure and poverty indicators are only available in the UNHS and child malnutrition is available in the UDHS.

Table 3.2: Indicators used in impact assessment

Indicator	Dataset	Unit of analysis
Poverty and material deprivation		
Household expenditure	UNHS	Households with older people of eligible-age
Poverty headcount index	UNHS	Households with older people of eligible-age
Poverty gap index	UNHS	Households with older people of eligible-age
Subjective poverty	UNHS	Households with older people of eligible-age
Wealth index (z-score)	Census	Older people 68+ years
Number of mobile phones	Census	Older people 68+ years
Ownership of 2+ sets of clothing	Census	Older people 68+ years
Ownership of 1+ pair of shoes	Census	Older people 68+ years
Use of soap for bathing	Census	Older people 68+ years
Productive assets and livelihoods		
Ownership of agricultural land	Census	Older people 68+ years
Ownership of any livestock	Census	Older people 68+ years
Ownership of exotic cattle	Census	Older people 68+ years
Ownership of local cattle	Census	Older people 68+ years
Ownership of goat(s)	Census	Older people 68+ years
Ownership of sheep	Census	Older people 68+ years
Ownership of pig(s)	Census	Older people 68+ years
Ownership of poultry	Census	Older people 68+ years
Number of types of livestock	Census	Older people 68+ years
Number of tropical livestock units	Census	Older people 68+ years
Working and type of main activity	Census	Older people 68+ years
	Census	Children 10-14 years co-residing with older people 68+ years
	Census	Working-age adults 18-59 years co-residing with older people 68+ years
Not working and main reasons not working	Census	Older people 68+ years
	Census	Children 10-14 years co-residing with older people 68+ years
	Census	Working-age adults 18-59 years co-residing with older people 68+ years
Remittances, any type received	Census	Older people 68+ years
Remittances, cash received	Census	Older people 68+ years
Remittances, goods received	Census	Older people 68+ years
Food and nutrition		
Average meals per day	Census	Older people 68+ years
Household eats 2+ meals per day	Census	Older people 68+ years
Sugar consumption once a day	Census	Older people 68+ years
Presence of salt in the house	Census	Older people 68+ years
Stunting (low height-for-age)	UDHS	Children 0-4 years co-residing with older people 68+ years
Wasting (low weight-for-height)	UDHS	Children 0-4 years co-residing with older people 68+ years
Underweight (low weight-for-age)	UDHS	Children 0-4 years co-residing with older people 68+ years
Education		
School attendance	Census	Children 6-18 years co-residing with older people 68+ years
Never attended school	Census	Children 6-18 years co-residing with older people 68+ years
Number of grades completed	Census	Children 6-18 years co-residing with older people 68+ years

Notes: Sample sizes vary by dataset and outcome indicator. See Annexes B and C for all outcome specific sample sizes.

3.2 METHODS

3.2.1 *Balancing, matching and regression adjustment*

The first approach we used to construct a comparison group for SCG recipients involved 'pre-processing' the Census data with matching techniques, followed by parametric regression adjustment. This two-step procedure produced more accurate and considerably fewer model-dependent causal inferences.[11] We utilised a 'pipeline' design, in which we compared recipients of the SCG living in the pilot areas with similar older persons living in the roll-out areas where the programme was not yet active at the time of the Census. We identified a comparison group of older persons which were as similar as possible to the SCG recipients on 40 background characteristics and covariates. These included: individual characteristics, such as age, sex, and disability status; household characteristics, such as the composition of the household, highest educational attainment among adults, marital status of the household head, distance to the nearest school and hospital, and access to electricity and piped water; and proxies for shocks, such as whether there was a death in the household in the last twelve months and a measure of drought. We also incorporated pre-intervention (community/regional) variables such as average levels of monetary and multidimensional poverty, the main types of livelihoods typically used by people in the area, and a binary variable for urban/rural areas.

To increase the robustness of our findings, we reported on the results from two different methods to achieve 'balance' in the covariate distributions across the treatment and comparison group:

- *Nearest neighbour matching*: We implemented a one-to-one nearest neighbour matching algorithm without replacement, which selected one comparison unit for each treated unit. Our measure of distance was a propensity score estimated with a binomial generalised linear model, transformed back onto a linear scale. We specified a caliper width of 0.2 standard deviations within which to draw comparison units. Matching was implemented with the R package *MatchIt*.[12]

- *Entropy balancing*: This preprocessing technique is based on a maximum entropy reweighting scheme that assigns weights to each unit such that the covariate distribution of the comparison group becomes very similar to the covariate distribution in the treatment group in the reweighted dataset. We stabilised

11 For a discussion, see: Ho D., Imai K., King G., & Stuart E. (2007). Matching as Nonparametric Preprocessing for Reducing Model Dependence in Parametric Causal Inference. *Political Analysis*, 15(3), 199-236.

12 Ibid.

the weights to reduce their variance. Entropy balancing was implemented with the R package *Weightit*.[13]

The matching algorithms were repeated for different units of analysis. For instance, when analysing household-level outcome variables, matching was performed at the household level. When analysing person-level outcomes, such as school attendance among children, we conducted the matching at the individual level to create a comparison group of children living with older people which was as similar as possible to children living with SCG recipients and added in child-specific covariates such as orphan status.

Figure 3.2 illustrates that the balancing algorithms performed very well, creating statistical comparison groups that were highly similar to the SCG recipients.[14] It shows a plot with the balance statistic on the X-axis and the covariates in the Y-axis. Each point represents the balance statistic for that covariate, coloured based on whether it is was calculated before or after the implementation of the two matching techniques. For all of the covariates, the absolute standardised differences of means are less than 0.1 while the variance ratios (not shown in the figure) are smaller than 2.

Finally, we implemented regression adjustment estimators using the weights obtained in the balancing procedures. This involved estimating the unobserved potential outcomes (the counterfactual) by fitting separate regression models with the observed data to the SCG and comparison groups.

3.2.2 *Difference-in-differences*

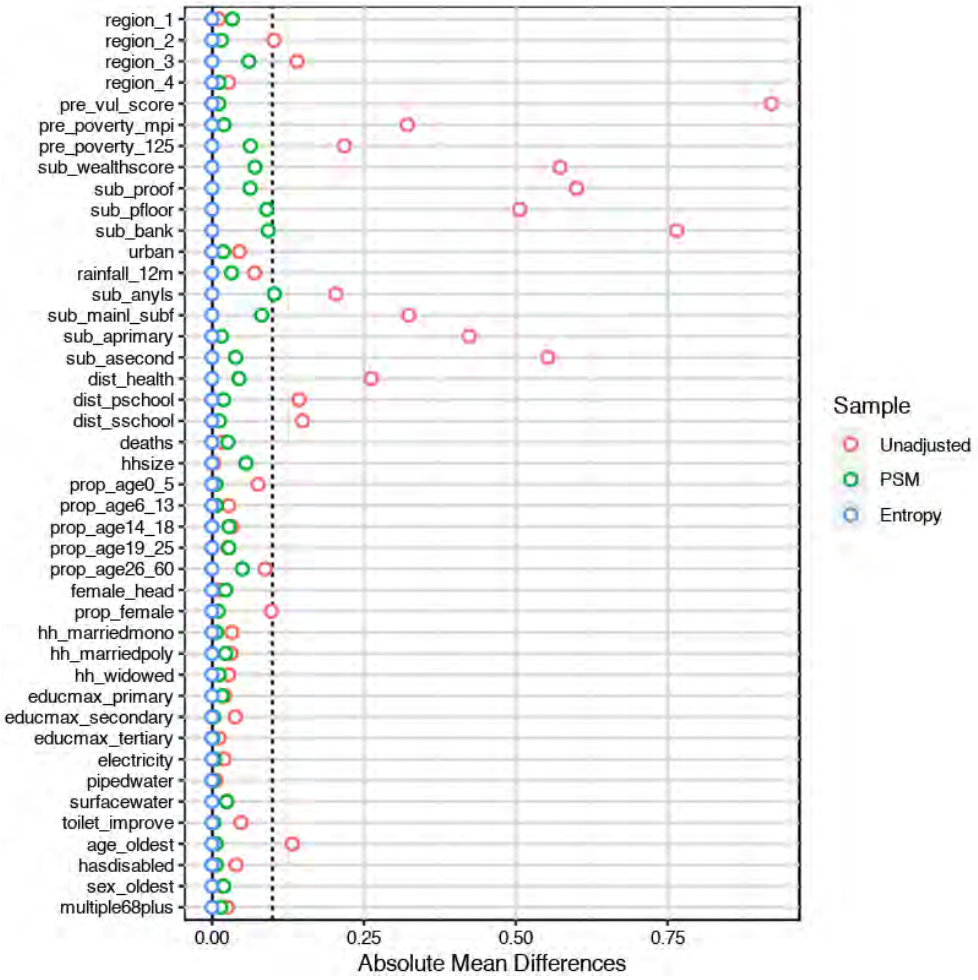
Our second evaluative approach was the difference-in-differences methodology (DID), which contrasted changes in the treated and comparison group outcomes before and after treatment assignment (i.e., the start of the SCG programme). We used this approach to analyse the UNHS surveys conducted in 2012/13 and 2016/17, and the UDHS surveys in 2011 and 2016. The region of Kampala was omitted from the survey datasets to improve balance.

We were particularly interested in investigating the impacts of the SCG on outcomes that were not available in the Census. In the UNHS, we explored the effects on poverty and household consumption expenditure and in the UDHS we investigated the impacts of the SCG on child malnutrition indicators. Treatment assignment was slightly different for both datasets. In the UNHS, this was done by identifying the district in which the household lived, and in the UDHS the subcounty was used to assign treatment.

13 See: Hainmueller, J. (2012). Entropy Balancing for Causal Effects: A Multivariate Reweighting Method to Produce Balanced Samples in Observational Studies. *Political Analysis*, 20(1), 25–46.

14 Balance was assessed with the R package *cobalt*.

Figure 3.2: Summary plot of covariate balance between SCG and comparison households before and after matching



Notes: Description of variables are listed in Table B.2 in Annex B.

By taking the difference in outcomes for the SCG recipients before and after receiving the cash transfer and subtracting the difference in outcomes for the comparison group before and after the cash transfer was disbursed, the DID estimator controlled for both time-trend confounding effects and permanent differences between these two groups. This meant that the DID was able to control for differences between the two groups that existed before the SCG started and for trends over time (e.g. economic shocks).

The key assumption was that unobserved differences between treatment and comparison groups remained the same over time before treatment (parallel trend assumption). The treatment and comparison groups did not necessarily need to have the same pre-intervention conditions. But for the DID to be valid, the comparison group needed to accurately represent the change in outcomes that would have been experienced by the treatment group in the absence of treatment. To

apply the DID, all that was necessary was to measure outcomes in the group that received the SCG (the treatment group) and the group that did not (the comparison group) both before and after the introduction of the SCG.

The DID estimates of the average effect of treatment on the treated (ATET) were obtained through OLS regression analysis that included controls for a range of household pre-intervention factors and district fixed effects to account for unobserved time-invariant district heterogeneity. A complete list of the controls, and the absolute difference in means between datasets, groups and survey rounds are available in Annex C. In both datasets, the main outstanding difference between SCG households and comparison households is the the highest educational level attained in the household. Additionally, for most of the covariates, the differences in means between SCG participants and control groups were not distinguishable from zero. Furthermore, for many of these covariates, the standardised absolute difference in mean was below 0.1.[15] Also, the mean differences of a number of key time-invariant covariates between rounds within each group were not distinguishable from zero, which suggested that the groups across survey rounds remained similar on a number of demographic characteristics.

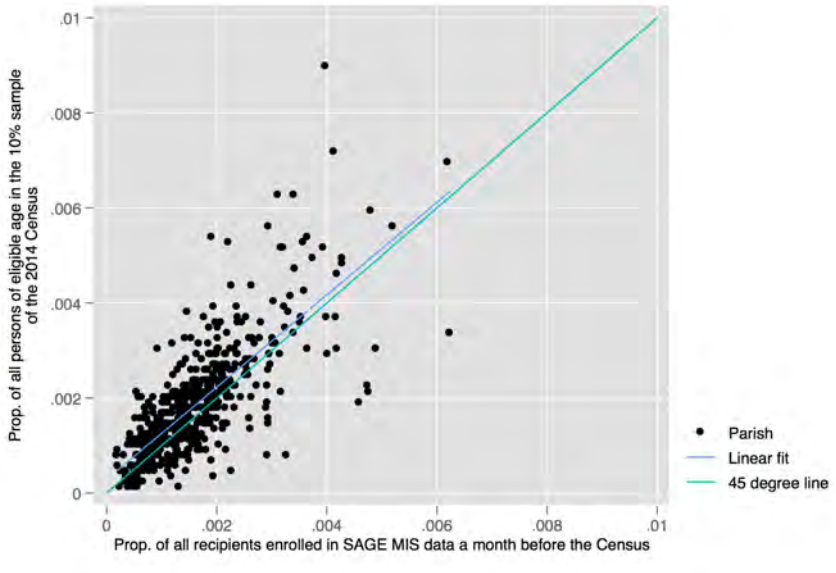
3.3 LIMITATIONS

Our study has a number of limitations. As discussed earlier, the Census and survey questionnaires did not include questions to directly identify programme recipients; rather, we relied on an identification approach using administrative data from the programme MIS. Strictly speaking, we are therefore conducting intention-to-treat (ITT) analysis. We cannot fully account for non-compliance or deviations that may have happened, although our analytical samples were developed in such a way so as to maximise the likelihood that the older persons classified as recipients were genuinely receiving the SCG. For example, Figure 3.3 indicates that there was a strong relationship between the number of older persons in SCG areas according to administrative data and the Census data.

Another limitation was sample sizes of the surveys used in the DID approach. By restricting the sample to only households with older people of eligible age, and with non-missing values for the outcomes and the covariates, the total sample size reduced to around 1,800 households with older persons in the UNHS dataset, and in the UDHS to some 330 children under 5 years living in households with older people of eligible-age and that took anthropometrics measurements.

15 The thresholds suggested for binary variables in the R package *cobalt* used for assessing balance.

Figure 3.3: Relationship between the proportion of older persons in parish areas according to the Census 2014 and SAGE MIS data, 2014



The lack of statistical power also hampered our ability to explore the heterogeneity of impacts.

Finally, by restricting the causal analysis to recipients in the pilot districts, our results are not necessarily fully generalisable to the roll-out districts. Some of the pilot districts located in the north of the country have received considerable support in the last few years, including from the Northern Uganda Social Action Fund. While great care was taken to control for as many factors as possible, we cannot rule out that some influences were not fully measured and controlled for.

4 RESULTS

This section reports on the findings from the quantitative impact analysis related to poverty and material deprivation; livelihoods and productive assets; food and nutrition; and education. Our main impact estimator is the average treatment effect on the treated (ATET), which is the difference between the average outcome for SCG recipients and the comparison group that serves as the counterfactual of what would have happened in the absence of the SCG. Unless noted otherwise, the ATET is expressed as an absolute difference in percentage points (pp).[16]

Results that are described as being statistically significant are those that are not likely to occur randomly or by chance, but are instead likely to be attributable to the Senior Citizens Grant. For simplicity, we report effect sizes as a simple average of the point estimates derived from different models and round them to the nearest integer in the text below. The tables in the Annex B contain more detailed statistics, such as standard errors and sample sizes.

4.1 POVERTY AND MATERIAL DEPRIVATION

We report on the following indicators relating to monetary poverty: the log of household expenditure per adult equivalent; the poverty headcount rate; and the poverty gap. The poverty threshold used in the analysis is the official poverty line as defined by the Ugandan Bureau of Statistics (UBOS). We also include a subjective measure of poverty, based on respondents' own perceptions of their welfare status. Indicators relating to material well-being include: the wealth asset index score; the number of mobiles phones owned by all household members; ownership of at least two sets of clothing for all members; ownership of at least one pair of shoes for all members; and use of soap for bathing.

4.1.1 *Monetary poverty*

The SCG appears to have been highly successful in reducing monetary poverty among its recipients, based on the difference-in-difference

16 The three exceptions include the following: differences in the natural logarithm of household expenditure, which are equivalent to relative percentage changes; level changes in the number of tropical livestock units; and differences in standard deviations for indicators normalised using z-scores (wealth index and anthropometric measures).

analysis of the Uganda national household surveys (see Table 4.1). The SCG had a statistically significant impact on household expenditure, a key proxy for overall living standards. The magnitude of the effect is large: our models indicate that the SCG increased expenditure per adult equivalent by 33 percent on average. The effect size should be interpreted in a context where levels of household expenditure tend to be relatively low. The average beneficiary household in our sample consumed no more than UGX 60,000 per person per month in 2012/13.[17] The average transfer value expressed as a percentage of household consumption was around 25 percent in 2012/13 and 14 percent in 2016/17. This points to the existence of multiplier effects.

Table 4.1: Impact of the SCG on measures of poverty among recipients in pilot districts

Indicator	Measure of effect	ATET	Significance
Log of expenditure pae	%-change	33.3	* * *
Poverty headcount index	pp-change	-18.9	* * *
Poverty gap index	pp-change	-9.7	* * *
Subjective poverty	pp-change	-17.5	* * *

Notes: The entries in column 3 are average treatment effects on the treated (ATETs) based on difference-in-differences estimates of OLS regressions using cross-sectional data from the latest two rounds of the UNHS (2012/13 and 2016/17). Regressions included controls for a range of household pre-intervention factors and district fixed effects. Robust standard errors clustered at district level were used. See Annex C for more details. The estimates capture the effects of the SCG in areas where the programme had been in place for 4 to 5 years. Household expenditure per adult equivalent is measured in logs. pp stands for percentage point. Significance level *** implies $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

As a result, there is a significant reduction in the poverty headcount index, i.e. the proportion of households with a level of expenditure below the national poverty line. The ATET for the poverty headcount is 19 percentage points. The poverty gap index – a measure of how far an average household falls below the poverty line – went down by an estimated 10 percentage points on average.

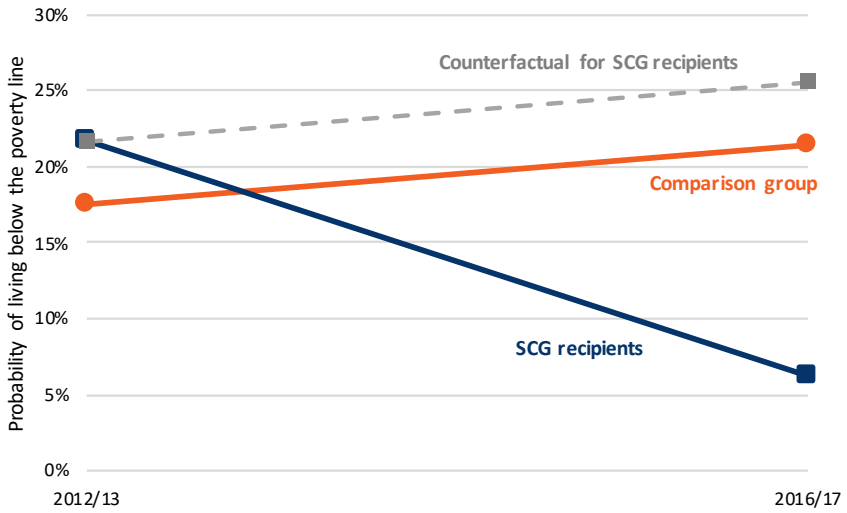
Figure 4.1 provides a visual representation of the difference-in-differences method.[18] It is important to note that the estimated counterfactual is the *change* in outcomes for the comparison group. SCG recipients and the comparison households do not necessarily need to have the same pre-intervention conditions. In 2012/13, when the SCG programme had only just started in most 'treatment' areas, the poverty rate among SCG recipients was higher than among the comparison

17 This is expressed in 2018 prices.

18 It shows the predicted values for the 'average' household in the treatment and comparison group, with all the variables we are controlling for in the model set to their mean value.

group. This is as expected, as the programme areas were deliberately selected from among the poorest districts in the country. However, by 2016/17, the comparison group experienced an increase in poverty, which is consistent with the overall rise in national poverty as reported by UBOS. Yet, the average SCG recipient in our sample experienced a significant decline in the likelihood of living below the poverty line. Under the assumption of common trend, we attribute the difference in the conditional probability of living poverty between the counterfactual (indicated by the grey dotted line in the Figure) and the poverty rate of the average recipient to the SCG programme.

Figure 4.1: Illustration of difference-in-differences of poverty rates between SCG beneficiaries and comparison group



4.1.2 *Subjective poverty*

The UNHS incorporated a measure of subjective poverty, by asking respondents to classify their household as very poor; poor; neither poor nor rich; or rich. Similar to measures of poverty based on expenditure, the SCG is also associated with a sharp reduction in subjective poverty. The share of households with a SCG recipient classifying themselves as being "very poor" or "poor" is 18 percentage points lower than in the counterfactual group.

4.1.3 *Material deprivation*

Table 4.2 shows ATET estimators for selected indicators derived from the causal inference analysis based on the census dataset. We constructed a national wealth index as a composite measure of households' cumulative living standards using principal component analysis, transformed into standard z-scores. The wealth index was calculated using

data on households' ownership of selected assets, such as mobile phones and televisions; materials used for housing construction; and type of access to water, sanitation and electricity. Overall, we find that the SCG has a statistically significant effect on households' wealth index score, with an average improvement of 0.04 standard deviations. The number of mobile phones owned by household members went up by about 0.1 phones on average (which represents a relative increase of 15 percent).

Table 4.2: Impact of the SCG on indicators of material well-being among recipients aged 68 years and above in pilot districts

Indicator	Measure of effect	Method 1 (PSM)		Method 2 (EBAL)		Average ATET
Wealth index (z-score)	Level change	0.04	***	0.04	***	0.04
Number of mobile phones	Level change	0.11	***	0.10	***	0.10
Owns 2+ sets of clothing	pp-change	8.5	***	7.6	***	8.1
Owns 1+ pair of shoes	pp-change	0.2		-0.2		0.0
Use of soap for bathing	pp-change	5.1	***	5.4	***	5.2

Notes: The entries in columns 3 and 5 are average treatment effects on the treated (ATETs) based on doubly robust estimators that combine nearest neighbour matching (method 1) or entropy balancing (method 2) with regression adjustment using 2014 Census data. See Annex B for more details. The estimates capture the effects of the SCG in areas where the programme had been in place for 2 to 3 years. pp stands for percentage point. Significance level *** implies $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

The SCG has also had highly significant positive effects on the consumption of goods such as clothing and soap, which can boost older people's sense of dignity. The share of households in which all members owned at least two sets of clothing increased by around 8 percentage points on average, while the use of soap for bathing went up by some 5 percentage points. However, the ATET for ownership of at least one pair of shoes is not statistically significant.

4.2 PRODUCTIVE ASSETS AND LIVELIHOODS

We report on productive assets using the following indicators: the share of older people in households owning agricultural land; the share of older people in households owning any form of livestock; and ownership of specific types of livestock (cattle, goats, sheep, pigs, and poultry). We also computed the number of tropical livestock units (TLUs) owned by households, to make it possible to compare different livestock types and sizes in a standardised manner.[19]

19 One TLU is commonly taken to be the equivalent to an animal of 250 kg live weight. The conversion factors used in our analysis are: cattle = 0.70; pigs = 0.20; sheep = 0.10; goats = 0.10; and chicken = 0.01. See: HarvestChoice (2015). Tropical Livestock

To examine the effects of the SCG on labour outcomes, we followed the approach used by UBOS[20] and split the population into two subgroups: those who were working and those who were not working in the 7-day reference period preceding the Census. The former includes people doing paid employment, own-account workers, and contributing family workers. The group of people classified as not working encompasses those whose main activity was doing household chores, full-time students, unemployed people, and people classified as inactive (e.g. because they are 'too old').

4.2.1 *Agricultural land*

We do not detect a significant impact of the SCG on the proportion of households owning agricultural land. This finding is similar to results reported by Merttens *et al*. (2016). Ownership of agricultural land is already relatively high (84 percent, on average) and the process of buying and selling land is complex and expensive, with land typically being communally owned by clans and with women having restricted land rights.

4.2.2 *Livestock ownership*

As illustrated in Table 4.3, there is very strong evidence that the SCG has had a causal effect on the accumulation of livestock. The scheme increased the probability that older people would live in a household owning any livestock by around 5 percentage points. We detected statistically significant increases in the ownership of goats (+8 percentage points), pigs (+7 percentage points), poultry (+6 percentage points), and sheep (+4 percentage points).

In relative terms, the effect size is particularly pronounced for pigs. The proportion of recipients in our sample who owned one or more pigs was 18 percent, on average, while the expected average ownership in the absence of the SCG would be just under 12 percent. In other words, the SCG increased the share of households owning pigs by 56 percent in relative terms.

Moreover, the scheme had a significant effect on livestock diversification, as measured by the average number of different types of animals owned. Overall, the average number of tropical livestock units increased by 0.6, from an estimated base of 1.8 TLUs.

Units (TLU, 2005). International Food Policy Research Institute, Washington, DC., and University of Minnesota, St. Paul, MN.

20 Uganda Bureau of Statistics (2016). The National Population and Housing Census 2014 – Main Report. UBOS: Kampala.

Table 4.3: Impact of the SCG on ownership of agricultural land and livestock assets among recipients aged 68 years and above in pilot districts

Indicator	Measure of effect	Method 1 (PSM)		Method 2 (EBAL)		Average ATET
Owns agricultural land	pp-change	1.8		2.0		1.9
Owns any livestock	pp-change	5.7	***	4.4	***	5.0
Owns exotic cattle	pp-change	-0.4		0.3		-0.1
Owns local cattle	pp-change	1.0		0.6		0.8
Owns goat(s)	pp-change	8.6	***	7.0	***	7.8
Owns sheep	pp-change	5.4	***	3.4	**	4.4
Owns pig(s)	pp-change	6.6	***	6.5	***	6.6
Owns poultry	pp-change	5.5	***	5.9	***	5.7
Number of livestock types	Level change	0.3	***	0.2	***	0.2
Tropical livestock units	Level change	0.5	*	0.6	*	0.6

Notes: The entries in columns 3 and 5 are average treatment effects on the treated (ATETs) based on doubly robust estimators that combine nearest neighbour matching (method 1) or entropy balancing (method 2) with regression adjustment using 2014 Census data. See Annex B for more details. The estimates capture the effects of the SCG in areas where the programme had been in place for 2 to 3 years. Significance level *** implies $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

4.2.3 *Economic activity*

Table 4.4 summarises the estimated effects of the SCG on labour outcomes of older persons aged 68 years and above who are recipients of the scheme. It shows a statistically significant reduction in paid labour and an increase in own-account work. We also detected statistically significant reductions in the share of recipients who were reported to be unemployed or inactive because they were 'too old'. The net effect is an increase in the labour supply of older persons by nearly 5 percentage points, on average. The SCG has enabled (some) older persons to stay active longer, while others reduce their involvement in paid labour in favour of working on their own account.

The SCG has also had a statistically significant impact on the supply of labour among working-age adults living with pensioners, by around 3 percentage points on average (Table 4.5). The effect is mostly driven by an increase in own-account workers, while the changes in paid work and unpaid family work are not statistically significant across both models. Conversely, we detect an equally-sized reduction in the share of adults aged 18-59 years who are not working, with a statistically significant decrease in unemployment. The vast majority of own-account workers in our sample are engaged in subsistence agriculture, so it may be that the extra resources provided by the SCG are being used to purchase agricultural inputs, which enable

some unemployed household members to become more involved in farming.

Table 4.4: Impact of the SCG on main activity status of recipients aged 68 years and above in pilot districts (percentage point change)

Main activity	Method 1 (PSM)	Signif.	Method 2 (EBAL)	Signif.	Average ATET
Working	4.7	* * *	4.3	* * *	4.5
Working for pay	-2.3	* * *	-2.0	* * *	-2.2
Own account worker	7.7	* * *	7.1	* * *	7.4
Contributing family worker	0.8		0.7	* *	0.8
Other type of worker	-0.5		-0.3		-0.4
Not working	-4.7	* * *	-4.3	* * *	-4.5
Household chores	-0.3		0.0		-0.2
Unemployed	-1.1	* *	-0.9	*	-1.0
Inactive ('too old to work')	-3.6	* * *	-2.9	* *	-3.3
Other activity status	0.2		-0.2		0.0

Notes: The entries in columns 2 and 4 are average treatment effects on the treated (ATETs) based on doubly robust estimators that combine nearest neighbour matching (method 1) or entropy balancing (method 2) with regression adjustment using 2014 Census data. See Annex B for more details. The estimates capture the effects of the SCG in areas where the programme had been in place for 2 to 3 years. Significance level *** implies $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Table 4.5: Impact of the SCG on main activity status of working-age adults 18-59 years co-residing with recipient(s) aged 68 years and above in pilot districts (percentage point change)

Main activity	Method 1 (PSM)	Signif.	Method 2 (EBAL)	Signif.	Average ATET
Working	4.0	* * *	2.9	* * *	3.4
Working for pay	0.0		-1.4	*	-0.7
Own account worker	5.0	* * *	5.3	* * *	5.2
Contributing family worker	-0.8		-0.8		-0.8
Not working	-4.0	* * *	-2.9	* * *	-3.4
Household chores	-1.6	* *	-0.9		-1.3
Unemployed	-1.1	* *	-1.3	* *	-1.2
Other activity status	-1.1	*	-0.6		-0.9

Notes: The entries in columns 2 and 4 are average treatment effects on the treated (ATETs) based on doubly robust estimators that combine nearest neighbour matching (method 1) or entropy balancing (method 2) with regression adjustment using 2014 Census data. See Annex B for more details. The estimates capture the effects of the SCG in areas where the programme had been in place for 2 to 3 years. Significance level *** implies $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Table 4.6 shows the results for children aged 10 to 14 years living with SCG recipients. The scheme reduced the probability of child labour by 5 percentage point, on average. This decrease is associated with a strong increase in the share of children who were reported to be full-time students (+7 percentage points, on average). The reduction in child labour in favour of school attendance is consistent with our results on education outcomes, as reported in Section 4.10 below.

Table 4.6: Impact of the SCG on main activity status of children 10-14 years co-residing with recipient(s) aged 68 years and above in pilot districts (percentage point change)

Main activity	Method 1 (PSM)	Signif.	Method 2 (EBAL)	Signif.	Average ATET
Working	-4.5	* *	-5.8	* * *	-5.2
Working for pay	-1.7		-3.1	* * *	-2.4
Own account worker	-0.9		-0.9		-0.9
Contributing family worker	-1.7	* *	-2.1	* *	-1.9
Other type of worker	-0.1		-0.6		-0.3
Not working	4.5	* *	5.8	* * *	5.2
Full-time student	7.5	* * *	6.0	* * *	6.8
Household chores	1.2		1.0		1.1
Unemployed	-1.6	*	-1.3	*	-1.4

Notes: The entries in columns 2 and 4 are average treatment effects on the treated (ATETs) based on doubly robust estimators that combine nearest neighbour matching (method 1) or entropy balancing (method 2) with regression adjustment using 2014 Census data. See Annex B for more details. The estimates capture the effects of the SCG in areas where the programme had been in place for 2 to 3 years. Significance level *** implies $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

4.2.4 *Remittances*

The SCG had no effect on overall remittances received from abroad. There is, however, an indication that the SCG had an impact on the type of remittances received. As shown in Table 4.7, the SCG decreased the number of older people receiving cash from family and friends living abroad by around 2 percentage points. But, at the same time, the SCG increased the likelihood of receiving remittances in kind by 1.8 percentage points, on average.

4.3 FOOD AND NUTRITION

We report on the following indicators related to food and nutrition: numbers of meals usually eaten by household members aged 5 years and older per day; share of households with members eating two or more meals per day on average; presence of salt in the household;

Table 4.7: Impact of the SCG on received remittances from abroad among recipients aged 68 years and above in pilot districts

Indicator	Measure of effect	Method 1 (PSM)		Method 2 (EBAL)		Average ATET
Remittances, any type received	pp-change	-0.4		-0.6		-0.5
Remittances, cash received only	pp-change	-2.0	**	-2.4	**	-2.2
Remittances, goods received only	pp-change	1.8	*	1.8	*	1.8

Notes: The entries in columns 3 and 5 are average treatment effects on the treated (ATETs) based on doubly robust estimators that combine nearest neighbour matching (method 1) or entropy balancing (method 2) with regression adjustment using 2014 Census data. See Annex B for more details. The estimates capture the effects of the SCG in areas where the programme had been in place for 2 to 3 years. Significance level *** implies $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

consumption of sugar at least once a day during the week preceding the Census; and anthropometric measures of malnutrition in children under five years of age.

4.3.1 *Food intake and diversity*

Table 4.8 presents impact estimates for indicators relating to food availability in the Census dataset. The SCG is associated with a small but statistically significant improvement in the average number of meals eaten per day by household members. The share of recipient households eating at least two meals per day was around 3 percentage points higher than in the comparison group. There were also indications that the SCG was used by recipients to diversify their foods, or at least to improve the flavour of meals. The SCG had a statistically highly significant effect on the presence of salt in the house, with an effect size of close to 5 percentage points. There is no discernible effect on the intake of sugar.

Table 4.8: Impact of the SCG on food intake among recipients aged 68 years and above in pilot districts

Indicator	Measure of effect	Method 1 (PSM)		Method 2 (EBAL)		Average ATET
Average meals per day	Level change	0.03	*	0.02		0.03
Household eats 2+ meals per day	pp-change	3.6	* * *	2.8	* *	3.2
Sugar consumption once a day	pp-change	-2.2		-2.2		-2.2
Presence of salt in the house	pp-change	5.8	* * *	4.3	* * *	5.0

Notes: The entries in columns 3 and 5 are average treatment effects on the treated (ATETs) based on doubly robust estimators that combine nearest neighbour matching (method 1) or entropy balancing (method 2) with regression adjustment using 2014 Census data. See Annex B for more details. The estimates capture the effects of the SCG in areas where the programme had been in place for 2 to 3 years. pp stands for percentage point. Significance level *** implies $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

4.3.2 *Child malnutrition*

We attempted to analyse the effects of the SCG on nutritional outcomes among young children under five co-residing with older people using a difference-in-difference analysis of Uganda's Demographic and Health Surveys (DHS). Three anthropometric measures to assess children's growth status were included: stunting (or low height-for-age); wasting (or low weight-for-height); and underweight (or low weight-for-age). For each of the measures, we assessed the SCG's potential impact on z-scores in relation to the World Health Organisation's reference population as well as cut-off-based prevalence rates of moderate and/or severe malnutrition.

Table 4.9: Impact of SCG on indicators of malnutrition among children under five co-residing with eligible older people

Outcome	ATET	St. Error	P-value	Signif.
Stunting (low height-for-age)				
Raw z-score	+1.10 SD	0.78	0.163	
Moderate and severe (z-score less than -2)	-6.4 pp	0.24	0.785	
Severe (z-score less than -3)	-20.7 pp	0.19	0.277	
Wasting (low weight-for-height)				
Raw z-score	+0.13 SD	0.76	0.860	
Moderate and severe (z-score less than -2)	-12.6 pp	0.17	0.449	
Severe (z-score less than -3)	-9.0 pp	0.15	0.544	
Underweight (low weight-for-age)				
Raw z-score	+1.30 SD	0.55	0.019	**
Moderate and severe (z-score less than -2)	-24.1 pp	0.18	0.183	
Severe (z-score less than -3)	-22.3 pp	0.14	0.113	

Notes: The entries in column 3 are average treatment effects on the treated (ATETs) based on difference-in-differences estimates of OLS regressions using cross-sectional data from the latest two rounds of the UDHS (2011 and 2016). Regressions included controls for a range of household pre-intervention factors and district fixed effects. Robust standard errors clustered at subcounty level were used. See Annex C for more details. The estimates capture the effects of the SCG in areas where the programme had been in place for 4 to 5 years. SD stands for standard deviation and pp for percentage point. Significance level *** implies $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

The results in Table 4.9 indicate that the SCG had a statistically significant positive effect on the z-scores for childhood underweight. The ATET estimators for the other measures of child malnutrition are all consistent in their direction of effect, that is, the SCG appears to have led to improvements in z-scores and reductions in the prevalence of childhood stunting, wasting, and underweight. However, these results are not statistically significant. A key constraint was the low statistical power of the survey dataset: our combined sample includes only 67 children under age five co-residing with an older person

receiving the SCG. As a result, we have a very reduced chance of detecting a true effect of the SCG on malnutrition.

4.4 EDUCATION

Using data from the Census, we estimate the causal effects of the SCG on education outcomes among school-age children (6-18 years) living with an older person enrolled on to the SCG programme for between two to three years. Three indicators are included in our analysis: the school attendance rate; the share of children who never attended school; and the average number of grades completed.

As shown in Table 4.10, the SCG is associated with a statistically highly significant reduction in the number of children who never entered school. The scheme reduced the likelihood of children never attending school by nearly 4 percentage points. In relative terms, the effect size is even more impressive. The proportion of children who never attended school is around 18 percent, on average, while the expected average rate in the absence of the SCG would be nearly 22 percent. This represents a relative decrease of 17 percent.

The share of children attending school increased by about 3 percentage points, from a base of 67 percent. Importantly, the SCG also had a significantly positive effect on the duration of schooling, increasing the average number of grades completed by at least 0.14 on average (a relative increase of 5 percent).

Table 4.10: Impact of the SCG on schooling outcomes among children 6-18 years co-residing with recipients aged 68 years and above in pilot districts

Indicator	Measure of effect	Method 1 (PSM)		Method 2 (EBAL)		Average ATET
School attendance	pp-change	3.3	* * *	2.6	* * *	2.9
Never attended school	pp-change	-3.7	* * *	-3.4	* * *	-3.6
Number of grades completed	Level change	0.16	* * *	0.13	* * *	0.14

Notes: The entries in columns 3 and 5 are average treatment effects on the treated (ATETs) based on doubly robust estimators that combine nearest neighbour matching (method 1) or entropy balancing (method 2) with regression adjustment using 2014 Census data. See Annex B for more details. The estimates capture the effects of the SCG in areas where the programme had been in place for 2 to 3 years. pp stands for percentage point. Significance level *** implies $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

5 CONCLUSION

This paper set out to assess the causal effects of Uganda's Senior Citizens Grant on the well-being of older persons and their families. In our first evaluative approach, we used data from Uganda's latest census to replicate a randomised experiment as closely as possible by obtaining a sample of SCG recipients and statistical comparison groups with highly similar covariate distributions. The analytical sample was restricted to people aged 68 years and above who had received at least 18 payments at the time of the Census, i.e. who had been on the scheme for around 2.5 years or more. We constructed doubly robust impact estimators by applying matching and weighting algorithms followed by regression adjustment. Our second evaluative approach relied on a difference-in-difference design to assess the effects of the SCG using multiple rounds of the cross-sectional UNHS and DHS surveys. In both approaches, the analyses controlled for some 40 covariates available in the Census and survey datasets and imported from other sources, related to individual, household and community-level characteristics, pre-intervention levels of poverty, and rainfall patterns (drought).

Our findings indicate that the SCG has been successful in achieving its poverty reduction objectives and improving the ownership of productive assets:

- The scheme is associated with a strong increase in household expenditure (a third, on average) and it reduced the poverty rate among recipients by an estimated 19 percentage points. Similar results were obtained when using a subjective measure of poverty.
- We detected improvements in the intake of food, with an increase in the share of recipients eating at least two meals per day.
- The SCG improved material well-being. It caused a significant increase in recipients' ability to purchase clothing and personal hygiene items such as soap, as well as increasing ownership of goods such as mobile phones.
- The SCG enabled older persons to invest in livestock. It increased the probability that older persons would live in a household owning any livestock by around 5 percentage points, and also enhanced livestock diversification.

These results are broadly consistent with findings reported in previous impact assessments and qualitative studies. However, to our

knowledge, this is the first quantitative study to detect effects of the SCG on employment, child labour, and education outcomes:

- The SCG appears to have enabled some older persons to stay active for longer, while others reduced their involvement in paid labour in favour of working for their own account. Interestingly, the net effect was an increase in the share of older persons working by nearly 5 percentage points, on average.
- The scheme is associated with a small increase in the supply of labour among working-age adults living with pensioners. It appears to have enabled some unemployed household members to become engaged in own-account work.
- Among children aged 10-14 years old, the SCG reduced the probability of child labour by an estimated 5 percentage points, on average.
- The SCG has had a positive impact on education outcomes among children aged 6-18 years who are living in the same house as a pensioner. We detected a reduction in the share of children who never attended school, as well as increases in school attendance and the number of grades completed.

The evidence on the impact of the SCG on the nutritional status of young children living in households with pensioners remains unclear. Our analysis points to large improvements in different anthropometric measures (stunting, wasting, underweight), but the effects are not statistically significant and therefore are not distinguishable from zero. It is, however, challenging to study the linkages between the SCG and child nutrition due to the very small number of households with both an older person over 65 and young children under age five in the datasets.

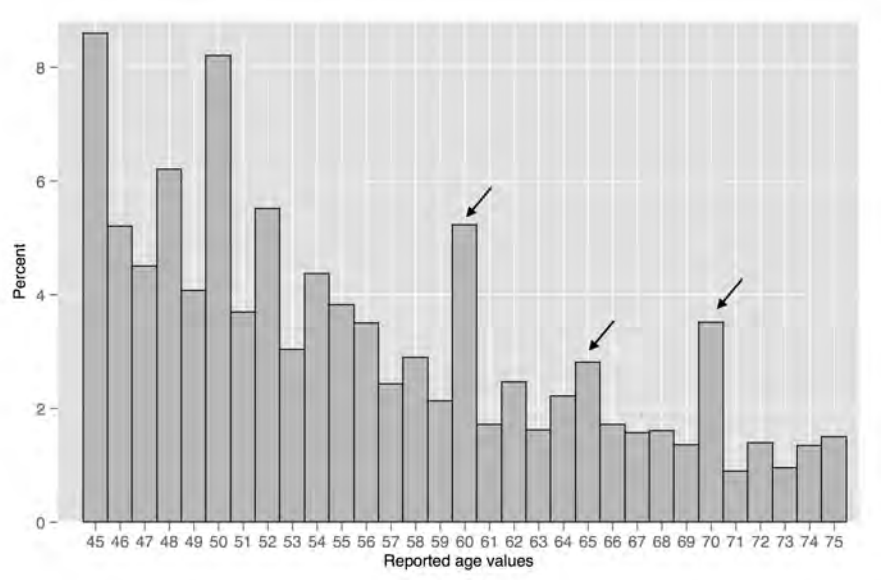
ANNEXES

A

REGRESSION DISCONTINUITY DESIGN

In addition to the main methods described in the body of the paper, we also attempted to apply a third technique known as regression discontinuity design (RDD). This took advantage of a quasi-experiment introduced by some known eligibility criteria, in this case the discontinuity introduced by the age-eligibility rule (60 years in Karamoja and 65 years in other locations). The evaluation design compared subjects just above the age cut-off point (who were receiving the SCG) with those just below (who constitute the comparison group). The logic was that by comparing groups just below and just above the age of eligibility the two groups were likely to be similar to each other in all respects other than that one group received the SCG and the other did not. In other words, people not yet eligible for the SCG but close enough to the age cut-off would be used as a comparison group to estimate the counterfactual (i.e. what would have happened to the group of eligible people in the absence of the SCG).

Figure A.1: Illustration of age heaping at ages with terminal digits '0' and '5' in the census



After conducting a series of sensitivity tests, however, it became clear that the technical assumptions underpinning the validity of an RDD were not fully met. In practice, the discontinuity was not entirely sharp but 'fuzzy' because of delays in enrolling people who had turned 65 (or 60 in Karamoja) onto the SCG scheme. Another challenge was age heaping or 'digit preference', that is, the tendency

of respondents to round reported ages to the nearest 5 or 10 years (see Figure A.1). In the RDD setup, it was difficult to correct for these problems because we could not directly identify SCG recipients in the census and survey datasets; instead, we rely on administrative data from the MIS, as was discussed earlier. Moreover, when limiting our analytical samples to older people just above and below the age-eligibility cut-off point living in the SCG pilot districts, sample sizes became very small without sufficient statistical power to detect effects. In the matching and difference-in-differences approaches, we dealt with the issue of age heaping by using more conservative thresholds, for example, by limiting our sample to older people aged 68 years and above who, in all likelihood, would all be receiving the SCG in the pilot areas where the programme was universally implemented.

B

SUPPLEMENTAL MATERIAL TO MATCHING METHODS

Table B.1: Description of variables used for balancing in the matching approach

Variable	Description	Source
region_1	Identifies whether household is in the Central region of Uganda	Census
region_2	Identifies whether household is in the Eastern of Uganda	Census
region_3	Identifies whether household is in the Northern of Uganda	Census
region_4	Identifies whether household is in the Western of Uganda	Census
pre_vul_score	Vulnerability score used to select pilot districts	ESP
pre_poverty_mpi	Subcounty multidimensional poverty index rate	Tatem et al. (2013)
pre_poverty_125	Subcounty poverty headcount rate	Tatem et al. (2013)
sub_wealthscore	Mean household asset index in subcounty. Asset index is constructed using principal component analysis	Census
sub_proof	Mean share of households with improved roof in subcounty	Census
sub_pfloor	Mean share of households with improved floor in subcounty	Census
sub_bank	Mean share of households with a bank acount in subcounty	Census
urban	Identifies whether household is in urban areas	Census
rainfall_12m	Total rainfall in the last 12 months	Ssentongo et al. (2018)
sub_anyls	Mean share of households with livestock in subcounty	Census

Table B.1 continued from previous page

Variable	Description	Source
sub_mainl_subf	Mean share of household whose main livelihoods is subsistence farming in subcounty	Census
sub_aprimary	Mean share of children 6-13 years of who attending school in subcounty	Census
sub_asecond	Mean share of children 14-18 years of who attending school in subcounty	Census
dist_health	Distance to nearest health facility	Census
dist_pschool	Distance to nearest primary school	Census
dist_sschool	Distance to nearest secondary school	Census
deaths	Identifies whether household has had any deaths in the past 12 months	Census
hhsize	Household size	Census
prop_age0_5	Proportion of household members aged 0-5 years in household	Census
prop_age6_13	Proportion of household members aged 6-13 years in household	Census
prop_age14_18	Proportion of household members aged 14-18 years in household	Census
prop_age19_25	Proportion of household members aged 19-25 years in household	Census
prop_age26_60	Proportion of household members aged 26-60 years in household	Census
female_head	Identifies whether the head of household is female	Census
prop_female	Proportion of female household members	
hh_marriedmono	Identifies whether household head is in a monogony marrital relationship	Census

Table B.1 continued from previous page

Variable	Description	Source
hh_marriedpoly	Identifies whether household head is in a polygamous marrital relationship	Census
educmax_primary	Identifies whether highest degree in household is primary education	Census
educmax_secondary	Identifies whether highest degree in household is secondary education	Census
educmax_tertiary	Identifies whether highest degree in household is tertiary education	Census
electricity	Identifies whether household has electricity	Census
pipedwater	Identifies whether household's main source of drinking water is piped	Census
surfacewater	Identifies whether household's main source of drinking water is from surface water	Census
toilet_improve	Identifies whether household has an improved toilet	Census
age_oldest	Age of the oldest household member	Census
hasdisabled	Identifies whether household has a member with severe disability	Census
sex_oldest	Gender of the oldest household member	Census
multiple68plus	Identifies whether household has multiple older persons aged 68 years or over	Census

Table B.2: Complete list of impact estimates using the matching approach

Method	Outcome	ATET	S.E.	z	*p*-val.	Signif.	N	Treated	Counter-factual	PO mean	Response ratio
Older people 68 + years											
PSM	Wealth index (z-score)	0.044	0.014	3.06	0.002	* * *	4,332	2,166	2,166	-0.673	0.934
EBAL	Wealth index (z-score)	0.043	0.014	3.04	0.002	* * *	18,240	2,191	16,049	-0.676	0.936
PSM	Number of mobile phones	0.100	0.030	3.34	0.001	* * *	4,332	2,166	2,166	0.682	1.147
EBAL	Number of mobile phones	0.109	0.033	3.36	0.001	* * *	18,240	2,191	16,049	0.670	1.163
PSM	Ownership of 2+ sets of clothing	8.5%	0.013	6.44	0.000	* * *	4,332	2,166	2,166	0.681	1.124
EBAL	Ownership of 2+ sets of clothing	7.6%	0.013	6.08	0.000	* * *	18,240	2,191	16,049	0.691	1.110
PSM	Ownership of 1+ pair of shoes	0.2%	0.014	0.17	0.869		4,332	2,166	2,166	0.408	1.006
EBAL	Ownership of 1+ pair of shoes	-0.2%	0.014	-0.14	0.885		18,240	2,191	16,049	0.411	0.995
PSM	Use of soap for bathing	5.1%	0.012	4.37	0.000	* * *	4,332	2,166	2,166	0.806	1.063
EBAL	Use of soap for bathing	5.4%	0.011	4.79	0.000	* * *	18,240	2,191	16,049	0.803	1.067
PSM	Average meals per day	0.035	0.019	1.81	0.070	*	4,332	2,166	2,166	2.031	1.017
EBAL	Average meals per day	0.018	0.019	1.00	0.319		18,240	2,191	16,049	2.045	1.009
PSM	Household eats 2+ meals per day	0.036	0.012	2.92	0.003	* * *	4,332	2,166	2,166	0.797	1.045
EBAL	Household eats 2+ meals per day	0.028	0.012	2.40	0.016	* *	18,240	2,191	16,049	0.804	1.035

Table B.2 continued from previous page

Method	Outcome	ATET	S.E.	z	*p*-val.	Signif.	N	Treated	Counter-factual	PO mean	Response ratio
PSM	Sugar consumption once a day	-0.022	0.015	-1.49	0.135		4,332	2,166	2,166	0.503	0.956
EBAL	Sugar consumption once a day	-0.022	0.015	-1.50	0.135		18,240	2,191	16,049	0.499	0.956
PSM	Presence of salt in the house	0.058	0.012	5.00	0.000	* * *	4,332	2,166	2,166	0.832	1.069
EBAL	Presence of salt in the house	0.043	0.011	4.02	0.000	* * *	18,240	2,191	16,049	0.846	1.051
PSM	Ownership of agricultural land	0.018	0.011	1.54	0.124		4,332	2,166	2,166	0.826	1.021
EBAL	Ownership of agricultural land	0.020	0.011	1.73	0.083	*	18,240	2,191	16,049	0.823	1.024
PSM	Ownership of any livestock	0.057	0.014	4.16	0.000	* * *	4,332	2,166	2,166	0.677	1.084
EBAL	Ownership of any livestock	0.044	0.013	3.40	0.001	* * *	18,240	2,191	16,049	0.690	1.063
PSM	Ownership of exotic cattle	-0.004	0.006	-0.73	0.463		4,332	2,166	2,166	0.031	0.855
EBAL	Ownership of exotic cattle	0.003	0.006	0.51	0.609		18,240	2,191	16,049	0.023	1.140
PSM	Ownership of local cattle	0.010	0.012	0.88	0.381		4,332	2,166	2,166	0.279	1.037
EBAL	Ownership of local cattle	0.006	0.012	0.49	0.624		18,240	2,191	16,049	0.282	1.021
PSM	Ownership of goat(s)	0.086	0.015	5.88	0.000	* * *	4,332	2,166	2,166	0.395	1.217
EBAL	Ownership of goat(s)	0.070	0.014	4.92	0.000	* * *	18,240	2,191	16,049	0.412	1.170
PSM	Ownership of sheep	0.054	0.010	5.12	0.000	* * *	4,332	2,166	2,166	0.117	1.459
EBAL	Ownership of sheep	0.034	0.011	3.16	0.002	* * *	18,240	2,191	16,049	0.137	1.247

Table B.2 continued from previous page

Method	Outcome	ATET	S.E.	z	*p*-val.	Signif.	N	Treated	Counter-factual	PO mean	Response ratio
PSM	Ownership of pig(s)	0.066	0.011	6.20	0.000	* * *	4,332	2,166	2,166	0.116	1.570
EBAL	Ownership of pig(s)	0.065	0.011	5.82	0.000	* * *	18,240	2,191	16,049	0.116	1.559
PSM	Ownership of poultry	0.055	0.014	3.80	0.000	* * *	4,332	2,166	2,166	0.505	1.108
EBAL	Ownership of poultry	0.059	0.014	4.25	0.000	* * *	18,240	2,191	16,049	0.499	1.118
PSM	Number of types of livestock	0.252	0.039	6.53	0.000	* * *	4,332	2,166	2,166	1.508	1.167
EBAL	Number of types of livestock	0.212	0.039	5.38	0.000	* * *	18,240	2,191	16,049	1.545	1.137
PSM	Number of tropical livestock units	0.513	0.227	2.26	0.024	* *	4,332	2,166	2,166	1.768	1.290
EBAL	Number of tropical livestock units	0.587	0.228	2.57	0.010	* *	18,240	2,191	16,049	1.747	1.336
PSM	Working	0.047	0.014	3.35	0.001	* * *	4,332	2,166	2,166	0.625	1.075
EBAL	Working	0.043	0.014	3.22	0.001	* * *	18,240	2,191	16,049	0.630	1.069
PSM	Not working	-0.047	0.014	-3.35	0.001	* * *	4,332	2,166	2,166	0.375	0.875
EBAL	Not working	-0.043	0.014	-3.22	0.001	* * *	18,240	2,191	16,049	0.370	0.882
PSM	Paid employee	-0.023	0.007	-3.49	0.000	* * *	4,332	2,166	2,166	0.058	0.601
EBAL	Paid employee	-0.020	0.006	-3.13	0.002	* * *	18,240	2,191	16,049	0.055	0.636
PSM	Own account worker	0.077	0.014	5.41	0.000	* * *	4,332	2,166	2,166	0.557	1.139
EBAL	Own account worker	0.071	0.014	5.14	0.000	* * *	18,240	2,191	16,049	0.564	1.126

Table B.2 continued from previous page

Method	Outcome	ATET	S.E.	z	*p*-val.	Signif.	N	Treated	Counter-factual	PO mean	Response ratio
PSM	Contributing family worker	0.008	0.302	0.03	0.978		4,332	2,166	2,166	0.029	1.290
EBAL	Contributing family worker	0.007	0.003	2.42	0.016	* *	18,240	2,191	16,049	0.005	2.370
PSM	Other type of worker	-0.005	0.004	-1.42	0.157		4,332	2,166	2,166	0.009	0.415
EBAL	Other type of worker	-0.003	0.002	-1.27	0.205		18,240	2,191	16,049	0.006	0.580
PSM	Household chores	-0.003	0.007	-0.51	0.613		4,332	2,166	2,166	0.035	0.903
EBAL	Household chores	0.000	0.006	0.03	0.973		18,240	2,191	16,049	0.032	1.006
PSM	Unemployed	-0.011	0.005	-2.05	0.040	* *	4,332	2,166	2,166	0.034	0.678
EBAL	Unemployed	-0.009	0.005	-1.76	0.078	*	18,240	2,191	16,049	0.032	0.716
PSM	Inactive	-0.036	0.013	-2.73	0.006	* * *	4,332	2,166	2,166	0.282	0.872
EBAL	Inactive	-0.029	0.013	-2.31	0.021	* *	18,240	2,191	16,049	0.273	0.893
PSM	Other activity status	0.002	0.006	0.31	0.758		4,332	2,166	2,166	0.026	1.071
EBAL	Other activity status	-0.002	0.006	-0.42	0.676		18,240	2,191	16,049	0.030	0.918
PSM	Remittances, any type	-0.004	0.012	-0.32	0.749		4,332	2,166	2,166	0.214	0.981
EBAL	Remittances, any type	-0.006	0.012	-0.51	0.610		18,240	2,191	16,049	0.217	0.971
PSM	Remittances, cash	-0.020	0.010	-2.07	0.039	* *	4,332	2,166	2,166	0.128	0.841
EBAL	Remittances, cash	-0.024	0.010	-2.45	0.014	* *	18,240	2,191	16,049	0.131	0.816

Table B.2 continued from previous page

Method	Outcome	ATET	S.E.	z	*p*-val.	Signif.	N	Treated	Counter-factual	PO mean	Response ratio
PSM	Remittances, in-kind	0.018	0.010	1.83	0.068	*	4,332	2,166	2,166	0.102	1.176
EBAL	Remittances, in-kind	0.018	0.010	1.86	0.063	*	18,240	2,191	16,049	0.104	1.172
Working-age adults											
PSM	Working	0.040	0.011	3.68	0.000	* * *	4,794	2,397	2,397	0.810	1.049
EBAL	Working	0.029	0.011	2.69	0.007	* * *	21,717	2,413	19,304	0.822	1.035
PSM	Not working	-0.040	0.011	-3.68	0.000	* * *	4,794	2,397	2,397	0.190	0.790
EBAL	Not working	-0.029	0.011	-2.69	0.007	* * *	21,717	2,413	19,304	0.178	0.840
PSM	Paid employee	0.000	0.008	-0.06	0.949		4,794	2,397	2,397	0.075	0.993
EBAL	Paid employee	-0.014	0.008	-1.70	0.088	*	21,717	2,413	19,304	0.089	0.845
PSM	Own account worker	0.050	0.012	4.10	0.000	* * *	4,794	2,397	2,397	0.709	1.071
EBAL	Own account worker	0.053	0.012	4.36	0.000	* * *	21,717	2,413	19,304	0.706	1.075
PSM	Contributing family worker	-0.008	0.005	-1.60	0.109		4,794	2,397	2,397	0.016	0.536
EBAL	Contributing family worker	-0.008	0.005	-1.46	0.144		21,717	2,413	19,304	0.017	0.539
PSM	Household chores	-0.016	0.008	-2.18	0.029	* *	4,794	2,397	2,397	0.072	0.772
EBAL	Household chores	-0.009	0.008	-1.24	0.214		21,717	2,413	19,304	0.065	0.856
PSM	Unemployed	-0.011	0.006	-1.98	0.047	* *	4,794	2,397	2,397	0.037	0.697

Table B.2 continued from previous page

Method	Outcome	ATET	S.E.	z	*p*-val.	Signif.	N	Treated	Counter-factual	PO mean	Response ratio
EBAL	Unemployed	-0.013	0.006	-2.30	0.021	* *	21,717	2,413	19,304	0.038	0.669
PSM	Other activity status	-0.011	0.007	-1.66	0.096	*	4,794	2,397	2,397	0.042	0.733
EBAL	Other activity status	-0.006	0.006	-0.96	0.336		21,717	2,413	19,304	0.037	0.840
Children 10-14 years											
PSM	Working	-0.045	0.020	-2.29	0.022	* *	2,546	1,273	1,273	0.529	0.914
EBAL	Working	-0.058	0.019	-3.04	0.002	* * *	10,942	1,309	9,633	0.542	0.892
PSM	Not working	0.045	0.020	2.29	0.022	* *	2,546	1,273	1,273	0.471	1.096
EBAL	Not working	0.058	0.019	3.04	0.002	* * *	10,942	1,309	9,633	0.458	1.128
PSM	Paid employee	-0.017	0.011	-1.61	0.107		2,546	1,273	1,273	0.080	0.788
EBAL	Paid employee	-0.031	0.011	-2.71	0.007	* * *	10,942	1,309	9,633	0.096	0.679
PSM	Own account worker	-0.009	0.019	-0.47	0.640		2,546	1,273	1,273	0.396	0.977
EBAL	Own account worker	-0.009	0.019	-0.49	0.623		10,942	1,309	9,633	0.394	0.977
PSM	Contributing family worker	-0.017	0.008	-2.08	0.038	* *	2,546	1,273	1,273	0.040	0.587
EBAL	Contributing family worker	-0.021	0.010	-2.11	0.035	* *	10,942	1,309	9,633	0.045	0.525
PSM	Other type of worker	-0.001	0.004	-0.30	0.767		2,546	1,273	1,273	0.012	0.887
EBAL	Other type of worker	-0.006	0.006	-1.00	0.319		10,942	1,309	9,633	0.016	0.640

Table B.2 continued from previous page

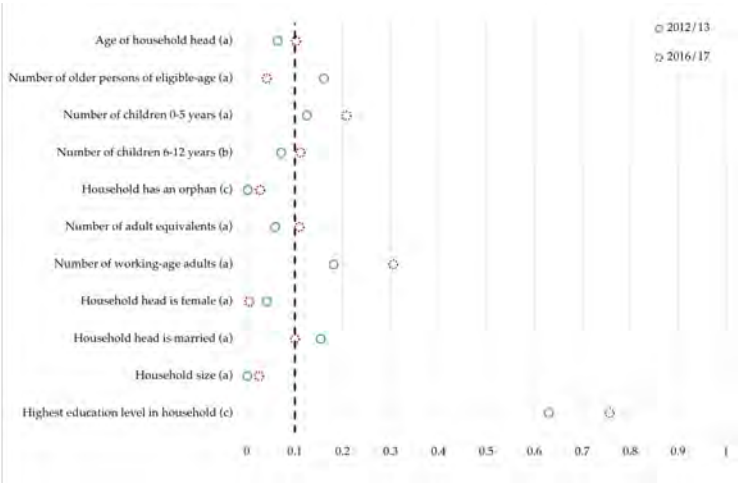
Method	Outcome	ATET	S.E.	z	*p*-val.	Signif.	N	Treated	Counter-factual	PO mean	Response ratio
PSM	Full-time student	0.075	0.018	4.22	0.000	* * *	2,546	1,273	1,273	0.227	1.332
EBAL	Full-time student	0.060	0.018	3.33	0.001	* * *	10,942	1,309	9,633	0.235	1.256
PSM	Household chores	0.012	0.014	0.88	0.377		2,546	1,273	1,273	0.125	1.096
EBAL	Household chores	0.010	0.014	0.74	0.460		10,942	1,309	9,633	0.127	1.080
PSM	Unemployed	-0.016	0.008	-1.91	0.056	*	2,546	1,273	1,273	0.042	0.631
EBAL	Unemployed	-0.013	0.008	-1.71	0.087	*	10,942	1,309	9,633	0.040	0.672
Children 6-18 years											
PSM	Attending school (%)	0.033	0.010	3.19	0.001	* * *	6,087	3,043	3,044	0.667	1.049
EBAL	Attending school (%)	0.026	0.010	2.59	0.009	* * *	26,690	3,106	23,584	0.672	1.038
PSM	Never attended school (%)	-0.037	0.008	-4.75	0.000	* * *	6,087	3,043	3,044	22%	0.826
EBAL	Never attended school (%)	-0.034	0.007	-4.70	0.000	* * *	26,690	3,106	23,584	21%	0.841
PSM	Number of grades completed	0.162	0.048	3.39	0.001	* * *	6,087	3,043	3,044	2.761	1.059
EBAL	Number of grades completed	0.128	0.048	2.65	0.008	* * *	26,690	3,106	23,584	2.777	1.046

Notes: The entries in columns 1 are average treatment effects on the treated (ATETs) based on doubly robust estimators that combine nearest neighbour matching (PSM, method 1) or entropy balancing (EBAL, method 2) with regression adjustment using 2014 Census data. The estimates capture the effects of the SCG in areas where the programme had been in place for 2 to 3 years. Significance level *** implies $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

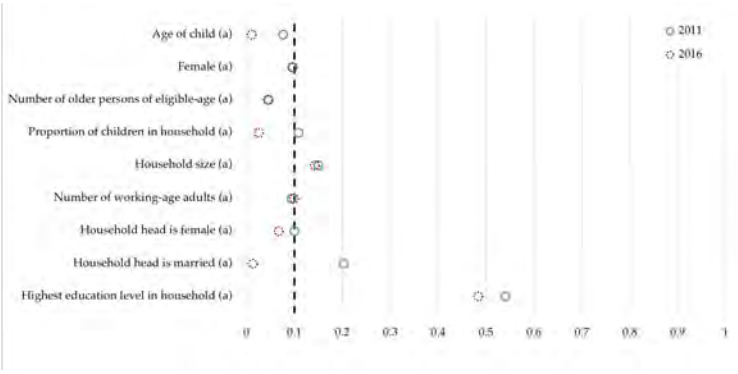
C

SUPPLEMENTAL MATERIAL TO DIFF-IN-DIFF METHOD

Figure C.1: Standardized absolute mean differences of covariates between SCG and comparison households used in the difference-in-differences, by survey and year



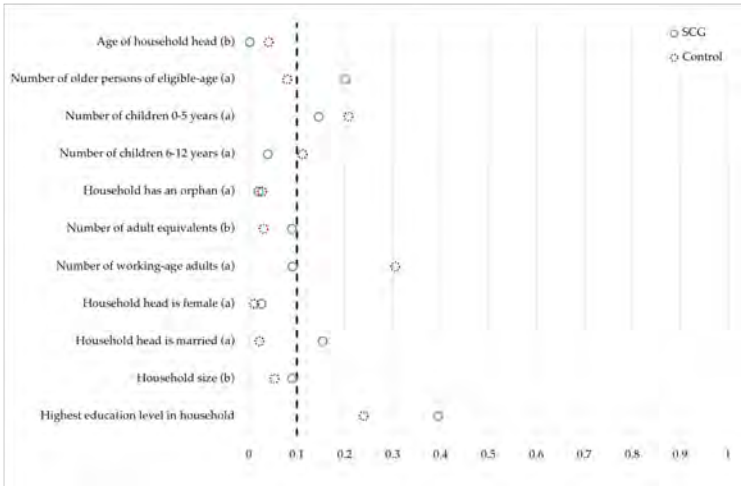
(a) UNHS



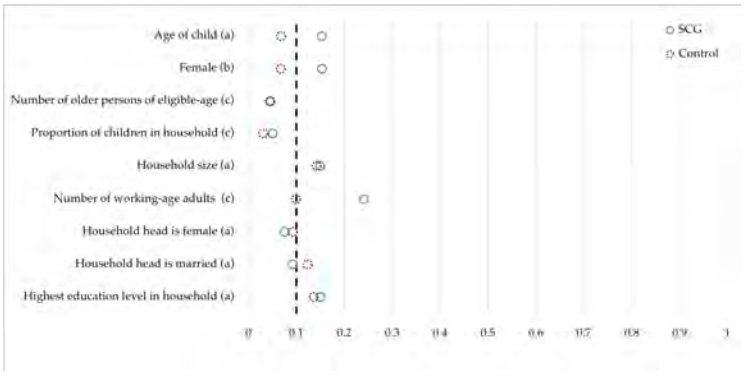
(b) UDHS

Notes: In addition to these covariates, all DID regressions in the results section included district-level fixed effects to control for time-invariant district-specific confounding effects. (a), (b) and (c) indicate whether the differences in mean are not distinguishable from zero (p-value > 0.05) in both rounds, in 2012/13 only or in 2016/17 only, respectively. Equality of means is tested by regressing outcome indicator on treatment assignment variable and district fixed effects separately for each round. p-value is from the t-test of the coefficient of interest being equal to zero.

Figure C.2: Standardized absolute mean differences of covariates between survey rounds used in the difference-in-differences, by survey and group



(a) UNHS



(b) UDHS

Notes: In addition to these covariates, all DID regressions in the results section included district-level fixed effects to control for time-invariant district-specific confounding effects. (a), (b) and (c) indicate whether the differences in mean are not distinguishable from zero (p-value > 0.05) in both groups, in the SCG group only or in the control group only, respectively. Equality of means is tested by regressing outcome indicator on survey round variable and district fixed effects separately for each group. p-value is from the t-test of the coefficient of interest being equal to zero.

Table C.1: Complete list of impact estimates using the difference-in-differences approach

Outcome	ATET estimate	S.E	Confidence intervals (95%)		p-val	N_{co}	N_{tr}	Predicted margins				Counter-factual mean
								Control, r0	Treated, r0	Control, r1	Treated, r1	
Household expenditure and poverty indicators using UNHS												
Monthly household per adult equivalent expenditure in 2009/10 prices and expressed in logs	0.333	0.107	0.120	0.545	0.003	1,601	236	11.19	11.06	11.18	11.42	11.06
Poverty headcount index. Indicator of whether monthly household per adult equivalent expenditure is below national poverty lines	-0.189	0.060	-0.310	-0.069	0.002	1,601	236	0.17	0.22	0.21	0.06	0.26
Poverty gap index. Poverty gap measured in percentages	-0.097	0.031	-0.159	-0.035	0.003	1,601	236	0.05	0.09	0.06	0.00	0.11

Table C.1 continued from previous page

Outcome	ATET estimate	S.E	Confidence intervals (95%)		p-val	N_{co}	N_{tr}	Predicted margins				Counter-factual mean
								Control, r0	Treated, r0	Control, r1	Treated, r1	
Subjective poverty, household's own poverty classification. A household is poor if it self-declared "very poor" or "poor"	-0.175	0.054	-0.283	-0.068	0.002	1,593	233	0.73	0.79	0.87	0.75	0.93
Child malnutrition indicators using UDHS												
Stunting (low height-for-age), Z-score	1.10	0.78	-0.45	2.64	0.16	266	67	-1.7	-2.0	-1.2	-0.4	-1.4
Moderate and severe stunting (z-score less than -2)	-0.06	0.24	-0.53	0.40	0.78	266	67	0.5	0.5	0.2	0.3	0.2
Severe stunting (z-score less than -3)	-0.21	0.19	-0.58	0.17	0.28	266	67	0.1	0.2	0.1	0.0	0.2
Wasting (low weight-for-height), Z-score	0.13	0.76	-1.37	1.64	0.86	264	67	0.0	-0.3	0.3	-0.2	0.0
Moderate and severe wasting (z-score less than -2)	-0.13	0.17	-0.45	0.20	0.45	264	67	0.0	0.1	0.0	0.0	0.1

Table C.1 continued from previous page

Outcome	ATET estimate	S.E	Confidence intervals (95%)		p-val	N_{co}	N_{tr}	Predicted margins				Counter-factual mean
								Control, r0	Treated, r0	Control, r1	Treated, r1	
Severe wasting (z-score less than -3)	-0.09	0.15	-0.38	0.20	0.54	264	67	0.0	0.0	0.0	0.0	0.0
Underweight (low weight-for-age), Z-score	1.30	0.55	0.21	2.39	0.02	267	68	-1.0	-1.3	-0.4	-0.03	-0.8
Moderate and severe underweight (z-score less than -2)	-0.24	0.18	-0.60	0.11	0.18	267	68	0.1	0.3	0.1	0.1	0.3
Severe underweight (z-score less than -3)	-0.22	0.14	-0.50	0.05	0.11	267	68	0.0	0.1	0.0	0.0	0.2

Notes: Average treatment effects on the treated (ATETs) are based on difference-in-differences estimates of OLS regressions using cross-sectional data from the latest two rounds of the UNHS (2011 and 2016) and the UDHS (2011 and 2016). Regressions included controls for a range of household pre-intervention factors and district fixed effects. Robust standard errors clustered at the level of treatment assignment were used. The estimates capture the effects of the SCG in areas where the programme had been in place for 4 to 5 years. Predicted margins were calculated fixing the covariates at their means.

The Government of Uganda through the Ministry of Gender, Labour and Social Development and with support from the UK's Department for International Development (UKAid/DFID) and Irish Aid is implementing the Expanding Social Protection Programme. The Ministry is mandated to coordinate other GoU line Ministry Departments and Agencies, to implement the National Social Protection Policy (NSPP).

As part of the wider NSSP, the ESP Programme Management is now implementing the Social Assistance Grants for Empowerment/Senior Citizens Grant. The development objective of the 5-year programme is to embed a National Social Protection System that benefits Uganda's poorest as a core element of the country's national policy, planning and budgeting process.

The Ministry of Gender, Labour and Social Development is mandated to mobilise and empower communities to harness their potential while protecting the rights of vulnerable groups. The Ministry's overall mission is to achieve a better standard of living, equity and social cohesion.

For more information:

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Facebook: Facebook.com/expanding

The second phase of the Expanding Social Protection Programme (ESP II) is implemented by the Ministry of Gender, Labour and Social Development, funded by the UK Department for International Development and Irish Aid

UKaid from the British people

DEVELOPMENT PATHWAYS

Irish Aid
Department of Foreign Affairs
An Roinn Gnóthaí Eachtracha