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The Graduation approach for the reduction of extreme poverty: impact evaluation of *Sembrando Oportunidades Familia por Familia* in Paraguay

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Abstract: Rural poverty, a widespread problem for the Paraguayan government over the last decade –as well as for other economies in the region-, led to the implementation, in 2016 and 2017, of the "Sembrando Oportunidades Familia por Familia" pilot program, an initiative based on the graduation approach to reduce the incidence of extreme poverty in rural areas. Evaluating the intervention results is essential to understand the effectiveness of this approach in reducing poverty in the Paraguayan context, where the government is in charge of its implementation. For this evaluation, an instrumental-variable impact evaluation and a results evaluation were conducted, showing significant positive changes in the treated households' productive capacity and savings behavior as well in their perception of wellbeing. These results are useful for the design of a program that can help to effectively overcome extreme poverty in this and other developing countries. This exercise is part of the set of evaluations carried out by the Platform for Evaluation and Learning of the Graduation Program in Latin America (www.plataformagraduacionla.info).

Keywords: integral approaches, extreme-poverty, Latin America, income, assets, psychosocial variables.

JEL codes: C32, C36, D04, H53, I32, I38.

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El enfoque de graduación para la reducción de la pobreza extrema: evaluación del impacto del programa *Sembrando Oportunidades Familia por Familia* en Paraguay

Jorge H. Maldonado, Viviana León-Jurado, John Gómez, Daniel Rodríguez, Laura Isabel Villa

Resumen: La pobreza rural, un problema persistente para el gobierno paraguayo en la última década –así como para varios países en la región-, llevo a la implementación, en los años 2016 y 2017 del programa piloto "Sembrando Oportunidades Familia por Familia", una iniciativa basada en el enfoque de graduación para la reducción de la pobreza extrema en áreas rurales. Evaluar los resultados de esta intervención es esencial para entender la efectividad de este enfoque en la reducción de la pobreza en el entorno paraguayo, en el cual el gobierno está a cargo de la implementación del programa. Con esto en mente, se realizaron una evaluación de impacto, basada en la metodología de variables instrumentales, y una evaluación de resultados. Estas evaluaciones muestran un efecto positivo tanto en la capacidad productiva como en el ahorro de los hogares tratados, así como en su percepción de bienestar. Estos resultados son útiles para el diseño de futuros programas que puedan ayudar a superar de manera efectiva la pobreza extrema tanto en Paraguay como en otros países en vías de desarrollo. Este ejercicio es parte de las evaluaciones desarrolladas por la Plataforma para la Evaluación y el Aprendizaje de los Programas de Graduación en América Latina (www.plataformagraduacionla.info).

Palabras Clave: Enfoques integrales, pobreza extrema, América Latina, Ingreso, Activos, Variables Psicosociales.

Códigos JEL: C32, C36, D04, H53, I32, I38

1. Introduction

According to the most recent data from the World Bank, 10% of the world´s population still lived in extreme poverty in 2015, most of whom lived in rural areas. For this reason, finding strategies to decrease rural poverty has become a priority for many countries. The graduation approach has emerged as a result of experiences from BRAC (Building Resources Across Communities), Ford Foundation and the Consultative Group to Assist the Poor (CGAP) in their efforts to reduce poverty, and has proven to be an effective alternative to combat this phenomenon. Specifically, the graduation approach program is an integrated intervention that focuses on five elements: asset transfer, consumption support, savings, technical training, and life skills development. This approach has been assessed in Asian, African, and Latin American countries, and has shown positive and long-lasting impacts. For instance, Banerjee et al. (2015) evaluated this program in six countries (Ethiopia, Ghana, Honduras, India, Pakistan, and Peru), using randomized control trials (RCT), and found sustainable improvements in living conditions one year after the implementation of the program. Its effects have also been identified in participants' working decisions, their expenditure, and overall income of their households (Banerjee et al. 2011; Bandiera et al. 2012).

The Platform for Evaluation and Learning of the Graduation Program in Latin America is an initiative developed by the Department of Economics at Universidad de Los Andes (UNIANDES), through the "*Centro de Estudios Sobre Desarrollo Económico*" (CEDE) to assess these types of programs in the region. The Platform is jointly funded by the Ford Foundation, the International Development Research Centre of Canada (IDRC), and *Fundación Capital* (FK) and its purpose is to evaluate the impact of the current wave of graduation programs in the region. Nowadays, such programs are being or have been implemented by the governments of Colombia, Mexico, Paraguay, and Honduras. The inclusion of these programs by governments in their public policy is an important difference with respect to the first generation of graduation programs, and it is one of the main aspects the platform seeks to evaluate.

In particular, the incidence of extreme poverty in urban areas in Paraguay was 1.64% in 2016, a figure far lower than that attained in rural areas (11.2%) (Dirección General de Estadística, Encuestas y Censos, 2018). To address this situation, the Paraguayan government developed the "*Reducción de Pobreza Extrema - Inclusión Productiva y Social*" project, the main strategy of which was the "*Sembrando Oportunidades Familia por Familia* (SOF)" pilot program, designed

following the graduation approach. By virtue of the collaboration agreement between the "*Secretaría Técnica de Planificación del Desarrollo Económico y Social de la República del Paraguay* (STP)," FK and UNIANDES, the CEDE assessed the SOF pilot program implemented by the STP and FK between 2016 and 2017.

The SOF evaluation is divided into two parts: The first, denominated Process Evaluation, analyses to what extent the SOF processes design followed the initial design and how it contributed to the performance of the implementation. This evaluation permits the identification of improvement opportunities, good practices, and bottlenecks in the implementation of the program. The second part is aimed at identifying the program impacts on the targeted households. This evaluation is made using an Impact Evaluation through the instrumental variable (IV) methodology. A results evaluation (non-experimental evaluation) was also implemented. The main results show positive impacts on the households' conditions (income increases and poverty reduction) through changes in productive assets, savings, and perceptions of wellbeing.

The purpose of this document is to present the main results of the impact evaluation (IE) and results evaluation (RE), and to discuss these results within the framework of the graduation approach.

These results are based on a household survey that was administered before (May-June 2016) and after (November 2017) SOF implementation. Assessing this intervention is key to provide information to policymakers about their achievements and performance, and an opportunity to evaluate the upscale potential of the graduation approach. This document is one of the few impact evaluations of an adaptation of the graduation approach to a program run by the government, and the first one in the Latin America region.

Given that the graduation approach is an integrated intervention, to capture the changes provoked by the program, the evaluation considered the measurement of different dimensions: per-capita and independent work income, savings, expenditure, food security, productive assets, subjective welfare, and daily hours dedicated to work.

In general, the majority of the outcomes indicated improvements in the living conditions of treated households. For example, the Progress out of Poverty Probability Index (PPI)[6]

[6] https://www.povertyindex.org/

decreased, indicating that many households overcame extreme poverty. The per capita household and labor income from independent work were greater for treated households, and these results were followed by positive impacts on informal savings (especially cash savings), productive assets, and the daily hours dedicated to work. At the same time, the wellbeing perception rose.

The document is organized as follows: Section 2 describes the SOF pilot program components, Section 3 explains the survey designed to collect data and the methodology used, Section 4 presents the results, and Section 5 discusses these results.

2. The SOF program

The SOF program was a government adaptation of the graduation approach, a program designed to combat extreme poverty, mainly in rural areas. Specifically, SOF was a strategy within the national program for the reduction of extreme poverty (Programa Nacional de Reducción de Pobreza Extrema Sembrando Oportunidades) implemented by the STP, with the support of Fundación Capital (FK) and funded by the Spanish Cooperation Agency (Agencia Española para la Cooperación Internacional y el Desarrollo, AECID). Implementation took place between the end of 2015 and May of 2017. Once the pilot was consolidated, the government would seek to upscale the intervention.

During the last decade, poverty levels in Paraguay have steadily decreased, presenting a reduction of 22.5 percentage points between 2006 and 2017. However, the reduction of extreme poverty was significantly less, with around 11 percentage points reduction during the same period. A closer analysis of this situation shows that extreme poverty is mainly concentrated in rural areas, where 8.97% of the population suffers from extreme poverty, while in urban areas, this value is 1.55% (See Figure 1).

The SOF was developed in accordance with Ordinance No. 291 of 2013 in order to "[increase] the income of and access to social services of vulnerable households" (STP, s.f.). To fulfill this purpose, the SOF pilot program delivered a seed capital equivalent to approximately USD500 (€430) per household to be used for the development of productive activities. The pilot was implemented in the Choré, Capiibary, and Carayaó municipalities (Figure 2), where it intervened 809 households living in conditions of extreme poverty.

Figure 1. Evolution of poverty in Paraguay

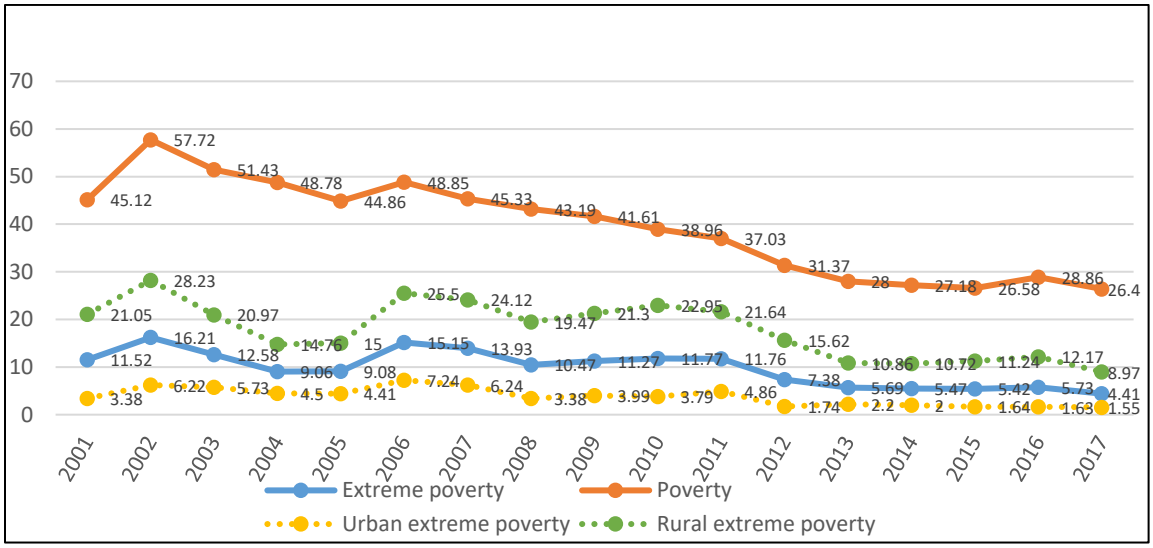
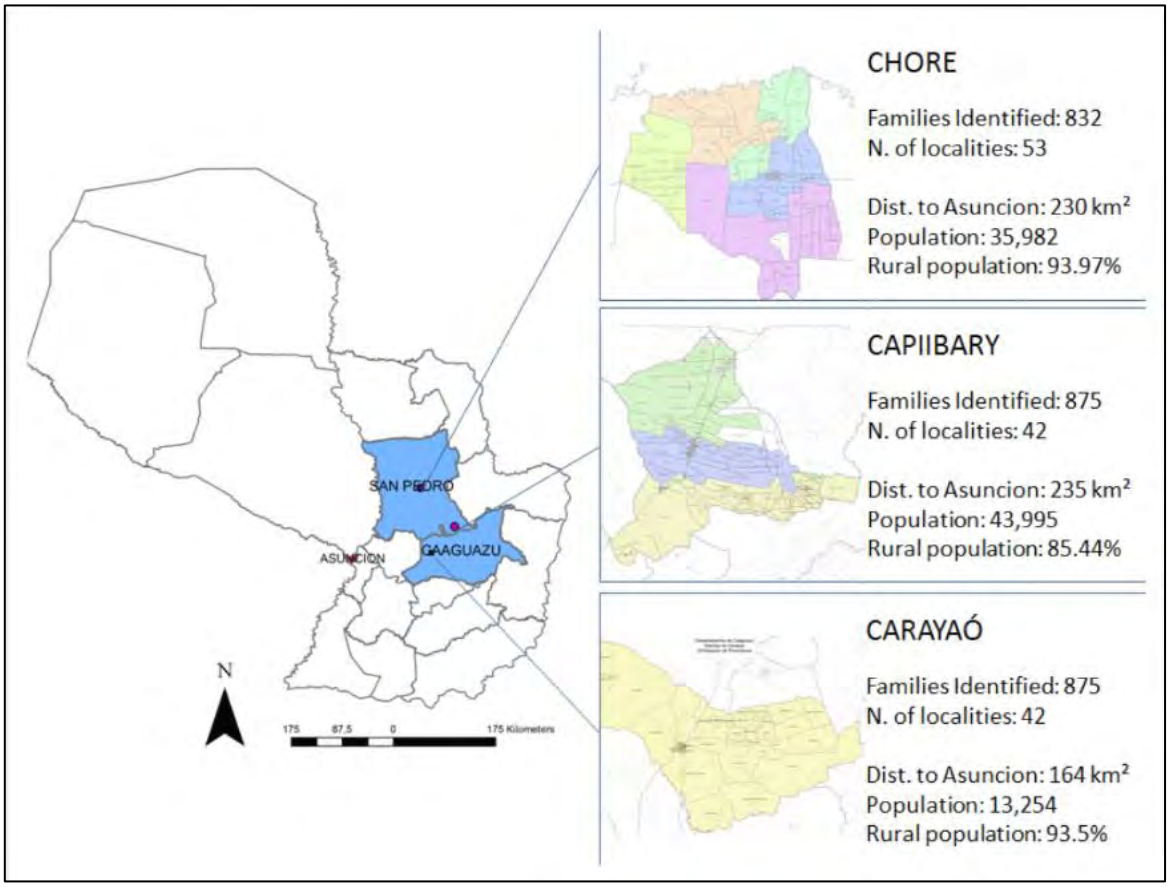


Figure 2. Geographical localization of SOF pilot



According to the Operative Manual, and based on the graduation approach, the SOF pilot was integrated by seven components:

- **Consumption support:** Following the graduation approach, SOF stated that an effective strategy against poverty must enable the participant to reduce the stress derived from searching for a minimum subsistence income. The program attempted to incorporate this component by working together with the Ministry of Agriculture (Ministerio de Agricultura y Ganadería, MAG) to enroll the families in the conditional cash transfer program (Tekoporá) and the food security program (Seguridad Alimentaria), according to their needs.
- **Savings:** Saving money allows the families to smooth their consumption across time as they engage in activities in which their income is periodical, and to avoid cutbacks on their consumption or to have to sell their productive capital. It was noted that, before the program, the level of economic vulnerability did not allow the SOF population to make decisions about their savings. This situation led the program to try and give those families the necessary knowledge and tools to promote their saving behavior by providing financial education and promoting access to financial services such as savings groups, savings accounts (in case they did not have one already), mobile banking, and others.
- **Life and technical skills building:** This component refers to a broader approach to the construction and strengthening of human capital for the people participating in the graduation programs, and especially in SOF. The program considers a vast array of topics, including technical workshops (such as workshops about basic business abilities and financial services), and personal development workshops (self-confidence, self-worth, empowerment communication skills, and teamwork). The objective of these workshops in the context of the program was to create a life plan and a business plan in which the participants could identify their strengths and goals and create a business strategy. One of FK's adaptations for the Latin-American context was the implementation of digital technologies. In Paraguay, the workshops were accompanied by electronic tablets with a specially designed app to be used in the country´s context, with the information delivered in the Guarani language (their native tongue).
- **Asset transfer:** The money transfer, which in the Paraguayan context amounted to nearly 500 USD (1,141.70 USD-PPA) or 2'913,143 Guaranies, seeks to help finance the business plan developed by the participant during the program. This money is transferred once through the national bank (Banco Nacional de Fomento, BNF) and its

expenditure is monitored by the program to ensure the family´s commitment to invest it in its proposed activity.

- **Periodical checkups:** Just as in other graduation programs, each of the SOF households was accompanied by a coach (promotor) with whom they would perform the different activities contemplated in the program. The coach would perform periodical checkups with the families "to advise them in the management of their business and give them support, companionship, and motivation" (STP, MTESS & FK, 2016).
- **Community building fairs:** This component was aimed at promoting the development and construction of social capital amongst the participants of the graduation programs. This corresponds to one of the original components implemented by BRAC in such interventions (BRAC, 2015) and it was present in some of the pilots led by the CGAP (Hashemi & Montesquieu, 2011). In this case, the plan was to organize community fairs in which the participants could share ideas about their productive projects, sell their products, and take part in cultural events. All of these elements were supported by the National Culture Bureau (Secretaría Nacional de Cultura). In the end, only one of these activities was developed.
- **Interinstitutional networks and strategic alliances:** This component is one of the Paraguayan government's adaptations to the graduation model and is aimed at building alliances with different institutions, including other public entities, universities, businesses and guilds, and financial entities. Ideally, the development of effective alliances would magnify and maintain the results of program interventions.

The SOF pilot program was one of the strategies undertaken by the STP in the context of the "Sembrando Oportunidades" program. The goal of this pilot was to enable the national government to aid the population living in extreme poverty in a continuous, all-encompassing, opportune, and efficient manner. The first effort to scale up this program to 10,000 families living in extreme poverty was made at the end of 2016 (FK, 2016) in a joint effort with the MAG.

3. Methodology

To properly evaluate the impact of this program, a first methodology was proposed based on a randomized control trial (RCT) designed at the beginning of the program. The initial proposal design was based on clusters randomization. From 123 municipalities identified by the program implementation team, 72 were selected for treatment. In total, the program was supposed to treat 1084 households across all the treated municipalities. The 51 remaining municipalities were assigned to the control group with 942 households. The methodology was selected according to 1) its political approval, 2) its feasibility, and 3) to provide a robust design to account for spillover effects.

However, the RCT methodology was not implemented in the end, due to theoretical and practical issues. Initially, the randomization was designed to generate the exogenous treatment needed to eliminate auto-selection bias; but several situations, such as cancellation of the experimental design at the beginning of program implementation, caused partial randomization. As an additional issue, the logistics of program implementation created three additional types of target households: The first group included new households that were treated to complete the program quota regardless of the control or treatment municipality assignation. This group finished the intervention with other households in the pilot program. The second group targeted households from the same zone as the pilot program during the second semester of 2016, but these households received a shorter treatment than the original households. This second group later came to be known as the "Extended Pilot (EP)" group. The last group received an upscale proposal program developed by the MAG and the "Proyecto de Desarrollo Rural Sostenible (PRODERS)"; for this reason, it was denominated "PRODERS" group. The second and third groups were comprised mostly of households living in the control-group municipalities, and some of the households (though not all) were part of the original control group for the RCT. Given the impossibility of performing the originally-planned RCT, the evaluation of the SOF program was implemented through an Instrumental Variable impact evaluation (IV) method that required a comparison between people who received the pilot (treated) and people that did not receive it but were eligible for the program (controls). The main problem with the impact evaluation for this program is that the assignation of treatments was not exogenous to beneficiaries' decisions. This problem can be solved with an endogeneity correction method, such as the IV approach. Specifically, the effects can be estimated with a simple comparison

between the treated and control group, if a variable that can explain program participation can be found. An instrumental variable (Z) must have two characteristics to be a good instrument: (1) to be relevant and (2) to be exogenous. Condition (1) means that the instrument must be correlated with program participation (D), in other words, it must explain the program participation probability; and condition (2) indicates that it must not be correlated or explain unobserved characteristics or outcomes from the program (Bernal & Peña, 2012; Gertler et al., 2011):

$$Cov\ (D, Z) \neq 0 \quad \rightarrow Relevant \tag{1}$$

$$Cov\ (Z, Y\ \perp D) = 0 \quad \rightarrow Exogenous \tag{2}$$

In this case, the original "randomization variable" was proposed as the instrument. This variable assigned the treatment group for the initial RCT design; however, given all the complications in the implementation, this selection was not completely followed. This means that, although correlated with the effective treatment of the households, the randomization variable does not explain it completely. Given that the randomization is, by design, not correlated with the household´s characteristics; and it is correlated with the treatment, the randomization variable meets the criteria for a good instrument. A similar approach is used in Glennerster et al. (2013) to analyze an RCT design with failures in randomization.

The limitation with this approach is that the estimated effects will be more restricted than those of an RCT implementation since the estimates will represent a local average treatment effect (LATE). Therefore, the impacts will correspond only to the households that were treated because of their initial assignment to the treatment group. Still, this is a good approach to estimate a causal effect. According to Angrist & Pischke (2008), in the situations where the randomization was not complete (partial compliance) the LATE theorem emerges, which confirms the IV approach as an alternative that can be applied. The greatest advantage of the IV approach is that we can use all the information available from the RCT to estimate the impact of the program. This advantage, among others, makes the IV approach the best option for this evaluation.

The implemented approach in Paraguay partially fulfills the required assumptions for the estimation through IV, without affecting assessment validity. Four assumptions can be validated: 1) relevance, 2) exclusion, 3) independence, and 4) monotonicity. The first one is the assumption

of the correlation between the instrumental variable and the probability of being targeted. According to program implementation data, a household that was assigned to the treated group has a 70% probability of being a program participant, for the control group, this probability is 40%. The monotonicity assumption demands that invited households must have a greater probability to participate in the program than those that were not invited (compliers). In the SOF case, where the households are invited to participate in an intervention of social protection that includes a cash transfer, it is difficult to think of households that are unwilling to accept. Almost none of the households that were offered the intervention rejected it, and the households that did not continue with the program only withdrew because they stopped complying with the program requirements.

The more complex assumptions are independence and exclusion. The former specifies that assignment treatment (treated or control) must be exogenous. If all the households complied with the randomly assigned treatment, this assumption could be accepted. However, this did not happen because some of the households originally assigned to the control group ended up receiving some kind of treatment. To accept the independence assumption, we must assume that the households which received the treatment, and were not originally assigned to it, are not structurally different from the original households. Arguably, if the assignment of the new treated households was conducted randomly, the randomness of the allocation can ensure the independence assumption.

The exclusion assumption requires the effect to be homogenous between beneficiaries, regardless of their original allocation to the control or treatment group. This assumption creates a problem in this particular situation because, as mentioned earlier, there are three different types of treatment in the program. However, if some households were to be taken out of the sample for the evaluation, there would be a risk of incurring in a selection bias which would affect the validity of the evaluation. With this in mind, the whole sample was used in the evaluation. It is pertinent to point out that, given the less intensive nature of the extended pilot and the PRODERS treatment, the effect captured this way could be somewhat underestimated for some of the outcome variables.

With the objective of generating a discussion about the results, this document presents two exercises: 1) Impact evaluation by IV, and 2) a results evaluation (RE).

The first case was evaluated with a two stages model for every outcome variable (Y). In the first stage, the probability of receiving SOF given the randomization is estimated following the model described below.

$$TREATED_i = \gamma_0 + \gamma_1 * RANDOMIZATION_i + u \qquad (1)$$

In the second stage, the model of interest is estimated, for every outcome, using the probability estimation of receiving the program calculated in the first stage to solve the endogeneity problem.

$$Y_i = \beta_0 + \beta_1 * \widehat{TREATED}_i + \boldsymbol{\lambda} * \boldsymbol{X_i} + e,$$

Where $\boldsymbol{X}$ is a vector of controls associated with the outcome Y, and $\boldsymbol{\lambda}$ is the vector of coefficients associated with the controls. We estimated all the regressions with fixed effects of the district (the stratification variable), and robust errors by municipality.

To complement this evaluation exercise, an RE is proposed, taking advantage of the information from the baseline for the treated households. The results, in this case, are non-experimental and therefore cannot be attributed exclusively to the intervention. This approach captures the time changes in treated households, without the certainty that change is an exclusive program effect (it is not possible to isolate the pilot effect). In the RE estimation, we compare the outcomes Y between baseline and endline, and we use fixed effects and robust errors in the model.

$$Y_{it} = \beta_0 + \beta_1 * D_{t=2} + v_{it}$$

The outcome variables were defined following the expected results of the graduation approach (see Table 1). The selection criteria emphasized previous works on graduation program evaluation, and it was based on the theory of change developed by different authors such as León-Jurado and Maldonado (2018), Montesquieu et al., (2014), and others, for this type of interventions.

Table 1. Outcome variables for the SOF evaluation

Dimension	Outcome variable	Description
Income	Monthly and daily per capita income	The monetary value reported by the household, divided by the number of household members
Consumption	Monthly and daily per capita expenditures	Quantities and values for different types of expenditure on goods and services reported by the households divided by the number of members
Food security	Food security	Food Security Score by the ELCSA index for last 30 days
Assets	Household asset monetary value	Household asset monetary value reported by the household head
Savings	Adoption of savings practices in the household. Household informal savings monetary value	Household saving in kind or cash (formal and informal). Household savings monetary value. The value reported by the household head (cash or in kind) for different savings types.
Productive activity	Work hours	Average work hours per participant per week.
Expectations and aspirations	Wellbeing expectations	Measurement of the current participant's wellbeing and the expected wellbeing in 2 and five years. The gap between expected and current wellbeing.
	Wellbeing aspirations	Measurement of the current participant's desired wellbeing in 2 and five years. The gap between wellbeing aspirations and current

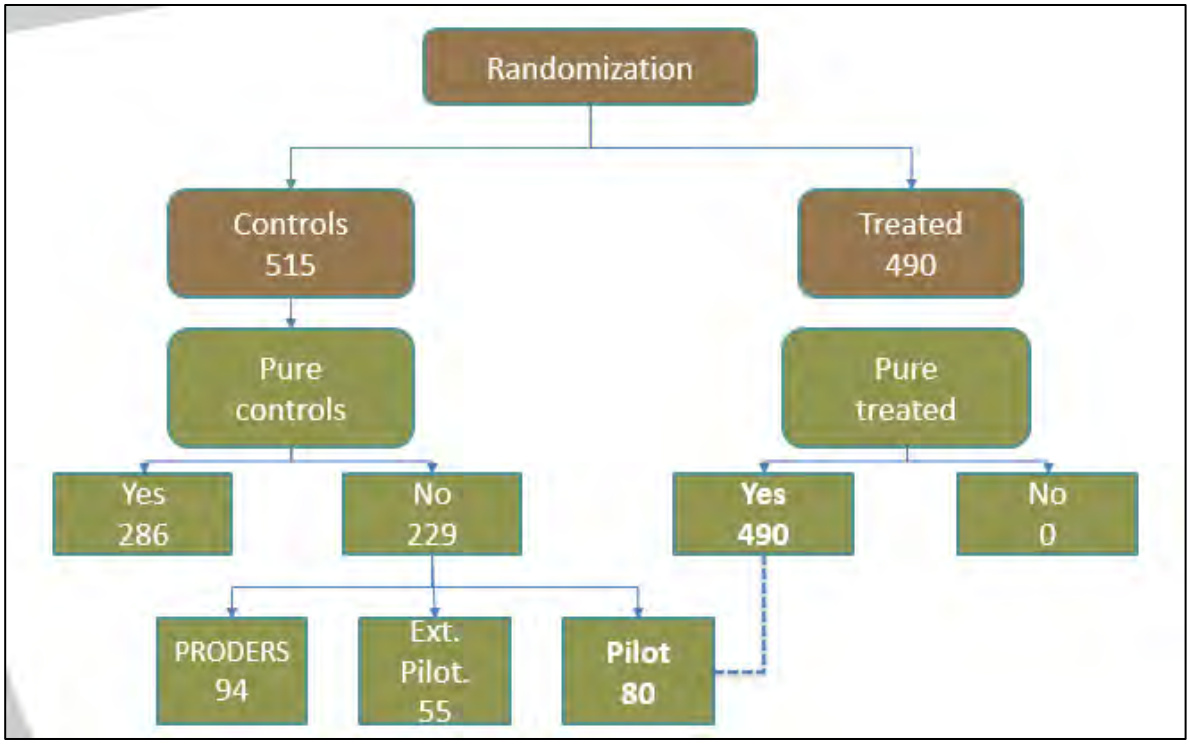
3.1 Survey design

To implement the evaluation exercises, we used the information gathered in the baseline and end line surveys. Five hundred and two SOF beneficiary treated households were surveyed in the baseline. The endline was applied in October of 2017 to 1,005 households, which were assigned to the control and treated groups with the original randomization design. The survey collected quantitative information about the socioeconomic dimensions the program is expected to affect (e.g., income, food security, household conditions, education, workforce, productive

assets, aspirations and expectations, and others), and provided the information needed to implement the evaluations.

The sample composition is shown in Figure 3. There are two basic groups: the sample according to randomization allocation (treated and control), and according to the reception of SOF. In total, 570 households were recipients of the SOF program, with 490 households belonging to the original treatment group and 80 to the original control group. There were also 94 households that received treatment from the PRODERS program and 55 from the extended pilot, which originally were assigned to the control group. This means that, by the end of the implementation, only 286 households from the sample did not receive any treatment.

Figure 3: Comparison groups according to the End Line



With the information from the base and end lines, it is possible to create six different groups for the comparison, shown in Table 2. Group A consists of the households that were intended to be treated from the beginning of the program. Groups B and C correspond to the households in the end line that received the totality of the SOF program. Groups D and E are the households that were treated by the extended pilot and PRODERS, respectively. Finally, the F group contains the households that did not receive any treatment.

For the impact evaluation (IV), groups B, C, D, and E are compared with group F; this exercise uses all the information available in the sample. On the other hand, the evaluation of the results (RE) compares groups A and B; specifically, the RE compares the 427 households that appear in both the base and the end line surveys.

Table 2: Comparison groups for the evaluation exercises

Group	Baseline	End line
Pure treatment	A:502	B:490
		C:80
Households with some intervention	-	D:55 (Extended Pilot)
		E:94 (PRODERS)
Pure Controls	-	F:286
Total	**502**	**1005**

The end line survey collected information about both the household and its members from the head of the household (HH) or his or her partner, both for the households that received treatment and those that did not. The same survey is administered to all households. Annex 1 details the structure of the survey and the informant.

3.2 Data

Having defined the information collected by the survey and the definition of the groups for the evaluation, the next step is to test the comparability of the different groups. To do this, mean tests are conducted for the socioeconomic variables that are not supposed to be affected by the program. Table 3 shows the results of this comparison for the impact evaluation group. The exercise shows that the households are similar when it comes to socioeconomic characteristics, with no statistically significant differences between the control and treated groups, except for the proportion of male participants and household heads in the household, which are higher in the control group than in the treated groups. However, this difference can be accounted for in the evaluation.

These tests also help to characterize the households in this study; in general, the households treated by the program consist of little more than six members, with 2 or 3 members of the household providing for the rest. These households also have low levels of education, with an average of 5 years of education for each member of the household, and slightly less (4.9)

for the head of the household. Moreover, the poverty levels in these households are staggeringly high, with 80% living under extreme poverty conditions, and an additional 18% living under poverty conditions. This characterization also serves as an indicator of the effectiveness of the program's household selection process, as it is designed specifically to help poor rural households overcome their conditions.

Table 3: Socioeconomic differences between control and treatment groups

	IV (B, C, D, E vs. F)		
	Controls	**Treated**	**Difference**
Average age of the household members	22.31 [7.450]	22.30 [7.158]	-0.01 [0.526]
SOF participant age	41.35 [10.34]	41.71 [10.69]	0.36 [0.766]
Age of the HH	44.77 [11.28]	45.24 [12.16]	0.47 [0.816]
Proportion of male HH	0.654 [0.477]	0.547 [0.498]	-0.107*** [0.036]
Proportion of male participants	0.217 [0.413]	0.100 [0.300]	-0.117*** [0.025]
Household size	6.038 [1.834]	6.195 [1.931]	0.156 [0.138]
Total men in the household	3.136 [1.376]	3.107 [1.493]	-0.029 [0.105]
Total women in the household	2.899 [1.364]	3.088 [1.450]	0.189* [0.103]
Average years of education of the HH	5.021 [2.604]	4.932 [2.636]	-0.089 [0.190]
Participants' average years of education	4.930 [2.480]	4.839 [2.724]	-0.091 [0.192]
Number of working household members	2.465 [1.386]	2.467 [1.413]	0.002 [0.102]
Number of unemployed household members	0 [0]	0.00702 [0.0835]	0.00702 [0.005]
Proportion of poor households	0.179 [0.384]	0.184 [0.388]	0.005 [0.028]
Proportion of households in extreme poverty	0.807 [0.395]	0.801 [0.399]	-0.006 [0.029]
Observations	**1,005**		

Mean coefficients; standard deviations in brackets
***p<0.01, ** p<0.05 * p<0.1

4. Results

According to recent literature, there are two types of causes of poverty: external and internal constraints. The former refers to traditional constraints such as market failures, liquidity and credit constraints, and lack of education. The latter include the behavioral bias, lack of aspirations, and absence of agency that can be decisive in the individual capacity to overcome poverty (Dalton et al., 2015; Lybbert & Wydick, 2015). The SOF program may have the capacity to alleviate these constraints by increasing households' savings, improving their management skills, alleviating liquidity constraints, raising self-esteem and self-confidence, and changing the mentality of the households.

To better understand and discuss the specific effects of the program, the following subsections detail the impact and result evaluations for the program´s effect on the households' poverty level, assets, income, working hours, savings, expenditure, food security, wellbeing perception, and empowerment.

4.1 Poverty

One of the main goals of the graduation programs, in general, is to set the different households in a path to overcome poverty by their own means. This goal was explored in-depth by Banerjee et al. (2016) in their evaluation of a graduation program. The evaluation found that seven years after program implementation, the assets, consumption, work hours, and other variables improved, suggesting that the program can guide the households on a path towards overcoming their poverty conditions.

In the SOF case, poverty was measured using two methodologies: the first measurement was the national poverty line, which amounted to 185.61 USD ppp (G 473,601) per month and 91.94 USD ppp (G 234,592) per month for extreme poverty. The second one is the Probability Poverty Index, PPI, which captures the probability of falling into conditions of extreme poverty. According to the measurement relating to the poverty line, 55 households out of 354 (15.5%) improved their condition, migrating out of extreme poverty and (mainly) into poverty. According to PPI measurement, 99 out of 146 households (68%) migrated out of extreme poverty, also mainly into poverty, and 58 out of 190 (31%) migrated from the poor to the non-poor category (Table 4).

Table 4. Proportion of poor and extremely poor households in the sample

A. Households living under the poverty line				
		End line		
Baseline		Extreme poverty	Poverty	Non-poor
Extreme poverty	354	299	**52**	**3**
Poverty	53	31	21	**1**
Non-poor	4	2	2	0
B. Poverty by PPI				
		End Line		
Baseline		Extreme poverty	Poverty	Non-Poor
Extreme poverty	146	47	**77**	**22**
Poverty	190	23	109	**58**
Non-poor	82	3	22	57

However, when measuring poverty using the national poverty line, the IV evaluation does show a significant reduction of 9 percentage points on the proportion of households living under the poverty line (see Table 5). This result is somewhat challenged by the results evaluation, which shows an increase of 5.4% in the households' living in poverty, which is explained by a decrease of the same magnitude in the proportion of households living in extreme poverty. This change suggests that, rather than non-poor households falling into poverty, the households were rising out extreme poverty and into poverty, although this change cannot be exclusively attributed to the program. These results suggest that, although the treated households did improve their poverty situation, they improved it only marginally significantly more than the control households.

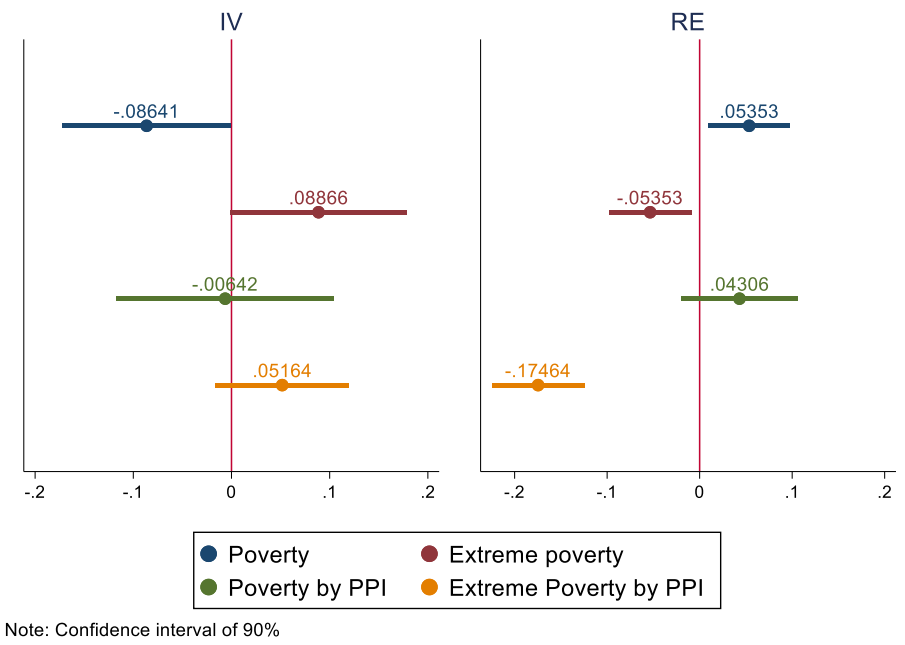
Table 5: Effects of SOF on poverty, according to IV and RE

Variables	IV		RE	
	Effect	Effect SD of CG	Change	Change SD of BL
Poverty measured by the poverty line	-0,09*	-0,22*	0,05**	0,16**
	(0,05)		(0,02)	
Extreme poverty measured by poverty line	0,09	0,22	-0,05**	-0,16**
	(0,05)		(0,02)	
Poverty by PPI	0,04	0,19	0,04	-0,08
	(0,03)		(0,03)	
Extreme poverty by PPI	0,04	0,20	-0,175***	-0,36***
	(0,02)		(0,02)	
Poverty measured by MPI	0,04	0,21	0,20***	0,47***
	(0,03)		(0,02)	
Observations	1005		854	

Standard errors in brackets, ***p<0.01, ** p<0.05 * p<0.1

When poverty is measured by using the PPI index, the impact evaluation does not show an effect of the program on the probability of falling under poverty conditions (see Figure 4). However, the results evaluation shows a 17.5 percentage points (p.p.) decrease in the extreme poverty conditions, as measured by the PPI, which suggest an overall improvement in the living conditions for the population in the sample.

Figure 4: Impact of SOF on poverty, according to IV and RE



Note: Confidence interval of 90%

4.2 Assets

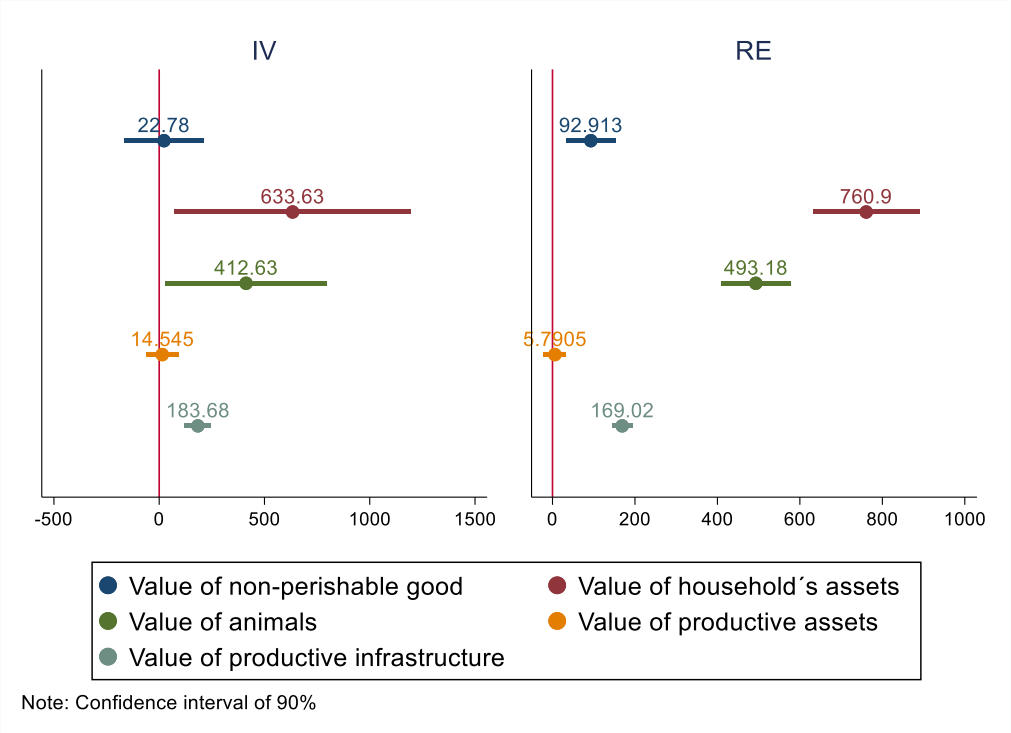
One of the other areas affected by the program is the households' value of assets. Table 6 shows the results of the different evaluations regarding this dimension: the most important result is a marginally significant increase in the households' total value of assets, which amounts to 633.6 USD-PPP according to the IV evaluation. When we decompose the different types of assets that drive this increase, we find that most of it come from the acquisition of animals, followed by the construction of productive infrastructure, and the effect is significant in both evaluations. These results are to be expected given the nature of the program, as treatment in any scenario requires the households to spend the cash transfer on the purchase of productive assets. Also, since the cash transfer has to be spent on productive assets, it is not surprising to see that the effects found for both evaluations are very similar both in magnitude and significance (see Figure 5).

Table 6: SOF effects on households' assets, according to IV and RE

Variables	IV		RE	
	Effect	Effect SD of CG	Change	Change SD of BL
Total value of the households' assets (USD ppp)	633,63*	0,31*	760.33***	0.42***
	(342,10)		(78.76)	
Total value of households' non-perishable goods (USD ppp)	22,78	0,03	92.91**	0.14**
	(114,18)		(36.65)	
Total value of animals in the households (USD ppp)	412,63*	0,28*	493.20***	0.40***
	(232,43)		(51.35)	
Total value of the households' productive assets (USD ppp)	14,55	0,05	5.79	0.02
	(47,06)		(16.47)	
Total value of productive infrastructure (USD ppp)	183,68**	1,38***	169.00***	1.10***
	(37,89)		(15.04)	
Observations	**1005**		**854**	

Standard errors in brackets, ***p<0.01, ** p<0.05 * p<0.1

Figure 5: Effects of SOF on the households' assets (USD ppp), according to IV and RE



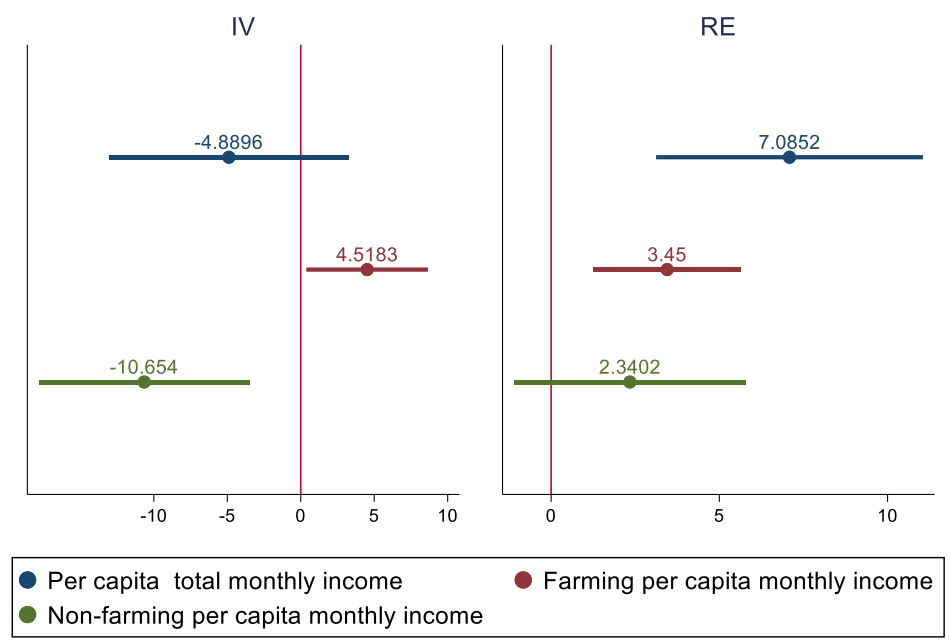
These results advocate for the effectiveness of the program since the goal of the monetary transfer was mainly to purchase animals and build the infrastructure necessary to raise them, so that the animals could become a stable source of income for the households. The

results are also consistent with the body of literature on the topic, which finds statistically significant increases in the total value of the assets in the short and medium terms.

4.3 Income

Given the increase in the households' productive assets, it stands to reason that the program should correlate with an increase in the income that comes from the productive activity that uses those assets. Figure 6 shows the effects of the program on the household income for the IV and RE methodologies. Both evaluations show an increase in the farming income of the household of 3.4 and 4.5 USD ppp per month, respectively. On the other hand, there is a reduction in the non-farming income in both cases, although this decrease does not translate into a statistically significant decrease in the households' total income. It is worth noting that the total income of the household is comprised of more than just farming and non-farming income.

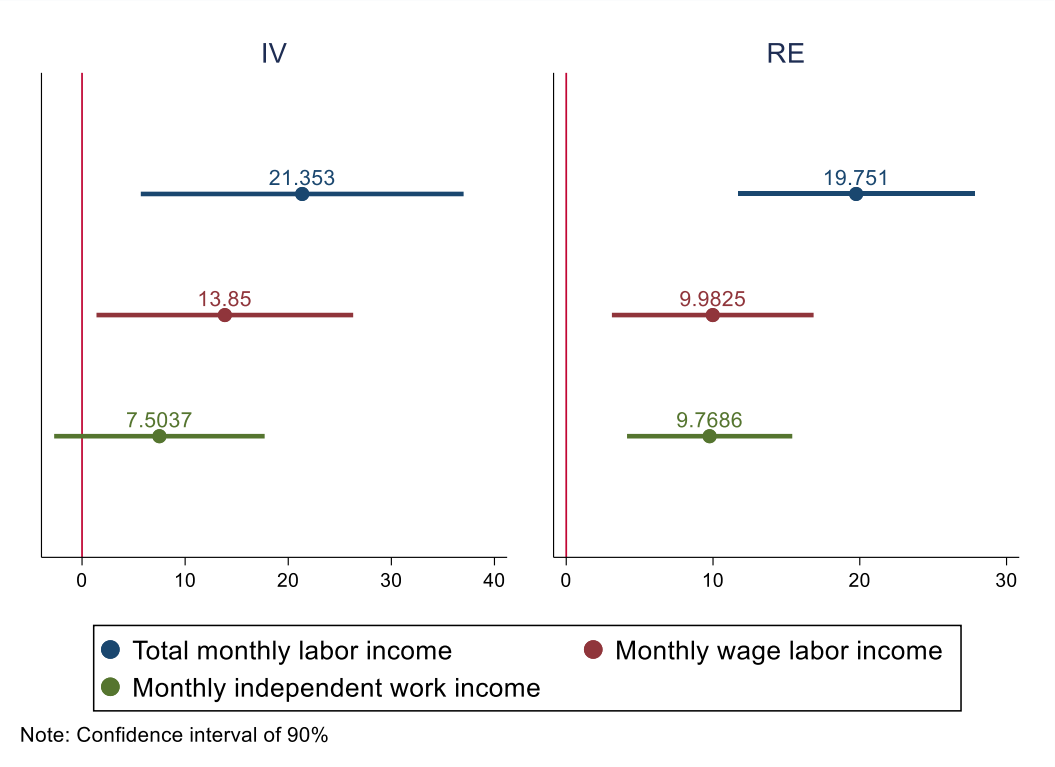
Figure 6: SOF effects on income (USD ppp), according to IV and RE



Note: Confidence interval of 90%

Given this increase in the households' income, it is pertinent to analyze the self-reported impact of the program on the participant, who is the direct recipient of the intervention. Figure 7 shows that the program had a significant effect of 21.35 USD ppp per month on the income of the participants both for the IV exercise, which translates to a statistically significant 0.71 USD ppp increase in their daily income.

Figure 7: SOF effects on participant income (USD ppp), according to IV and RE



The fact that there was no statistically significant effect on the total income of the household, according to the impact evaluation, does not mean that the households in questions did not increase their income. The ER in Table 7 shows that the households' per capita income increased by a statistically significant 7.09 USD ppp per month. This increase, combined with the lack of impact captured by the IV evaluations, suggests a general improvement in the income of both the treated and control households.

Another important aspect to recognize is a significant shift in the composition of income in the household, where the relative importance of non-agricultural jobs decreases as the income from agricultural activities is positively affected by the program, which could indicate that the households are becoming more self-reliant and economically independent as a result of the program increasing their production possibilities.

Table 7: SOF effects on income (all values in USD ppp), according to IV and RE

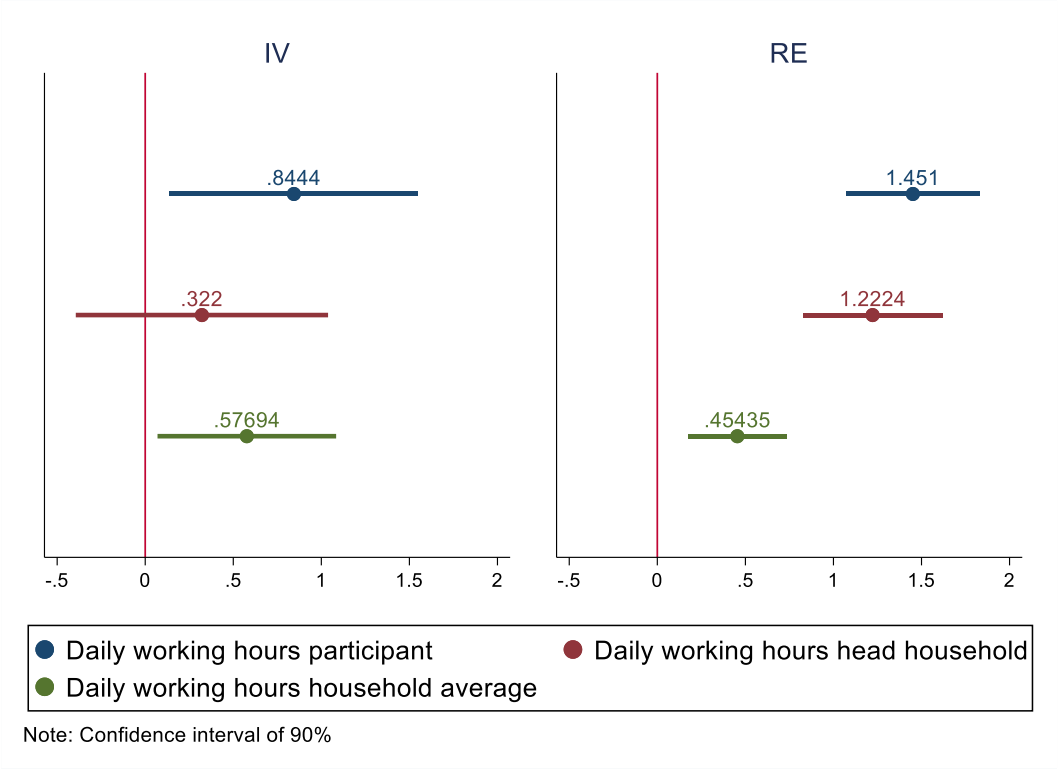
Variables	IV Effect	IV SD of CG	ER Effects	ER SD of BL
Households' per capita total monthly income	-4,89	-0,12	7.09***	0.17***
	(4,96)		(2.41)	
Non-farming per capita monthly income	-10,65**	-0,31**	2.34	0.06
	(4,35)		(2.08)	
Farming related per capita monthly income	4,52*	0,24*	3.45***	0.15***
	(2,52)		(1.33)	
Social aid related monthly per capita income	4,28**	0,30**	1.99***	0.15***
	(1,82)		(0.69)	
Participants' total monthly labor income	21,35**	0,23**	19.75***	0.27***
	(9,52)		(4.90)	
Participants' monthly labor income from paid work	13,85*	0,21*	9.98**	0.19**
	(7,57)		(4.17)	
Participants' monthly income from independent work	7,50	0,11	9.77***	0.18***
	(6,20)		(3.42)	
Observations	**1005**		**854**	

Standard errors in brackets, ***p<0.01, ** p<0.05 * p<0.1

4.4 Working hours

One of the main effects of graduation programs is the increase in working hours for the participants, which is strongly associated with their increased income (Benerjee et al. 2011; 2015, Bandiera et al. 2012). When it comes to the SOF pilot, the IV evaluation finds that program participants increased their daily working time by 0.84 hours, which is equal to an increase of 27% in their daily working time. Similarly, the RE finds that the beneficiaries increased their daily working time by 1.4 hours, which amounts to an 84% increase in the total working time when compared with the baseline.

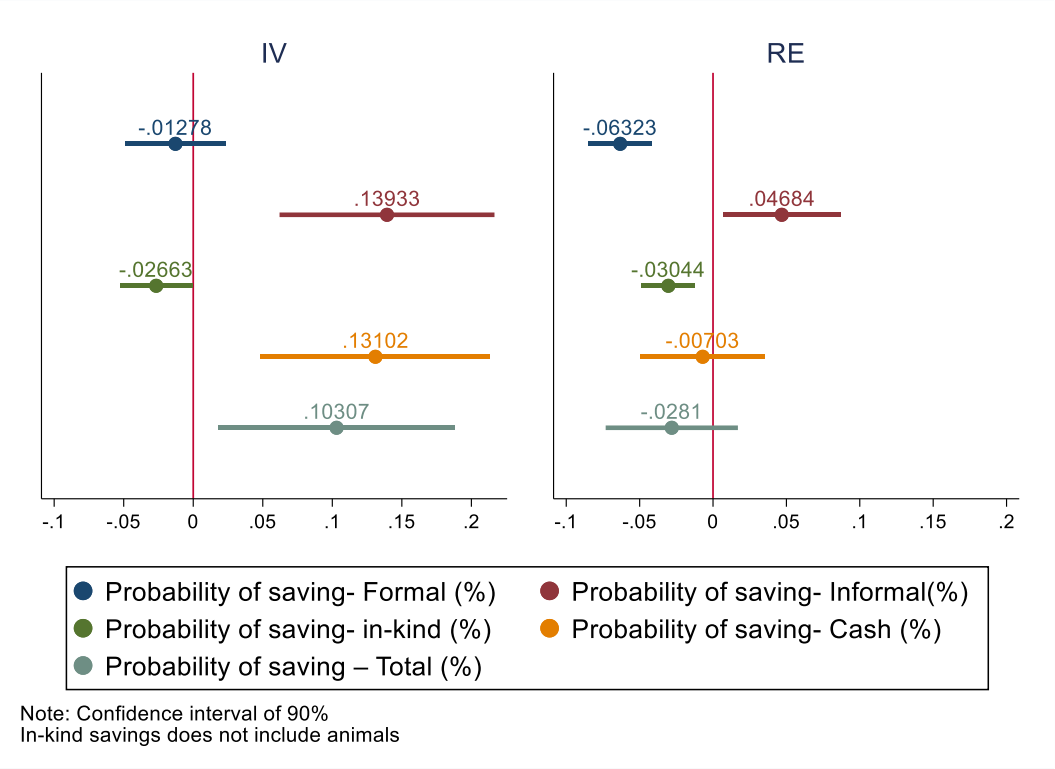
Figure 8: SOF Effects on working hours, according to IV and RE



4.5 Savings

One of the emphases of these programs is financial education and the encouragement to save, with former literature finding significant increases in the amount of money saved by the households because of the programs (Banerjee et al. 2011; 2015). For this case, the results of the intervention on savings are shown in Figure 9 for three types of savings: (1) formal savings, (2) informal savings in cash, and (3) informal savings in kind, not including animals.

Figure 9: Effects of SOF on the probability of saving, according to IV and RE



The impact evaluation shows an increase of 13.9% in the probability of saving informally, which in turn, is probably driven by an increase in the probability of saving through cash. This result can be associated with the promotion of saving groups among the activities planned in the graduation approach. The probability of saving formally, however, does not appear to be impacted by the program in the IV evaluation. When it comes to saving in kind, there is a slightly negative effect on the impact evaluation. It is worth noting that this effect would be positive and significant if animals were included in this category, but to avoid confusion with the measurement of the assets, animals were not included. When it comes to the total value of the savings, the impact evaluation does not find statistically significant results for any of the modalities. This could be due to the small number of households that do report to have saved money, or to the heterogeneity between the amounts of money saved.

Table 8 shows that the impact evaluation results agree with the RE in the increase in probabilities of informal saving and the decrease in probabilities of in-kind savings.

Table 8: SOF effects on savings, according to IV and RE

Variables	IV		RE	
	Effect	SD of CG	Change	SD of BL
Probability of saving- formal (%)	-0,01	-0,13	-6.32***	-0.24***
	(0,02)		(0.01)	
Probability of saving- informal, Total (%)	0,14***	0,82***	4.68*	0.13*
	(0,05)		(0.02)	
Probability of saving- in-kind (%)	-0,03*	-0,14*	-3.04***	-0.15***
	(0,02)		(0.01)	
Probability of saving- cash (%)	0,13***	0,69***	-0.70	-0.02
	(0,05)		(0.03)	
Probability of saving – total (%)	0,10**	0,39**	-2.81	-0.07
	(0,05)		(0.03)	
Value of formal savings (USD ppp)	1,56	0,10	-5.32**	-0.13**
	(3,87)		(2.16)	
Value of informal savings (USD ppp)	7,98	0,31	16.04***	0.35***
	(8,85)		(4.68)	
Value of in-kind savings (USD ppp)	69,00	0,11	-34.34	-0.05
	(90,75)		(49.13)	
Value of cash savings (USD ppp)	9,54	0,27	10.78**	0.18**
	(9,65)		(5.04)	
Observations	**1,005**		**854**	

Standard errors in brackets, ***p<0.01, ** p<0.05 * p<0.1

4.6 Expenditure

In this area, Banerjee et al. (2015), evaluating six graduation programs, find that there are positive effects in expenditure both at the end of the program and one year after the implementation. Banerjee et al. (2016) also find that seven years after the implementation of the graduation program in West Bengal, there are still positive effects on consumption.

In the Paraguayan case, the impact evaluation exercises did not find statically significant effects of the program on expenditure, and when studied closely, there are no statistically significant effects on expenditure for almost any category except for negative effects on transportation and clothing (Table 9). These results are similar to those found in the study of

the "Transformando mi Futuro" program in Colombia, where no changes were found in the expenditure variables. A possible explanation for this behavior lies in the households' spending decisions, where the money received from the productive incentive could be allocated to investments in productive assets, to savings or consumption. This lack of impact of the program on consumption, coupled with the effects on assets and savings suggests that the households are deciding to invest their money on the strengthening of their projects, rather than on short term expenditure.

Table 9: SOF effects on expenditure, according to IV and RE

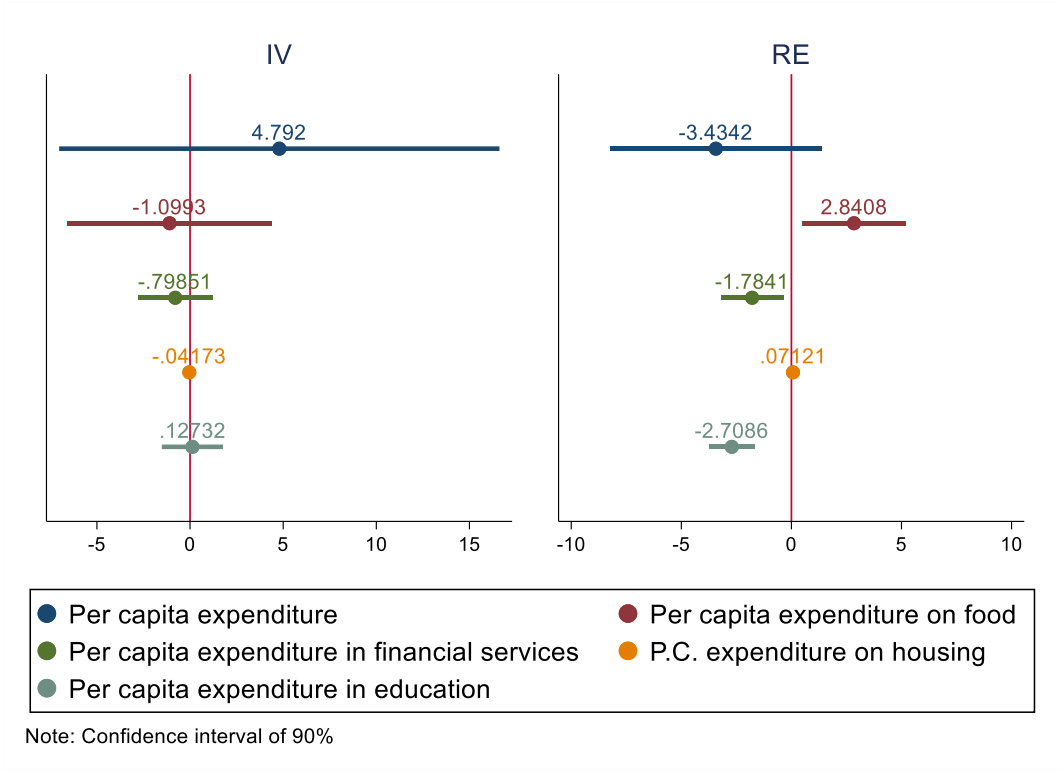
Variables	IV		RE	
	Effect	**SD of CG**	**Change**	**SD of BL**
Total household per capita expenditure (USD ppp)	4,79	0,12	-3.43	-0.09
	(6,03)		(2.45)	
Total per capita expenditure on financial services (USD ppp)	-0,80	-0,09	-1.78**	-0.14**
	(1,02)		(0.72)	
Total per capita expenditure on housing (USD ppp)	-0,04	-0,05	0.07	0.12
	(0,09)		(0.05)	
Total per capita expenditure on cleaning items (USD ppp)	-0,81	-0,23	-0.68**	-0.11**
	(0,57)		(0.33)	
Total per capita expenditure on clothing (USD ppp)	-0,85**	-0,38**	0.92***	0.46***
	(0,41)		(0.16)	
Total per capita monthly expenditure on entertainment and leisure (USD ppp)	1,00	0,34	0.72**	0.24**
	(0,68)		(0.34)	
Total per capita expenditure on transportation (USD ppp)	-2,07*	-0,19*	0.44	0.05
	(1,21)		(0.62)	
Total per capita expenditure on education (USD ppp)	0,13	0,02	-2.71***	-0.28***
	(0,84)		(0.53)	
Total per capita expenditure on public services (USD ppp)	-0,55	-0,11	2.34***	0.78***
	(0,67)		(0.24)	
Total per capita expenditure on health (USD ppp)	0,33	0,04	1.25*	0.17*
	(1,25)		(0.65)	
Total per capita expenditure on food (USD ppp)	-1,10	-0,05	2.84**	0.14**
	(2,80)		(1.20)	
Observations	**1005**		854	

Standard errors in brackets, ***p<0.01, ** p<0.05 * p<0.1

The RE provides somewhat different results, with an increase in the amount of money spent on clothing, entertainment, public services, health, and food; and a decrease on

expenditure in cleaning items, financial services, and education (see Figure 10). However, similarly to the case of savings, this behavior can be explained by the timing of the end line survey. The end of October and beginning of November coincides with the end of the school year for the children, which brings about reductions in the spending from schooling and transportation, and increases in the expenditure on clothing, entertainment, and possibly medical expenses.

Figure 10: SOF effects on expenditure (USD ppp), according to IV and RE

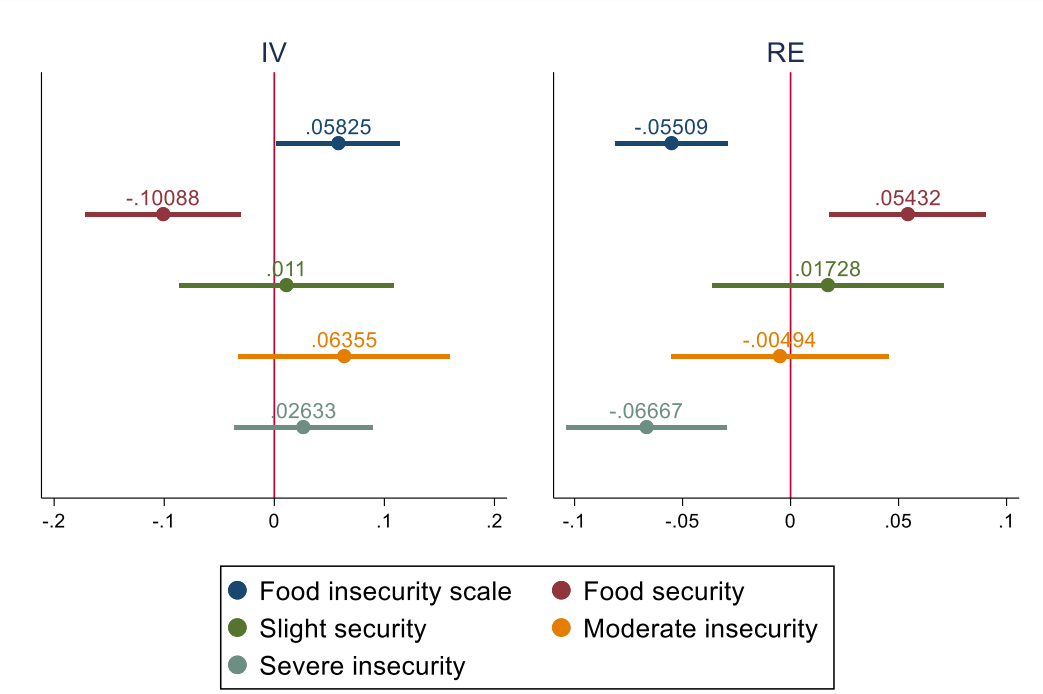


4.7 Food Security

Given the nature of the program and the focus on the creation of small rural businesses, it is possible that the SOF program might affect the alimentary situation of the families it treats, a situation that directly affects the living conditions of poor and extremely poor families. The scale used to measure the nutritional situation of the households in the sample is the Food Security and Nutrition Scale for Latin America and the Caribbean (Escala de Seguridad Alimentaria y Nutricional para America Latina y el Caribe, ELCSA), a scale developed by FAO to measure food insecurity across the region. It is relevant to point out that this scale considers both the availability of food and the variety of the diet in its assessment of food insecurity.

The RE finds a significant 6.7% reduction in the number of households suffering from severe food insecurity across the sample, which coincides with a 5.4% decrease in the number of households suffering from any kind of insecurity (See Figure 11). These effects differ slightly with the IV exercise, which shows a 10% decrease in the number of households with food security as a result of the program. Studying this result more closely, the component of the scale that drove this difference was the one that considers food variety. This means that households from the treated group either had less diverse diets or higher expectations for variety in their diet. These results are consistent with the idea expressed by Duflo & Banerjee (2011) who state that, when given a choice, poor households prefer to improve the quality of their meals rather than the number of calories consumed.

Figure 11: Effects of SOF on food security, according to IV and RE



4.8 Wellbeing

This program also aimed to affect the psychological or internal constraints of poverty for the treated individuals. With this in mind, this section studies the perception of wellbeing both as perceived in the present by the participants and the expectations of wellbeing in the short and medium term.

Expectations are defined as the goals and the quality of life an individual believes that he or she is going to accomplish in a given time. They are measured using the *ladder of life (Cantril ladder),* following the design of Moya & Carter (2014), originally proposed by the World Bank (Narayan et al., 2007). This ladder consists of 6 steps, where the highest step represents the highest level of wellbeing the respondent believes a person can achieve in his or her community. In this sense, the individuals were asked to think about what they consider wellbeing and think about the people in their community who had the lowest and highest levels of wellbeing (steps one and six on the ladder, respectively), as they perceived it. Then, they were asked to grade themselves in the ladder, and then state their expectations for 2 and five years into the future. The respondents' level of satisfaction with life was also used as a measure for wellbeing as an effort to contextualize the results of the expectations.

Table 10 shows the results of the evaluation exercises for the variables of happiness, the perception of wellbeing, expectations of wellbeing, and the gap between the current level of wellbeing and expectations. The RE shows that the program participants were happier after program implementation than they were before, but there were no statistically significant differences between them and the controls. When it comes to wellbeing, however, Figure 11 shows a marginally significant difference of 0.28 between the treated and the control groups. This suggests that the program was able to affect the perception of the households about their living conditions.

With regard to expectations of wellbeing, the RE shows that there is a significant increase of 0.28 steps in terms of expectations in the short term (2 years), while the medium-term expectations stay relatively stable. Given the increase in the perception of wellbeing in the present and the smaller increase in expectations, the last two rows of Table 9 show that there is a significant reduction in the gap between the current wellbeing and the expectations (42% and 20.1% for five and two years respectively). This result can be interpreted as a significant shift in the households towards achieving their goals and obtaining their expected level of wellbeing.

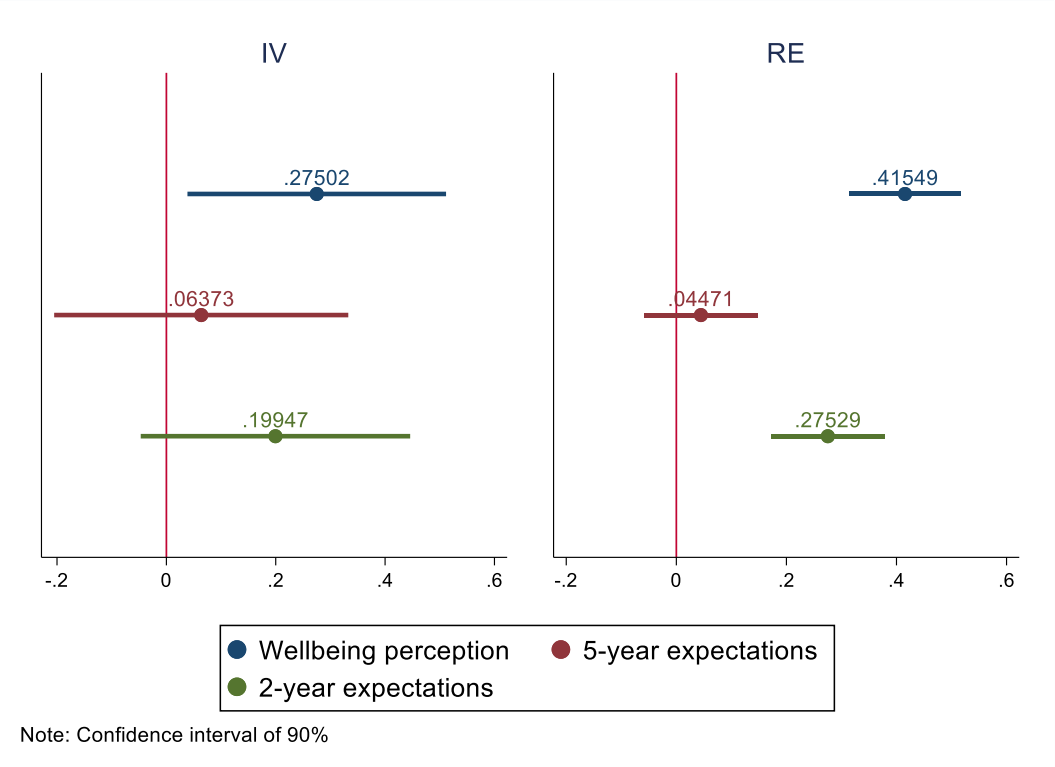
Table 10: Impacts of SOF on wellbeing, according to IV and RE

Variables	IV		RE	
	Effect	SD of CG	Change	SD of BL
Happiness Level	0,04	0,05	0.23***	0.24***
	(0,08)		(0.05)	
Wellbeing perception	0,28*	0,30*	0.42***	0.42***
	(0,14)		(0.06)	
5-year expectations	0,06	0,05	0.04	0.04
	(0,16)		(0.06)	
2-year expectations	0,20	0,20	0.28***	0.26***
	(0,15)		(0.06)	
Reduction in the gap for the 5-year expectations (%)	19,28	0,24	41.95***	0.36***
	(12,52)		(6.36)	
Reduction in the gap for the 2-year expectations (%)	9,91	0,18	20.14***	0.28***
	(6,98)		(4.16)	
Observations	1005		854	

Standard errors in brackets, ***p<0.01, ** p<0.05 * p<0.1

The IV evaluation does not show any significant effects of the program with respect to any of the expectation variables. This suggests that, although the perception of wellbeing increased, the program did not significantly affect the households' expectations.

Figure 12: SOF Impact on wellbeing and expectations, according to IV and RE

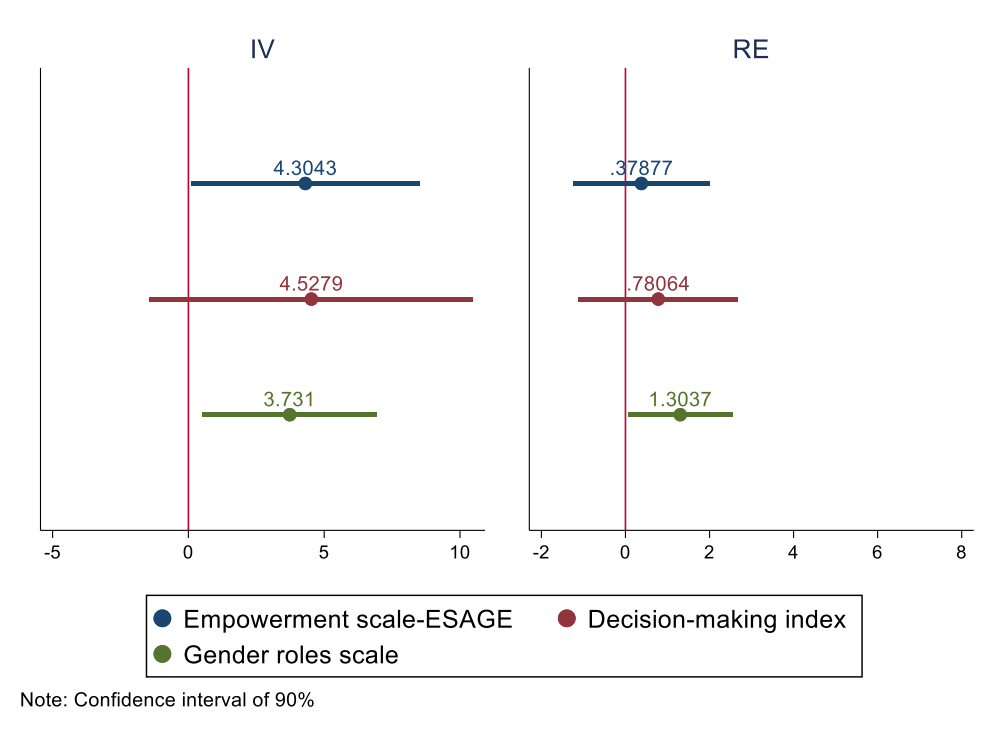


4.9 Empowerment

The final aspect to evaluate is participant empowerment. Given the program's emphasis on entrepreneurship, and the different workshops and monetary transfer it provides, the program is expected to empower the participant to make decisions in his or her life in an effective manner. To measure this expected empowerment, three indicators were used: (1) an empowerment scale based on a section of the scale to measure personal agency and empowerment (*Escala para medir Agencia Personal y Empoderamiento*, ESAGE), designed by Pick et al. (2007), (2) an index of the participant´s capacity, and independence, in decision making in the household, and (3) a gender role scale. The first indicator measures the level of involvement of the respondent in different aspects of their community, the second provides a measure of the authority of the participant inside his or her family environment, and the third reflects the perception of the respondent regarding different situations and conceptions about gender roles. All these measurements are scaled from 0 to 100, with 100 being the best result possible.

The IV evaluation shows an improvement in the gender role indicator of 3.73 points, as does the RE (1.3 points). This shows that the program was able to change the participants' perception of the equality of gender household roles (see Figure 13).

Figure 13: Effect of SOF on empowerment, according to IV and RE



The other indicators, however, do not show significant results, except for a marginally significant increase of 4.3 points in the empowerment scale for the IV evaluation (see table 10). This would suggest that the program participants do increase their level of involvement with their communities, albeit slightly.

Table 11: Impact of SOF on empowerment variables, according to IV and RE

Variables	IV		RE	
	Effect	SD of CG	Change	SD of BL
Empowerment scale- ESAGE	4.30*	0.28*	0.38	0.03
	(2.55)		(0.98)	
Decision-making index	4.53	0.19	0.78	0.03
	(3.61)		(1.15)	
Gender roles scale	3.73*	0.33*	1.30*	0.10*
	(1.96)		(0.76)	
Observations	1005		854	

Standard errors in brackets, ***p<0.01, ** p<0.05 * p<0.1

5. Conclusions

The SOF graduation program implemented in Paraguay was specifically aimed at strengthening the productive capacity of the treated households through the reinforcement of both human and physical capital, and the households' empowerment in their activities. The results from this study show that the program was effective in this goal, although not in all dimensions.

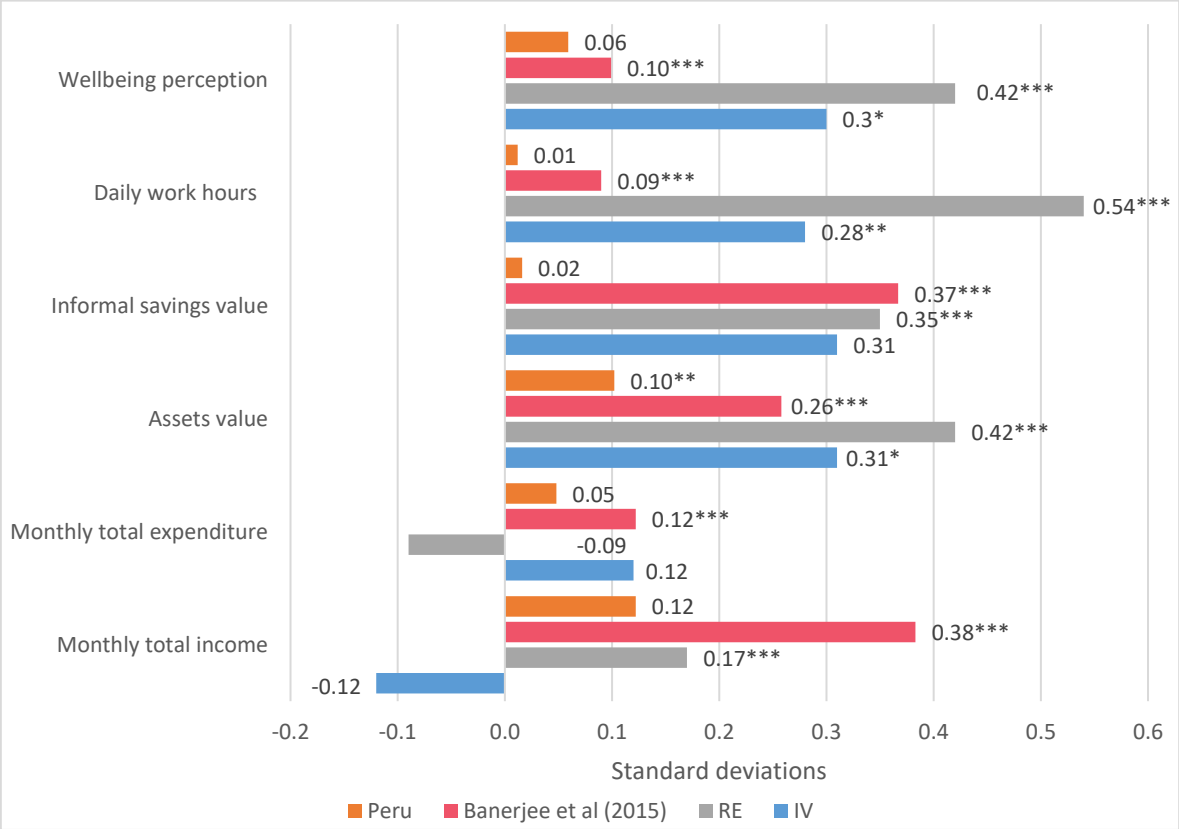
The positive impacts of the program on the number of hours worked by participants, as shown in the IV evaluation, and the increased income from their work perceived by the RE, show that the program can empower the participants to work and earn an income for their families. The fact that this increased income does not directly translate into increased expenditure can be attributed to the positive effect on the households' assets (especially livestock) and savings. This suggests that the program had the double effect of increasing the participants' ability to increase their earnings, and the likelihood of them using it to increase their capital and productive assets, instead of using these earning in short-term consumption.

Another aspect worth noting is the change in the structure of the income. Although no significant effect was found in the households' total income, the fact that farming related income increased while non-farming income decreased suggests a shift of the households towards self-sustainability and independence in their production process. This shift towards owning their productive capital and managing their source of income goes in line with the SOF goal of providing the households with the means to get out of poverty in their own right. This change is consistent with the impact found in the participants' perception of the wellbeing since a greater sense of independence could lead to a higher perception of wellbeing.

Comparing the results of this program with those for other countries in the area, there are some consistent effects. For instance, when compared with the graduation program in Peru and with an aggregate of the results of different graduation programs in Ethiopia, Honduras, Ghana, India, Pakistan, and Peru, evaluated by Banerjee et al. (2015), the effects of the program on assets and savings are similar both in magnitude and significance. For the case of wellbeing perception, and daily work hours, the effects in Paraguay are greater than those reported in Perú and the aggregation of countries. In the case of expenditure, as discussed before, for the case of Paraguay there is no a significant effect, while Banerjee et al. (2015) did find a positive effect in

consumption (see Figure 14). The effects found in this evaluation tend to be consistently higher than in the evaluation of the Peruvian case, and the quantity of variables affected is also higher.

Figure 14: Comparison between SOF and other countries



Significance level: *0.1 **0.05 ***0.01

Ultimately, the effectiveness of this program must be measured by evaluating its capacity to alleviate both the external and internal constraints that poor households face when trying to improve their standard of living (Leon-Jurado & Maldonado, 2017). In general, the effects found in this study suggest that, by instilling in the households the mentality to start their own productive projects and providing them with the means to do this, the program was able to remove the internal constraints that usually hamper the poverty relief efforts of interventions that only provide financial support.

Finally, this paper opens the door to other questions about the dynamics of the different graduation programs in Latin America. The context of the Paraguayan program and the extended pilot raises the question of whether the duration of the program has an effect on the outcome variables it intends to treat, a question that, if pertinent, could underestimate the effects captured

in this work. This is a question to be answered in the future. The question of whether there is a differentiated effect between male and female participants of the different outcome variables, and especially the ones related with empowerment, could also help direct more efficiently the resources of the policymakers, given that most of the beneficiaries of the program are female. In our case, more than 90 percent of participants were women, and this makes it difficult to estimate the effect differentiating by gender. However, good results are mainly associated with women.

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Annexes

Annex 1: Survey composition according to household type

Chapter	Target population: Household type 1: Households treated by SOF	Target population: Household Type 2: Not treated by SOF	Informant
A – Household Composition	All household members		Head of the household, partner, or a member of the household 18 years old or older who knows the household information in detail. More than one member of the household may be interviewed.
B – Workforce	Household members ten years old or older		
C – Household information	Household		Head of the household, partner, or a member of the household 18 years old or older who knows the household information in detail.
Interlude 1	SOF participant	The "hypothetical participant."	The beneficiary of the program as defined by the official listing, or the person who would have been chosen to be the beneficiary.
D – Assets	Household		Head of the household, partner, or a member of the household 18 years old or older who knows the household information in detail.
E – Participation in other programs	Household		
F – Shocks or events in the family	Household		
Interlude 2	SOF participant	The "hypothetical participant."	The beneficiary of the program as defined by the official listing, or the person who would have been chosen to be the beneficiary.
G – Income and expenditure	Household		Head of the household, partner, or a member of the household 18 years old or older who knows the household information in detail.
H – Access to financial services	Household		
I – Food security	Household		
Interlude 3	SOF participant	The "hypothetical participant."	The beneficiary of the program as defined by the official listing, or the person who would have been chosen to be the beneficiary.
J – Entrepreneurship	SOF participant	The "hypothetical participant."	
K – Aspirations and expectations	SOF participant	The "hypothetical participant."	
L – Empowerment	SOF participant	The "hypothetical participant."	
M – SOF program	SOF participant	N/A	The beneficiary of the program as defined by the official listing.