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The Impact of Ethiopian Productive Safety Net Program on Children's Educational Aspirations and Attainments

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Abstract

The Productive Safety Net Program (PSNP) was launched by the government of Ethiopia in 2005 to support food-insecure rural households. In this paper, we evaluate the impact of PSNP on children's educational aspirations and actual attainments. We use longitudinal data from the Ethiopian sample of the Young Lives' survey and by means of a differences-in-differences, individual fixed-effects estimator, we find that the program increases both educational aspirations and actual attainment of children. In our preferred specification, the immediate effect (after 3 years) of the program is to increase by 1.05 years of educational aspirations and by about 0.35 years actual education of children. Furthermore, there is evidence that the program has significant effect even in the long run (after 6 years). The results point to broad and long-lasting positive effects on children education of a program designed primarily to relieve chronically poor households from food insecurity.

Keywords: food insecure, educational attainment, Young Lives, Ethiopia, Educational aspirations
JEL classification: I25, I38, O12

1. Introduction

Development economists have long recognized the existence of 'poverty traps', that is, self-reinforcing mechanisms whereby poor people remain poor just because they started poor (Duflo, 2006). One strand of literature has emphasized 'external individual constraints' that induce the poor to remain in a state of poverty (for example, because they face credit constraints, labour market imperfections or do not have enough money to buy food with important consequences on malnutrition, health and education). A more recent literature emphasizes the importance of 'internal' constraints that derive from psychological factors that keep individuals into a poverty trap (La Ferrara, 2019). A specific form of internal constraints comes from aspirations. Genicot and Ray, 2017 define aspirations as reference points that individuals aim to achieve. Aspirations (and the lack of) are important for

decision-making. Appadurai, 2004 underlines that poor individuals lack the 'capacity to aspire', for example, because they anticipate that resource constraints will not allow them to get very far in life. Due to these low aspirations, poor individuals may make economic choices, such as low investment in education, that lead them to remain in a state of poverty. Ray, 2006 states also that frustrated aspirations, the unattainability of what poor individuals aspire, may plunge them into a poverty trap. Dalton *et al., 2016* show that, although both the rich and the poor face the same behavioural bias (internal constraints such as myopia or lack of willpower), poverty may exacerbate them and make individuals more susceptible to a failure to aspire to, and achieve, their own best possible outcome. An implication of this line of reasoning is that reducing poverty can break the 'aspiration trap' and take individuals out of poverty. At this purpose, safety net programs may have an important role in developing countries to pull households out of chronic poverty, not only because they can reduce the external individual constraints, but also because they can have an effect on the internal ones. In fact, becoming wealthier makes households feeling less poor and therefore more optimistic about the future and with greater aspirations. This might lead them to put in effort and focus to take correct decisions (Genicot and Ray, 2017; Banerjee *et al., 2021*). In this paper, we focus on education and we investigate whether the introduction of an anti-poverty program, called Productive Safety Net Program (PSNP), influences children's educational aspirations and attainment in Ethiopia, a very low-income African country, with a rather low level of education. The Ethiopian government launched the PSNP in 2005 to provide transfers to chronically food-insecure households. The program was designed to supply predictable support to defined households, thus departing from previous social protection schemes of delivering emergency food when a specific catastrophe happens.

Our claim is that since the safety net program is expected to raise income of households, being a PSNP recipient induces individuals to feel less poor and thus to increase their educational aspirations and to invest more in education. Few studies have explored how aspirations of the poor can be lifted, and they mostly focus on exposure to new information or new role models that may induce individuals to revise their aspirations. For instance, Beaman *et al., 2012* investigated the impact of female leadership on girls' aspirations and educational attainment exploiting a randomized experiment in India and found a significant impact of female leadership on girls' career aspirations and educational attainment. Bernard *et al., 2015* studied how aspirations of the poor in remote rural Ethiopia improved after watching documentaries of people in the same status changing their life without outside intervention. Chiapa *et al., 2012* explored the impacts of a social program and exposure to professionals on the aspirations of parents for their children in Mexico and found a positive impact on the educational aspirations. They also checked the correlations of parental aspirations and educational attainment of children and found positive correlations. The authors mainly focus on households' aspirations for their children without involving children's own educational aspirations.

Focusing on educational aspirations is key because they are very important predictors of educational attainment and occupational success, as recently documented by some studies. For example, using UK longitudinal data, Schoon and Parsons, 2002 find that teenage aspirations play a major role in the occupational development of the youth and in mediating social background factors. Ross, 2019 studies whether the difference between occupational aspirations and initial conditions of the primary economic earner in the household has an effect on the human capital of a child at later ages using the Young Lives (YL) data for India. From a randomized control trial conducted in Uganda, Riley, 2017 finds that aspirations affect examination results of students in secondary school. Moreover, Serneels and Dercon, 2021 document that aspirations raise educational attainment in India. Particularly relevant for us is the study by Favara, 2017: the author finds that educational aspirations correlate with actual education in Ethiopia.

In this paper, we claim that an important channel through which the PSNP could positively affect actual educational attainment is educational aspirations. Because it is difficult to estimate the mediated causal effect of aspiration on years of education, we first estimate the effect of the PSNP on educational aspirations and then we provide the reduced form evidence, *i.e.*, the effect of the program on actual educational attainment. Several studies have already documented the impact of the PSNP on households. However, as far as we know, little is known about the effects of the program on children's educational aspirations and attainment. Gilligan *et al.*, 2009 showed that the public works program (PWP) of the PSNP affects individual calories' acquisition. Berhane *et al.*, 2011 and Berhane *et al.*, 2014 revealed that households' food security and consumption are impacted by PSNP. Sabates-Wheeler and Devereux, 2010)showed that food transfers are superior to cash transfers in affecting income growth, livestock accumulation and self-reported food security. Andersson *et al.*, 2011 also evaluated the impacts of PSNP on livestock and tree holdings and find that the program increased households' tree holdings, whereas livestock holdings are unaffected.

Understanding whether the effects of the program go beyond its immediate target, namely chronic poverty and food insecurity of rural households, is particularly important from a policy perspective given that the program is extremely expensive (in 2009, PSNP had an annual budget of 360 million USD, roughly 1.2% of Ethiopian GDP). Debela *et al.*, 2015 and Porter and Goyal, 2016 investigate the impacts of the program on children's health (mainly nutrition), and both studies document positive effects. Studies also investigated the impacts of PSNP on the trade-offs between education and work participation (Hoddinott *et al.*, 2010; Woldehanna, 2010).

In this study, we investigate the effect of PSNP on children's own educational aspirations, and thereby on attainment, using a difference-in-differences (DID) estimation strategy at the child level. The PSNP is non-randomly targeted toward food-insecure households. To identify the causal effect of PSNP, we exploit the rich child and household-level information available in the YL Ethiopia survey and its longitudinal nature: we control for several observable characteristics and we include child fixed effects to control for time-invariant unobservables. Moreover, in additional regressions, we apply matching techniques to obtain treated and control groups with similar covariates' distributions.

The panel dimension of our data set also gives us the possibility to investigate both the short- and long-run effects of the program. In our preferred specification, the short-run effect (after 3 years) of the program is to increase by 1.05 years educational aspirations and by 0.35 years actual education of children. Furthermore, our findings suggest that exposure to the PSNP increases by 0.99 years educational aspirations in the long run (after 6 years). However, no significant effect is traced on actual educational attainments. When we consider the effect of PSNP at different cut-off points, the program is found to affect lower years of educational aspirations and attainments in the short run and relatively higher years of educational aspirations and attainments in the long run. Finally, we attempt to investigate possible channels through which PSNP affects educational aspirations and therefore attainment. As said, PSNP increasing household income could make households feeling less poor and therefore with greater aspirations. This could induce children to invest more in education and make their households spend more in a child's education. To explore whether these mechanisms are at play, we construct a measure of subjective relative poverty status, and we find that PSNP decreases the probability for a child to feel poorer than other households living in the same area. In addition, we find that PSNP raises household expenditure on a child's education, both in the short and in the long run.

The paper is organized as follows. The next section discusses the PSNP and its eligibility criteria in selecting beneficiaries. Section 3 describes the data we use in our study and presents some descriptive statistics. Section 4 presents the econometric strategy. Section 5

provides the empirical results and robustness checks of our main results. The last section concludes.

2. The productive safety-net program

The PSNP is a social protection program launched by the Ethiopian government in 2005 to provide transfers to chronically food-insecure households. The program aims to respond to food insecurity arising from shocks or natural calamities such as drought, flooding, pests and so on, in addition to the chronic food needs of poor households. The program has evolved through several phases. The number of people supported by PSNP has increased from 4.5 million in 2005 to 7.9 million total incumbent and new beneficiaries in 2020, when the fifth phase of PSNP was launched and the program expanded from rural to urban areas. The PSNP consists of 80% public work program that provides countercyclical employment mostly on rural infrastructure and land rehabilitation projects and 20% direct support program that provides unconditional cash or food transfer to vulnerable households that have no able-bodied members to participate in public works. Once households have become food sufficient, and thus they are no longer eligible for the PSNP, they 'graduate' from the program (Wiseman *et al.*, 2010).

The PSNP has been designed to respect the responsibilities of each level of the federal administrative structure of the Ethiopian Government, which is composed of nine regions and two administrative cities. Each region is then divided into woredas (districts), which are administered by locally elected councils. Each woreda is subdivided into kebeles, the lowest administrative layers that can be understood as neighbourhood associations or wards. Finally, in the rural areas, each kebele includes a number of villages or communities. The selection process into PSNP proceeds as follows. The federal government first identifies chronically food insecure woredas, *i.e.*, districts that have been recipients of food aid for at least 3 years. Using this criterion, the government chose 262 of 710 woredas in 2005 and increased to 290 woredas in 2009. Then, woredas select chronically food-insecure kebeles. Finally, households within these kebeles are selected to participate in the PSNP according to the following process: first, households' eligibility to PSNP depends on whether they meet the criteria set by the local administration (kebele) and whether the household is selected by the Community Food Security Task Force (CFSTF). The CFSTF selects households on the basis of basic PSNP criteria and supplementary local criteria. The basic PSNP eligibility criteria are as follows: households that faced a continuous food shortage for 3 months in the last 3 years, those that suddenly become more vulnerable and could not support themselves over the last 3–6 months, and those without family support and other social protections (Ministry of Agriculture, 2014). Then, the list of eligible households, finalised at the community level, should be approved at the kebele, woreda and regional levels.

3. The data

This study uses longitudinal data from the YL survey. YL is an international research project, coordinated by the University of Oxford, that followed 12,000 children in Ethiopia, India, Peru and Vietnam through 15 years. The aim of the project is to identify the main drivers of child poverty and assist local policymakers. The sample in each country consists of two cohorts of children: a younger cohort of 2,000 children born in 2001–2002 and an older cohort of 1,000 children born in 1994–1995. To date, there are five rounds of the surveys that have been conducted in 2002, 2006, 2009, 2013 and 2016, respectively. Focusing on Ethiopia, YL samples were selected from 20 sentinel sites after a three-stage sampling process (Outes-Leon and Sanchez, 2008). In the first stage, 5 regions, namely Oromia, Amhara, SNNP, Tigray and Addis Ababa, an administrative city, were selected.

The main criterion was national coverage, and the selected regions account for 96% of the national population. Then from these regions, 20 woredas were chosen with a pro-poor bias: the food-deficit woredas were oversampled because the major goal of YL is investigating childhood poverty and its dynamics. In the last stage, at least one kebele in each woreda was chosen. Finally, households containing children were randomly selected within the sites, and one child per household is then interviewed. The attrition rate is low compared with other longitudinal studies: it was about 5% for all cohorts in the first four waves.

YL data include questions on educational aspirations, actual educational attainments and other related issues, which were asked to the older cohort children from the second round onwards (the younger cohort were 4 to 5 years old in the second round, thus too young to be asked about education and education aspiration). However, questions on educational aspirations were not included in the fifth round of the survey. The question on a child's educational aspirations, used in our main analysis, was framed as: 'Imagine you had no constraints and could study for as long as you liked, or go back to school if you have already left. What level of formal education would you like to complete?'. The answer to this question is coded according to the highest grade the child aspires to achieve, 1–12 indicating grades 1–12; 13 for technical and vocational school and 14 for college degree and higher. We recoded 14–15 (12 years of school plus 3 years of higher institution) to interpret educational aspirations in terms of years of education. This question has been also used by Favara, 2017 for Ethiopia to properly measure educational aspirations. A possible limitation of this measure refers to the fact that the 'capacity to aspire' is not evenly distributed among individuals. Aspirations are endogenously determined by subjective expectations about the future, so poor individuals can lack the 'capacity to aspire', for example, because they anticipate the resource constraints they will face (Appadurai, 2004). As Favara, 2017 underlines, by asking about the desired outcome in absence of any constraints, this question might represent self-reported preferences rather than aspirations, because the uncertainty linked to achieving the preferred outcome would be reduced. Yet, individuals, even when told to imagine a situation without any constraints, tend to internalize impediments associated to their current status. This implies that they are likely to end up reporting their own aspirations rather than their preferences. In our full estimated sample, children's aspiration are significantly (unconditionally) negatively correlated with their perceived poverty status, suggesting that individuals who feel poorer tend to aspire less.

In addition, caregivers were asked: 'Ideally, what level of formal education would you like (child) to complete?' in round two and three of the survey. We also recode and use this question to test whether, at least in the short run, the PSNP program affects parental educational aspirations, which are often shown to be positively correlated with their children's educational outcomes (e.g., Chiapa *et al.*, 2012).[1]

Similarly, actual educational attainments is measured in terms of the highest years of education that the child completed. Like the educational aspirations, education is coded from 1 to 12 indicating grades 1–12, 13 for technical and vocational school and 14 for college degree and higher. We recode category 14–15 (12 years of school plus 3 years of higher institution) to interpret educational attainments in terms of years of education.

From the third round (2009) onward, households have been interviewed about their participation in PSNP as follows: (i) Was any member of the household registered as a beneficiary of the PSNP—PWP? (ii) Was any member of the household registered as beneficiary of the Direct Support program (transfers of cash, food or other goods without requiring individuals to work)? If the household's response is 'Yes' to at least one of the

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[1] Note that the questions of child and caregiver's aspirations are slightly different. Particularly, the question asked to the child refers to a desired outcome in absence of constraints. Differently, the question asked to the caregiver does not refer to any constraint-free situation.

questions, then the household would be regarded as a beneficiary of the PSNP program and belongs to the 'treatment' group, whereas if the response to both questions is 'No', then the household is in the 'control' group.

To evaluate the effect of the PSNP on children's educational aspirations and actual educational attainments, we follow Porter and Goyal, 2016, who estimate the impact of the PSNP on child nutrition using a DID estimator at the child level. As in Porter and Goyal, 2016, the second round of the YL survey (conducted in 2006) is considered as a baseline because the payment was delayed during the first year of the implementation of the program (2005–2006) (Gilligan *et al.,* 2009), and no impacts of the program were experienced in 2006 (Woldehanna, 2010).

The PSNP was conducted in rural areas until phase 5, and therefore, we exclude the urban population. To improve the comparability of the groups of our analysis, two sites where no households participated in the program were dropped from the sample.[2]

Our analysis is, therefore, based on the older cohort of children living in 11 rural sites and interviewed at the ages of 12, 15 and 19 in 2006, 2009 and 2013, respectively. We consider only children interviewed in all the three waves to assess both the short- (after 3 years) and long-run (after 6 years) effects of the program. More precisely, our treatment group includes children who need to be in the program in waves three and four (or graduated in wave 4), whereas our control group includes children observed in all the waves and who have never received the treatment.[3] We have not, on the other hand, considered the fifth wave because questions on educational aspirations are not included in this wave.[4]

Table 1 reports the descriptive statistics of observable characteristics for the individuals in the sample receiving the PSNP transfer (the treated group), and those living in the same areas but not enrolled in the program (the control group). No statistical difference between the mean of the treated and control groups is observed with respect to educational aspirations, enrollment, cognitive outcome (based on the score obtained on a mathematical test), wealth and age of household head. However, the mean difference between the two groups is statistically significant with regard to years of education, sex of household head, mother's education[5], owning livestock and most climatic shocks (a set of dummies taking value of 1 if the household experienced a specific natural disaster since the previous wave). There is no statistical differences in the number of females in the household regardless of their age, why in the control group there are significantly more males aged 6–60 years. Table 1 also reports descriptive statistics of additional outcomes used in the attempt to investigate possible channels through which PSNP affects educational aspirations and therefore attainment.

As we will explain in Section 4, following Porter and Goyal, 2016, we further restrict the sample to improve the balance between treatment and control groups as Table A1 of the Appendix shows.

Figure 1 shows the unconditional distribution of aspirations/educational attainments of the participants and the non-participants in the full sample before and after the intervention

[2]   The reason why there was no PSNP participation in these two sites is that they are relatively well-off: the first site is a rich rural area in the outskirts of Debrezeit town in the Oromia region and the second site is a densely populated rural area growing 'enset' (false banana) in the SNNP region.

[3]   This can be either because children belong to non-eligible households (by definition wealthier and food-secure households) or live in households that potentially have been shortlisted but never received the benefit due to budget restrictions of the PSNP program.

[4]   Actual educational attainment is available for the fifth round of the survey. However, despite the high wave-to-wave retention rate of YL compared with other surveys, we need individuals who participated in the survey for three consecutive waves, and thus overall sampling attrition turns to be high. In unreported regressions, we test the effect of PSNP on educational attainment using round 5. Although the sign is right, the effect of the program is not precisely estimated: no significant effect of the program on educational attainment is obtained for the fifth round. Note also that in round five, children turned 22 years old, and it is expected that many had started working or looking for a job by that age.

[5]   Mother's education is a three-category variable: no education, adult literacy, and grade 1 and above completed. Adult literacy education refers to a program supposed to reach out a portion of the population aged 15 and older so as to equip them with the basics of reading, writing and numeracy skills.

Table 1. Descriptive Statistics by Treatment Status at the Baseline (2006) on the 'Full Sample'

	N_control	Control	N_treated	Treated	Difference (C − T)	P-value
Main outcomes of interest						
Years of educational aspirations	105	13.657	88	13.330	0.328	0.319
Years of education	105	2.438	88	2.795	−0.357	0.084
Additional outcomes of interest						
Educational aspiration of children by the caregiver	104	14.212	88	13.682	0.530	0.040
Relative-subjective poverty compared with other hhs	105	0.152	88	0.511	−0.359	0.000
Natural logarithm of real education expenditure	103	4.983	86	4.215	0.768	0.000
Hours/day spent in paid activities	105	0.029	88	0.170	−0.142	0.085
Hours/day spent in unpaid activities	105	5.038	88	4.443	0.595	0.008
Hours/day spent studying and in school	105	7.290	88	7.247	0.043	0.816
Household and child characteristics						
Currently enrolled in school	105	0.990	88	1.000	−0.010	0.361
z score of mathematics test	105	−0.311	88	−0.125	−0.186	0.190
Wealth index	105	0.212	88	0.196	0.016	0.247
Age of household head	105	46.324	88	45.773	0.551	0.716
Sex of household head—male	105	0.924	88	0.636	0.287	0.000
Mother's education—adult literacy	105	0.133	88	0.170	−0.037	0.475
Mother's education—grade 1 and above	105	0.343	88	0.148	0.195	0.002
Household owned any livestock	105	0.962	88	0.841	0.121	0.004
Total area of land owned by the hh	105	1.754	88	1.000	0.754	0.076
Household composition						
No. males aged 0–5	105	0.352	88	0.261	0.091	0.274
No. males aged 6–12	105	0.790	88	0.523	0.268	0.012
No. males aged 13–17	105	0.714	88	0.409	0.305	0.001
No. males aged 18–60	105	1.724	88	1.205	0.519	0.001
No. males aged 61+	105	0.086	88	0.136	−0.051	0.263
No. females aged 0–5	105	0.381	88	0.375	0.006	0.943
No. females aged 6–12	105	0.590	88	0.602	−0.012	0.904
No. females aged 13–17	105	0.724	88	0.591	0.133	0.228
No. females aged 18–60	105	1.667	88	1.545	0.121	0.365
No. females aged 61+	105	0.067	88	0.045	0.021	0.529
Shocks						
Shock-drought	105	0.581	88	0.466	0.115	0.112
Shock-flooding	105	0.333	88	0.148	0.186	0.003
Shock-erosion	105	0.210	88	0.091	0.119	0.023
Shock-frost	105	0.229	88	0.136	0.092	0.102
Shock-pests on crops	105	0.238	88	0.068	0.170	0.001
Shock-crop failure	105	0.410	88	0.409	0.000	0.995
Shock-pests on storage	105	0.105	88	0.023	0.082	0.024
Shock-pests on livestock	105	0.152	88	0.057	0.096	0.034
Observations	193					

Notes: *Mother's level of education has three categories: No education (66%), Grade 1 and above (22%) and adult literacy (12%). The first and the second columns describe the number of observations and the mean of the variables for the control group; the third and the fourth column presents the number of observations and the mean for the treatment group; whereas the last two columns are the difference between the mean values of the treatment and the control groups and the *P*-values corresponding to the *t*-tests with different variances, respectively.
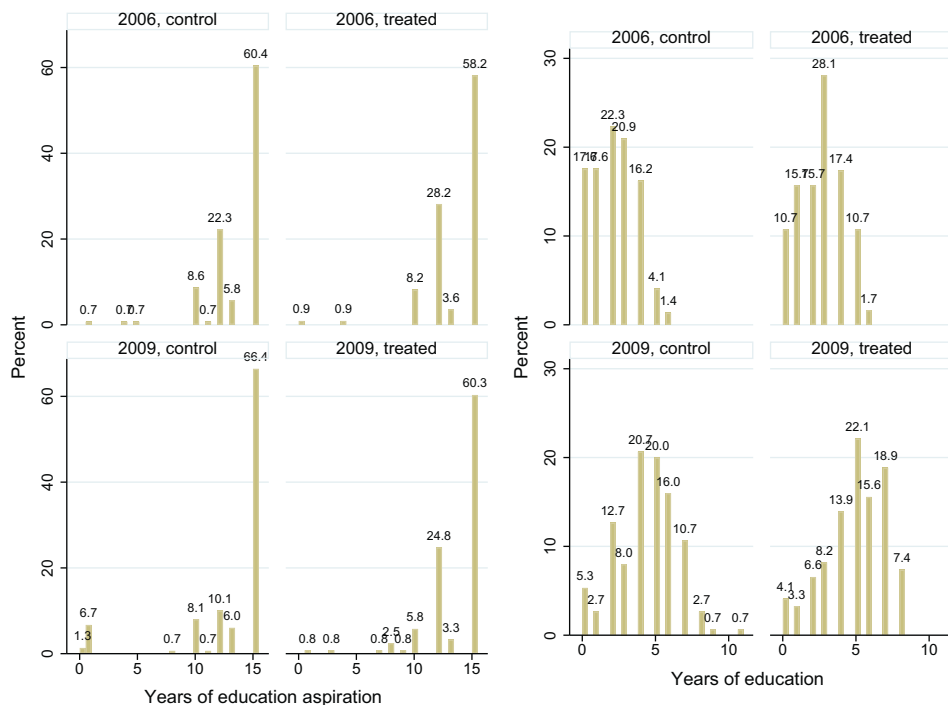
Figure 1. Years of Educational Aspirations and Attainments by Treatment Status in the Short Run. *Notes:* The figure depicts the percentage distribution of years of educational aspirations and attainments for the control group and for the treatment group both before and 3 years after the implementation of the program. The figure on the left depicts the distribution for the years of educational aspirations and the one on the left is for the actual educational attainments.

in the short run. Educational aspirations and actual educational attainments seem to increase for both the participants and non-participants.

Figure 2 shows aspirations/educational attainments of the participants and the non-participants before and after the intervention in the long run. Again, both educational aspirations and actual educational attainments increase for participants and non-participants. The DID analysis serves to identify the differential effect of the program on the change of aspirations and actual educations of the treated groups with respect to the untreated one.

4. Econometric strategy

This section describes the methodology used in our empirical analysis. The effect of PSNP on educational aspirations and attainment of children is analyzed using the DID estimator. Our objective is to measure the average treatment effect on the treated (ATT). The ATT is given by:

$$ATT = E\left[A_1 - A_0 | P = 1\right] = E\left[A_1 | P = 1\right] - E\left[A_0 | P = 1\right] \tag{1}$$

Where A_1 is the potential outcome, *i.e.*, educational aspirations or educational attainments, in case of treatment, A_0 is the potential outcome in the absence of treatment and P indicates the treatment status, which is equal to 1 if the individual participates in PSNP and 0 otherwise. The problem is that we miss the counterfactual, *i.e.*, we cannot observe the
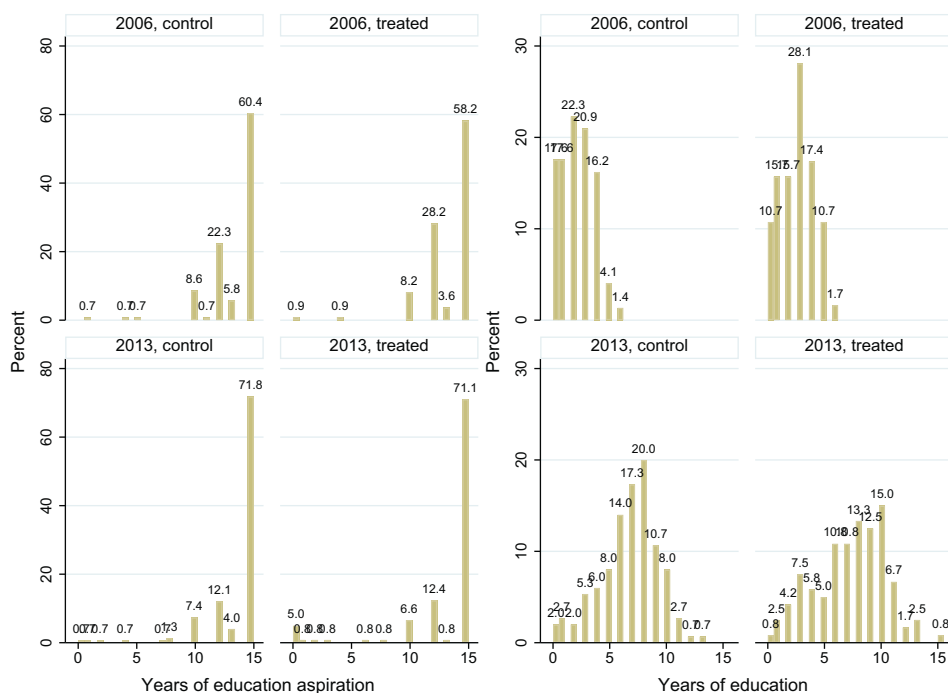
Figure 2. Years of Educational Aspirations and Attainments by Treatment Status in the Long Run. *Notes:* The figure depicts the percentage distribution of years of educational aspirations and attainments for the control group and for the treatment group both before and 6 years after the implementation of the program. The figure on the left depicts the distribution for the years of educational aspirations and the one on the left is for the actual educational attainments.

untreated outcome for the treated, $E[A_0|P = 1]$ and we must use $E[A_0|P = 0]$ as an estimate for the unobserved outcome, $E[A_0|P = 1]$. This might give rise to selection bias and to the concern that changes in the outcome of interest would have been systematically different in the treatment and control groups even in the absence of the program. In our context, the PSNP was introduced to help chronically and transitory food-insecure rural households and to enable them withstand shocks like droughts, which are frequent in Ethiopia. To improve the comparability between treated and untreated individuals, we consider only rural areas and we dropped from the sample two sites where no households participated in the program. However, because our control group includes children who have never received the treatment either because they belong to non-eligible households (by definition, wealthier and food-secure households) or live in households that potentially have been shortlisted but never receive the benefit (due to budget restrictions of the PSNP program), treatment and control groups are systematically different along a few observable characteristics as it is confirmed in Table 1.

To interpret the DID coefficient as a treatment effect, the conditional independence assumption (CIA) must hold. That is, conditional on a set of observable characteristics, treatment assignment should be as good as random. Therefore, to obtain a causal estimate, we follow a similar approach to the one carried out by Porter and Goyal, 2016 that analyses the impact of PSNP on child nutritional outcomes. First, we add a large set of child and household characteristics to control for observable heterogeneity and child fixed effects to control for unobserved heterogeneity. Because children do not move across

sentinel sites in our working sample, we do not need to control for sentinel site fixed effects. Still, if the distribution of covariates is markedly different in the treated and control group, CIA may not be satisfied. In an alternative specification, we create a 'matched sample', and we restrict the sample by means of a propensity score-matching procedure to improve the balance between treatment and control groups.[6] More specifically, we construct a comparison group based on a Kernel matching with bandwidth of 0.05 on the pre-program child and household characteristics, including indicators for household wealth and vulnerability, which includes livestock and land ownership, the number of male and female adult members, sex and age of the household head, wealth index, shocks and cognitive outcome. Both the mean and median percent bias reduced significantly after balancing.[7] We estimate the following model:

$$A_{it} = \beta_0 + \beta_1 Y_t + \beta_2 (P_i * Y_t) + X_{1,it}\beta_3 + X_{2,it}\beta_4 + CS_{it}\beta_5 + \lambda_i + u_{it} \qquad (2)$$

Where the outcome variable A_{it} denotes educational aspirations or educational attainments of child i at time t; Y_t is a time dummy that equals one if year is 2009 and zero if year is 2006 in the short run and equals one if year is 2013 and zero if year is 2006 in the long run; P_i is a treatment dummy that equals 1 for children in households participating in PSNP and 0 for non-participants; $X_{1,it}$ is a set of child characteristics (a dummy if the child is enrolled in school and a variable indicating the cognitive outcome of the child), $X_{2,it}$ are household characteristics (a wealth index of the household, household ownership of any livestock, the total area of land owned, a dummy that takes the value of 1 if the household head is a male, age of household head, dummies for household composition, dummies to control for the level of education of the mother) and CS_{it} is a set of dummies indicating whether the household had experienced climatic shocks during the period of interest.[8] Finally, λ_i accounts for child individual fixed effects. Standard errors are bootstrapped at child level. We estimate equation (2) with the Within estimator (Meyer, 1995), β_2 is the estimated ATT, *i.e.*, the effect of PSNP on educational aspirations or actual educational attainments of the children living in a treated household after controlling for observable characteristics and child fixed effects. β_1 is the expected mean change in educational aspirations/educational attainments before and after the intervention period in the control group and indicates the effect of time in the absence of the program.

5. Results

5.1. Impact of PSNP on educational aspirations

Table 2 presents the DID estimation results of the impact of PSNP on educational aspirations of children in the short run (Panel A) and in the long run (Panel B). We report the year dummy and the coefficient of interest; full estimation results are available in the Appendix (Table A2).

The first three columns are estimated on the full sample, whereas the last three columns are based on the matched sample. The first column includes no covariates, whereas the second column controls for child and household covariates, $X_{1,it}$ and $X_{2,ht}$. The third column adds dummies for experiencing shocks, CS_{ht}. The same holds for the last three columns.

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[6] For a further robustness, Porter and Goyal, 2016 also consider a 'shortlisted sample', *i.e.*, a sample restriction based on households that were shortlisted for the program but were not able to participate due to budget constraints. Unfortunately, we cannot use the shortlisted comparison group because we would retain very few (15) observations because our sample includes only the older cohort of children.

[7] See Figure 4 in the Appendix for the balance before and after matching.

[8] Drought, flooding, erosion, frost, pests on crops, crop failure, pests on storage and pests on livestock.

Table 2. Impact of PSNP on Educational Aspirations

	Full sample			Matched sample		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Short run						
Year dummy (2009)	−0.352	−0.101	−0.146	−0.352	−0.0858	−0.135
	(0.381)	(0.634)	(0.616)	(0.381)	(0.641)	(0.626)
DID	0.864*	0.975*	1.046**	0.870*	0.970*	1.048**
	(0.513)	(0.515)	(0.508)	(0.525)	(0.526)	(0.522)
R^2	0.0143	0.136	0.219	0.0141	0.133	0.215
No. of children	193	193	193	188	188	188
N	386	386	386	376	376	376
Panel B: Long run						
Year dummy (2013)	0.314	−0.348	−0.297	0.314	0.418	0.428
	(0.293)	(0.639)	(0.670)	(0.293)	(0.455)	(0.519)
DID	0.447	1.031**	0.999**	0.674	1.089**	1.099**
	(0.463)	(0.463)	(0.453)	(0.432)	(0.472)	(0.460)
R^2	0.0310	0.256	0.312	0.0532	0.210	0.273
No. of children	193	193	193	188	188	188
N	386	386	386	376	376	376
Household and child controls	NO	YES	YES	NO	YES	YES
Shocks	NO	NO	YES	NO	NO	YES

Notes: Robust standard errors in parentheses, clustered at child level. * $P < 0.1$, ** $P < 0.05$, *** $P < 0.01$. Fixed effects is adopted as a baseline regression in all the specifications. DID refers to the difference-in-differences coefficient, which is the interaction of time and treatment indicators. The dependent variable in all columns is years of educational aspirations. The first three columns are estimated on the full sample, whereas the last three columns are based on the matched sample. The first column includes no covariates, whereas the second column controls for child and household covariates including: school enrollment and z score of maths test scores of children, household wealth index, household head sex, household head age, mother's education, household ownership of any livestock, the total area of land owned, and household composition based on age and sex. The third column adds dummies for experiencing shocks including drought, flooding, erosion, frost, pests on crops, crop failure, pests on storage and pests on livestock. The same is true with the last three columns. Panel A is the impact of being in the program after 3 years (the short-run results), whereas Panel B is the impact after 6 years (the long-run results).

In the short run (Panel A), PSNP has a positive and statistically significant effect on educational aspirations across all the estimated specifications. Column (1) shows that PSNP increases educational aspirations by 0.86 school years. The magnitude of PSNP on educational aspirations of children increases to 0.98 school years and 1.05 school years when we control for demographic variables and climatic shocks, respectively, even though the differences among specifications are not statistically significant. We observe the same pattern in the matched sample, with no significant differences from the full sample. Panel B of Table 2 depicts the DID estimation results in the long run. The results in Panel B of Table 2 reveal that the impact of the program is still positive and statistically significant. The magnitude of the effect of the program after 6 years is comparable with the results for the short run. This suggests that the PSNP has significant effects on educational aspirations that persist in the long run.

Educational aspirations are measured in terms of years of education that children aspire to complete. We now test whether the impact of PSNP is still relevant at different cut-off points. We constructed a set of dummy variables indicating whether children aspire to complete more than a given number of years of education. Figure 3 presents the DID estimation result
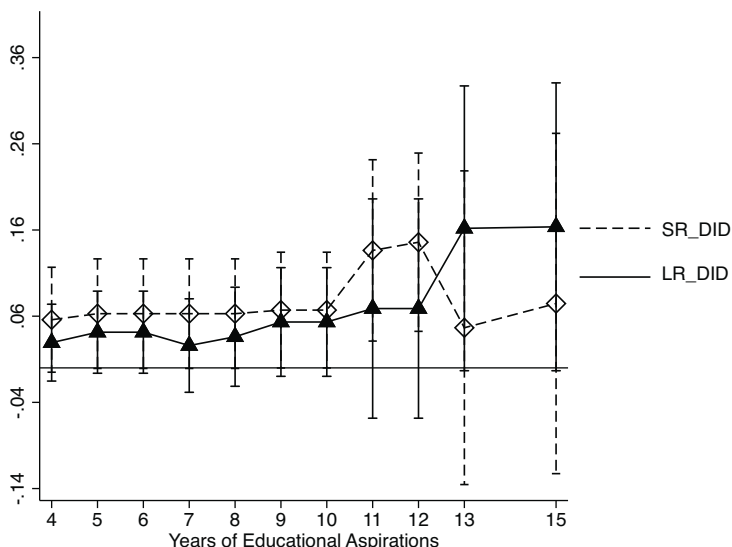
Figure 3. Impacts of PSNP on Educational Aspirations at Different Cut-Off Points. *Notes:* The figure depicts the DID coefficients from the estimation of the impact of PSNP on educational aspirations at different cut-off points. The labels on the *x*-axis indicate that the years of educational aspirations is greater than or equal to the specific number. For instance '4' indicates the years of aspiration is greater than or equal to 4 years, whereas '15' indicates 15 or more years of educational aspiration. Each point is the magnitude of the DID coefficient, and the bars are the confidence intervals for the specific coefficients. Both the short-run and the long-run results are presented. In addition, all the regressions are conducted after controlling all child, household and climatic variables.

at different cut-off points in both the short run and the long run.[9] The results highlight that PSNP indeed affects children's years of aspiration at different cut-off points. In the short run, the program is found to affect children's years of aspiration until high school graduation (12 years), but no impact is found on the aspirations to go to vocational schools or universities. However, in the long run, a relatively higher and significant effect of the program is traced on the aspirations to go to vocational schools and universities. The reasons behind the results might lie in the children's educational experience with ages. In the short run, the children are attending the lower grades, and the maximum years they aspire might be limited to finishing grade 12. But as time passes by and children's educational attainments increase, they might see beyond high school and aspire to go to higher education.

The YL survey also provides information on caregiver educational aspirations for rounds two and three. Therefore, it is possible to test (at least in the short run) whether the PSNP program also affects parental educational aspirations, which are often shown to be positively correlated with their children's educational outcomes (e.g., Chiapa *et al.,* 2012). Table 3 shows that in the short run, PSNP has a positive effect on caregivers' educational aspirations, statistically significant (at 10% level) when all the controls are included. Overall, these results suggest that PSNP influences both the child's and caregiver's educational aspirations, even if the latter results should be considered with caution due to the poor statistical significance.

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[9] The regressions are conducted controlling for all child, household and climatic variables. Table A3 in the Appendix shows the DID coefficients from the estimation at different cut-off points.

Table 3. Impacts of PSNP on Caregiver's Educational Aspirations

	Full sample			Matched sample		
	(1)	(2)	(3)	(4)	(5)	(6)
Year dummy (2009)	−0.260	−0.00557	−0.149	−0.260	−0.0324	−0.183
	(0.299)	(0.426)	(0.410)	(0.299)	(0.433)	(0.416)
DID	0.669	0.621	0.744*	0.609	0.578	0.724*
	(0.410)	(0.398)	(0.403)	(0.420)	(0.405)	(0.415)
R^2	0.0137	0.174	0.292	0.0109	0.170	0.291
No. of children	193	193	193	188	188	188
N	385	385	385	375	375	375
Household and child controls	NO	YES	YES	NO	YES	YES
Shocks	NO	NO	YES	NO	NO	YES

Robust standard errors in parentheses, clustered at child level. All the regressions include child fixed effects * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ *Notes:* Robust standard errors in parentheses, clustered at child level. Child fixed effects is adopted as a baseline regression in all the specifications. DID refers to the difference-in-differences coefficient, which is the interaction of time and treatment indicators. The dependent variable in all columns is years of caregiver aspirations about education of the child. The first three columns are estimated on the full sample, whereas the last three columns are based on the matched sample. The first column includes no covariates, whereas the second column controls for child and household covariates including: school enrollment and z score of maths test scores of children, household wealth index, household head sex, household head age, mother's education, household ownership of any livestock, the total area of land owned and household composition based on age and sex. The third column adds dummies for experiencing shocks including drought, flooding, erosion, frost, pests on crops, crop failure, pests on storage and pests on livestock. The same is true with the last three columns.

5.2. Impact of PSNP on actual educational attainments

Educational aspirations are very important for future education and work, as recently documented by some studies [see for instance Favara, 2017, for Ethiopia]. In this paper, we claim that an important channel through which the PSNP program could positively affect actual educational attainment is educational aspirations. Although it is difficult to estimate the mediated causal effect of aspiration on years of education, in this section, we provide the reduced form evidence, *i.e.*, the effect of PSNP on actual educational attainment. We perform the same empirical analysis as in section 5.1, with years of actual educational attainment (measured in terms of the years of schooling the child has completed) as outcome of interest.

In Ethiopia, primary education consists of two cycles: the first cycle includes grades 1–4, and the second cycle includes grades 5–8. Even if primary education is compulsory by law (children should start going to school at age 7), late enrollment is a common phenomenon, especially in rural areas. In addition, it is quite common that children drop out of school and come back after a certain period. These behaviors lead children to reach compulsory educational targets at a later age and are a barrier for further education. At the end of the second cycle of primary education, students are required to sit for 8th grade regional examination to enter high school. Secondary education consists of two cycles: the first cycle is the general secondary education including grades 9–10 and the second cycle is preparatory school including grades 11–12. Table 4 shows that on average, at age 15 and 19, children have completed about 5 and 7.8 years of education, respectively, as opposed to 8 and 12 years of education per the expected ideal scenario. This implies that children might complete their primary and/or secondary education at later ages, and completed primary education can be already seen as a success in rural Ethiopia. In terms of the proportion of children enrolled in school, 99% of individuals are enrolled in school at age 12, 91 and 64% at ages 15 and 19, respectively. The enrollment rate at age 19 is quite high and this is expected due to the slow grade progression and late school enrollment.

Table 4. Years of Education and Enrollment Rate by Survey Rounds

Survey rounds	Average years of education	SD	Currently enrolled in school	SD	N
2006 (Age 12)	2.60	1.429	0.995	0.072	193
2009 (Age 15)	5.01	1.801	0.912	0.284	193
2013 (Age 19)	7.75	2.346	0.642	0.481	193

Notes: Years of education refers to the highest education level the child has completed. The second column shows the average years of education by survey years among older cohort children, the third column is the standard deviations, the fourth column is the percentage of children enrolled in school, the fifth column is the standard deviation and the last column is the number of observations for each survey rounds.

Table 5 shows the results for the DID estimates of PSNP on actual years of educational attainments both in the short run (Panel A) and in the long run (Panel B). The results indicate that PSNP has a significant effect on the years of actual educational attainment in the short run but not in the long run (columns (3) and (6) show that PSNP increases education by 0.35 school years in the short run). One possible explanation for the difference between short- and long-term effects might be the fact that our sample focused on rural areas where there are very few high schools. In rural Ethiopia, the government has invested a lot in the construction of primary schools but not as much in secondary schools. Due to the absence of secondary schools in nearby areas, pupils are forced to move to towns to continue their education, which requires family investment for accommodation and housing.

To further investigate this issue, we consider the effect of PSNP on actual educational attainments at different cut-off points. Figure 4 reveals that PSNP increases the probability of completing the lower years of education (6 and 7 years of schooling) by around 17 and 15% in the short run, and of completing relatively higher years of education (10, 11 and 12 years of education) in the long run by around 14, 10 and 7%, respectively.[10] This implies that although the average effect of PSNP on the years of educational attainments is not significant, there is evidence that the program affects actual educational attainments both in the short run and in the long run, at least for some relevant cut-off points.

N.B: the coefficients after 9 and more years of education are dropped because there are no enough number of children who reached grade 9.

5.3. Analysis of possible mechanisms

In this section, we perform some analysis that would help us better understand how educational aspirations and attainment are affected by households' participation in the PSNP. Aspiration frustrations could induce individuals to take the wrong decision of investing less in education. Children may lose focus on education and spend less time on studying; households may invest less money in children's education. PSNP, increasing household income, could make households (and their children) feel less poor and therefore more optimistic about the future, with greater aspirations and more willing to focus and thus put them in a better position to invest in education (*e.g.*, Genicot and Ray, 2017; Banerjee *et al.*, 2021).

In an attempt to test whether these mechanisms are at play, we construct a measure of subjective relative poverty status; we consider the following question: "Compared to other households in this VILLAGE, would you describe your household at the moment as: 01 = The richest, 02 = Among the richest, 03 = Richer than most households, 04 = About average, 05 = A little poorer than most households, 06 = Among the poorest, 07 = The poorest, 30 = Other specify", and we construct a dummy variable that takes the value

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[10] Table A3 in the Appendix shows the DID coefficients from the estimation of the impact of PSNP on educational attainments at different cut-off points.

Table 5. Impact of PSNP on Actual Educational Attainments

	Full sample			Matched sample		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Short run						
Year dummy (2009)	2.305***	2.260***	2.139***	2.305***	2.246***	2.126***
	(0.123)	(0.163)	(0.161)	(0.123)	(0.164)	(0.162)
DID	0.218	0.284*	0.351**	0.225	0.282*	0.349**
	(0.151)	(0.152)	(0.151)	(0.152)	(0.154)	(0.152)
R^2	0.833	0.858	0.864	0.833	0.856	0.862
No. of children	193	193	193	188	188	188
N	386	386	386	376	376	376
Panel B: Long run						
Year dummy (2013)	5.010***	4.932***	4.798***	5.010***	5.135***	5.003***
	(0.162)	(0.323)	(0.339)	(0.162)	(0.308)	(0.326)
DID	0.297	0.166	0.234	0.304	0.138	0.210
	(0.260)	(0.259)	(0.254)	(0.257)	(0.262)	(0.254)
R^2	0.895	0.920	0.924	0.899	0.921	0.926
No. children	193	193	193	188	188	188
N	386	386	386	376	376	376
Household and child controls	NO	YES	YES	NO	YES	YES
Shocks	NO	NO	YES	NO	NO	YES

Robust standard errors in parentheses, clustered at child level * $p < 0.1$,** $p < 0.05$, *** $p < 0.01$ *Notes:* Robust standard errors in parentheses, clustered at child level. Fixed effects is adopted as a baseline regression in all the specifications. DID refers to the difference-in-differences coefficient, which is the interaction of time and treatment indicators. The dependent variable in all columns is years of actual educational attainments. The first three columns are estimated on the full sample, whereas the last three columns are based on the matched sample. The first column includes no covariates, whereas the second column controls for child and household covariates including: school enrollment and z score of math test scores of children as proxy for cognitive outcome, household wealth index, household head sex, household head age, mother's education, household ownership of any livestock, the total area of land owned and household composition based on age and sex. The third column adds dummies for experiencing shocks including drought, flooding, erosion, frost, pests on crops, crop failure, pests on storage and pests on livestock. The same is true with the last three columns. Panel A is the impact of being in the program after 3 years (the short-run results), whereas Panel B is the impact after 6 years (in the longer run).

of 1 if the answer is coded as 5, 6, 7. Table 6, Panel A, shows that PSNP decreases the probability to feel poorer than other households living in the same area, both in the long run and in the short run. Conversely, Table 6, Panel B, shows that PSNP raises (the log of) total expenditure on a child's education, which includes fees (if any), school uniforms, school materials, transportation, both in the long run and in the short run.

Finally in Panel C, we investigate whether PSNP changes the level of a child's educational investment through his/her time use. Because the program is expected to raise the income of households, from one side, it can increase educational aspirations inducing children to study more; from the other side, the work requirement of the PSNP might affect a child's time spent on several activities, inducing them to work more and study less. In other words, because households that are part of the PWP are required to contribute labour, there could be scenarios where children might substitute for household work activities and other income-generating activities. This might affect the time spent on studying and their time investment
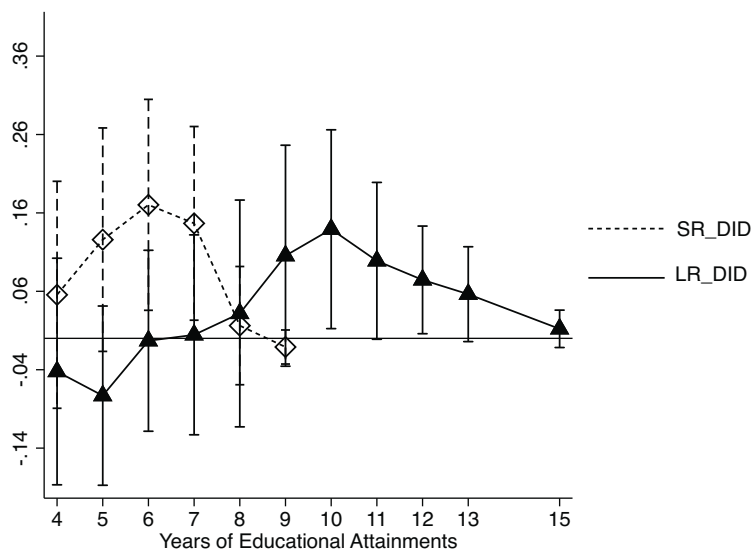
Figure 4. Impacts of PSNP on Actual Years of Education at Different Cut-Off Points. *Notes:* The figure depicts the DID coefficients from the estimation of the impact of PSNP on educational attainments at different cut-off points. The labels on the *x*-axis indicate that the years of educational attainments is greater than or equal to the specific number. For instance, '4' indicates the years of actual education is greater than or equal to 4 years, whereas '15' indicates 15 or more years of actual educational attainment. Each point is the magnitude of the DID coefficient, and the bars are the confidence intervals for the specific coefficients. Both the short-run and the long-run results are presented. In addition, all the regressions are conducted after controlling all child, household and climatic variables.

in education.[11] In the survey, children are asked to specify how they spend their time in a typical weekday separated into several categories: education (in school or studying outside school), paid work (time spent in paid activities), unpaid work (work for the domestic tasks/farm business, chores and caring for household members), leisure and sleep. Focusing on studying/working activities, Table 6, Panel C, shows that we reject the hypothesis that the program has adverse effects on the time children devote to educational activities. In addition, there is no evidence of the substitution effect: no statistically significant effect on unpaid work, and if anything, some reduction, not increase, in the hours of paid work in the short run.

5.4.   Robustness checks

PSNP transfers are delivered in two variants: the PWP and the direct support program. Participants in the PWP are required to provide labour to predesigned public works to get the transfers. The direct support program, on the other hand, is an unconditional cash or food transfer to households without able-bodied members who can contribute labour to public works. The effects of the two variants on our outcomes of interest might be different. From one side, studies documented that unconditional transfers have a positive impact on the livelihoods of poor households. For instance, Haushofer and Shapiro, 2016 documented a significant impact of unconditional cash transfers on households' economic

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[11]   PSNP transfers are delivered in two variants: the PWP and the direct support program. Participants in the PWP are required to provide labour to predesigned public works to get the transfers. The direct support program, on the other hand, is an unconditional cash or food transfer to households without able-bodied members who can contribute labour to public works. See also sub-section 5.4.

and psychological well-being in Kenya. Baird *et al.,* 2014 find that both conditional and unconditional cash transfers have an impact on schooling, but conditional transfers have a higher impact provided that the conditions are school-related. On the other hand, children from households involved in the PWP may substitute working adult members either in household chores or other household tasks. This might negatively interfere with their education and their desire for education. Haile and Haile, 2012 find that child labour, which could include domestic chores and paid works, is associated with lower educational attainment. We have already provided evidence against the substitution hypothesis in Table 5, Panel C, exploiting time use information in YL survey. We now restrict the sample to participants to the PWP and exclude recipients of the direct support (7% of the households included in the sample used in Table 1). Table 7 presents the estimation results for the short run (Panel A) and the long run (Panel B) only on the PWP participants. Results are shown to be robust to the exclusion of the households that are part of the direct support program.

In the YL survey, households were asked whether they graduated from the PSNP, *i.e.,* whether they were not receiving the transfer because they were not considered poor anymore. About 17% of the respondents in our treated sample did not receive any benefit in 2013, as those in the control group. To this end, we explored whether the effect on educational aspirations/attainments would yield a different result dropping the graduated sample in the long run. Table 7 reveals that PSNP still has a significant effect on educational aspirations in the long run even after dropping the graduated households. In other words, the long-run effect of PSNP on educational aspirations is not dragged up by the graduated subsample, which is a sample of selected households that were able to support themselves and not in the program anymore in 2013. In addition, similar to the results in Panel B of Table 4, the effect of the PSNP on actual education is still not statistically significant in the long run even after dropping the sample of PSNP graduates.

6. Conclusions

In this paper, we evaluate the impact of a nationwide anti-poverty policy, the Ethiopian PSNP, on educational aspiration and attainment of children. To estimate the causal effect of the program, we exploited the difference in the time trend of the aspirations and attainments between recipients and non-recipients of the PSNP. We estimated the average treatment effect on the treated by means of a fixed-effect DID estimator. The results convey significant and positive impacts of PSNP on education aspirations and attainments both in the short run and, to a lesser extent, in the long run. The smaller effects of the program on actual education in the long run may be due to the unavailability of secondary schools in the nearby rural communities, which begs for additional investments to send children to towns. The transfers from PSNP might not be enough to cover the expenses for sending children to nearby towns. We also run the DID estimation at different cut-off points in both the short run and the long run. The program is found to affect lower years of educational aspirations and attainments in the short run and relatively higher years of educational aspirations and attainments in the long run.

We then investigated the potential mechanisms in place and we find supporting evidence of an income effect (PSNP alleviates the budget constraint of the household and allows families to invest more in children's education) and of a psychological effect: children (and their caregivers) perceive themselves as less poor and put more focus on studying.

Our results have important policy implications both at the macro and micro level. As regards the former, we provide evidence of an important and welfare-enhancing effect of the PSNP beyond its direct scope of alleviating poverty. Given the high costs of the program, this is an important piece of evidence for policymakers. At a micro, individual level, our results imply that small transfers may mean a lot for the food-insecure rural households; they could

Table 6. Impact of PSNP on Subjective Relative Poverty Status, Education Expenditure and Hours of Work/Study

	Short run		Long run	
	Full	Matched	Full	Matched
Panel A: Subjective relative poverty				
DID	−0.232***	−0.248***	−0.179**	−0.195**
	(0.0846)	(0.0863)	(0.0853)	(0.0825)
R²	0.222	0.228	0.213	0.235
No. children	193	188	193	188
N	385	375	386	376
Panel B: Education expenditure				
DID	0.417*	0.366*	1.035***	0.935***
	(0.219)	(0.212)	(0.293)	(0.291)
R²	0.159	0.165	0.363	0.352
No. children	193	188	192	187
N	381	371	332	324
Panel C: Hours of work/study				
Hours of paid work				
DID	−0.295	−0.379**	0.134	0.149
	(0.191)	(0.177)	(0.454)	(0.464)
R²	0.291	0.289	0.293	0.291
No. children	193	188	193	188
N	385	375	386	376
Hours of unpaid work				
DID	−0.091	−0.00054	0.023	0.0035
	(0.293)	(0.298)	(0.495)	(0.507)
R²	0.314	0.332	0.336	0.346
No. children	193	188	193	188
N	385	375	386	376
Hours spent in study or schooling				
DID	0.176	0.128	−0.114	−0.096
	(0.229)	(0.231)	(0.353)	(0.344)
R²	0.663	0.650	0.797	0.805
No. children	193	188	193	188
N	385	375	386	376

Robust standard errors in parentheses, clustered at child level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ *Notes:* Robust standard errors in parentheses, clustered at child level. Fixed effect is adopted as a baseline regression in all the specifications. DID refers to the difference-in-differences coefficient, which is the interaction of time and treatment indicators. The first and third columns are estimated on the full sample, whereas the second and the fourth columns are based on the matched sample. All columns control for child and household covariates including school enrollment and z score of maths test scores of children as a proxy for a cognitive outcome, household wealth index, household head sex, household head age, mother's education, household ownership of any livestock, the total area of land owned and household composition based on age and sex, dummies for experiencing shocks including drought, flooding, erosion, frost, pests on crops, crop failure, pests on storage and pests on livestock. The outcome variable in Panel A is the subjective relative poverty, in Panel B is the logarithm of expenditure on education and Panel C includes hours per day spent in paid work, unpaid work and study/school. The first two columns show the impact of being in the program after 3 years (the short-run results), whereas the last two columns show the impact after 6 years (in the longer run).

sustain their life and affect their livelihoods in different directions: in this case, we show that a financial safety net can have important spillover effects on education. Because most of the population of Ethiopia depends on a small agricultural livelihood, food insecurity, caused

Table 7. Impact of PSNP on Educational Aspirations and Educational Attainment

	Full sample		Matched sample	
	Aspirations	Actual education	Aspirations	Actual education
Panel A: Short run (Only PWP)				
Year dummy (2009)	0.140	2.152***	0.128	2.150***
	(0.710)	(0.172)	(0.712)	(0.173)
DID	1.063*	0.377**	1.022*	0.367**
	(0.562)	(0.159)	(0.571)	(0.160)
R^2	0.269	0.858	0.268	0.857
No. children	174	174	172	172
N	348	348	344	344
Panel B: Long run (Only PWP)				
Year dummy (2013)	0.259	5.127***	0.280	5.151***
	(0.529)	(0.359)	(0.528)	(0.358)
DID	1.154**	0.161	1.207**	0.112
	(0.491)	(0.272)	(0.501)	(0.273)
R^2	0.271	0.923	0.269	0.924
No. children	174	174	172	172
N	348	348	344	344
Panel C: Dropping the PSNP graduates				
Year dummy (2013)	−0.606	4.765***	0.104	4.958***
	(0.659)	(0.376)	(0.499)	(0.368)
DID	0.791**	0.201	0.850**	0.169
	(0.390)	(0.298)	(0.392)	(0.296)
R^2	0.301	0.924	0.243	0.926
No. children	176	176	171	171
N	352	352	342	342

Robust standard errors in parentheses, clustered at child level * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ *Notes:* Robust standard errors in parentheses, clustered at child level. Fixed effects is adopted as a baseline regression in all the specifications. DID refers to the difference-in-differences coefficient, which is the interaction of time and treatment indicators. The dependent variables include years of educational aspirations and years of actual educational attainments. The first two columns are estimated on the full sample, whereas the last two columns are based on the matched sample. The covariates are child and household covariates including: school enrollment and z score of maths test scores of children as proxy for cognitive outcome, household wealth index, household head sex, household head age, mother's education, household ownership of any livestock, the total area of land owned and household composition based on age and sex and dummies for experiencing shocks including drought, flooding, erosion, frost, pests on crops, crop failure, pests on storage and pests on livestock. Panel A is the impact of being in the program after 3 years (the short-run results), whereas Panel B is the impact after 6 years (the longer run results). Panel C is the impact of the program in the long run after dropping out the PSNP graduates.

mostly by natural calamities, is a threat to the rural households, and PSNP can have an important impact on a large part of the population.

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Supplementary material

Supplementary material is available at *Journal of African Economies* online.

Data availability

The data underlying this article are available in the article and in its online supplementary material.

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Table A1. Descriptive Statistics by Treatment Status at the Baseline (2006) on the 'Matched Sample'

	N_control	Control	N_treated	Treated	Difference (C-T)	P-value
Main outcomes of interest						
Years of education aspirations	105	13.657	83	13.289	0.368	0.274
Years of education	105	2.438	83	2.735	−0.297	0.156
Additional outcomes of interest						
Educational aspiration of children by the caregiver	104	14.212	83	13.687	0.525	0.047
Relative-subjective poverty compared with other hhs	105	0.152	83	0.506	−0.354	0.000
Natural logarithm of real education expenditure	103	4.983	81	4.305	0.678	0.001
Hours/day spent in paid activities	105	0.029	83	0.181	−0.152	0.073
Hours/day spent in unpaid activities	105	5.038	83	4.410	0.628	0.007
Hours/day spent studying and in school	105	7.290	83	7.261	0.028	0.882
Household and child characteristics						
Currently enrolled in school	105	0.990	83	1.000	−0.010	0.375
z score of mathematics test	105	−0.311	83	−0.179	−0.132	0.360
Wealth index	105	0.212	83	0.197	0.016	0.279
Age of household head	105	46.324	83	45.807	0.517	0.734
Sex of household head—male	105	0.924	83	0.675	0.249	0.000
Mother's education—adult literacy	105	0.133	83	0.181	−0.047	0.374
Mother's education—grade 1 and above	105	0.343	83	0.157	0.186	0.004
Household owned any livestock	105	0.962	83	0.867	0.094	0.018
Total area of land owned by the hh	105	1.754	83	1.033	0.720	0.099
Household composition						
No. males aged 0–5	105	0.352	83	0.277	0.075	0.378
No. males aged 6–12	105	0.790	83	0.542	0.248	0.022
No. males aged 13–17	105	0.714	83	0.422	0.293	0.001
No. males aged 18–60	105	1.724	83	1.277	0.447	0.006
No. males aged 61+	105	0.086	83	0.145	−0.059	0.205
No. females aged 0–5	105	0.381	83	0.373	0.007	0.930
No. females aged 6–12	105	0.590	83	0.614	−0.024	0.809
No. females aged 13–17	105	0.724	83	0.590	0.133	0.233
No. females aged 18–60	105	1.667	83	1.578	0.088	0.519
No. females aged 61+	105	0.067	83	0.036	0.031	0.357
Shocks						
Shock-drought	105	0.581	83	0.470	0.111	0.131
Shock-flooding	105	0.333	83	0.157	0.177	0.006
Shock-erosion	105	0.210	83	0.096	0.113	0.036
Shock-frost	105	0.229	83	0.145	0.084	0.148
Shock-pests on crops	105	0.238	83	0.072	0.166	0.002
Shock-crop failure	105	0.410	83	0.410	−0.000	0.999
Shock-pests on storage	105	0.105	83	0.024	0.081	0.030
Shock-pests on livestock	105	0.152	83	0.060	0.092	0.047
Observations	188					

Notes: *Mother's level of education has three categories: No education (66%), Grade 1 and above (22%) and adult literacy (12%). The first and the second columns describe the number of observation and the mean of the variables for the control group; the third and the fourth column presents the number of observations and the mean for the treatment group; whereas the last two columns are the difference between the mean values of the treatment and the control groups and the *P*-values corresponding to the *t*-tests with different variances, respectively.

Table A2. Impact of PSNP on Educational Aspirations and Actual Attainments (Full Covariates)

	Years of education aspirations		Years of education attainments	
	(SR)	(LR)	(SR)	(LR)
Year dummy (2009)	−0.146		2.139 ***	
	(0.616)		(0.161)	
Year dummy (2013)		−0.297		4.798***
		(0.670)		(0.339)
DID	1.046 **	0.999**	0.351**	0.234
	(0.508)	(0.453)	(0.151)	(0.254)
Currently enrolled in school	1.984	1.333**	0.809**	1.024***
	(1.656)	(0.531)	(0.337)	(0.284)
z score of mathematics test	0.707**	0.509*	0.0174	0.158
	(0.294)	(0.272)	(0.0865)	(0.112)
Wealth index	−2.847	−2.582	0.296	4.160***
	(3.537)	(2.037)	(0.886)	(1.110)
Age of household head	−0.109	0.134*	−0.00803	0.0219
	(0.0686)	(0.0725)	(0.0117)	(0.0219)
Sex of household head—male	2.042*	−1.606	−0.196	−0.760*
	(1.147)	(1.053)	(0.433)	(0.447)
Mother's education—adult literacy	1.043	1.447*	0.406	0.551
	(0.736)	(0.755)	(0.265)	(0.469)
Mother's education—grade 1 and above	−0.288	1.730*	0.120	0.637
	(1.329)	(0.941)	(0.301)	(0.420)
Household owned any livestock	−1.337	0.159	−0.0134	0.253
	(0.940)	(0.574)	(0.259)	(0.354)
Total area of land owned by the hh	0.00614	−0.00113	−0.00542	−0.000566
	(0.0373)	(0.00116)	(0.0133)	(0.000708)
No. males aged 0–5	−0.382	−0.0228	−0.186	0.133
	(0.493)	(0.374)	(0.169)	(0.208)
No. males aged 6–12	−0.0203	−0.0121	0.196	0.323
	(0.588)	(0.321)	(0.189)	(0.204)
No. males aged 13–17	−0.559	−0.0237	0.0521	0.307
	(0.576)	(0.381)	(0.215)	(0.228)
No. males aged 18–60	−0.0611	−0.199	0.203	0.234
	(0.577)	(0.284)	(0.166)	(0.236)
No. males aged 61+	−1.334	0.531	0.503*	0.795***
	(1.204)	(0.523)	(0.291)	(0.301)
No. females aged 0–5	−0.123	−0.139	−0.490**	−0.427**
	(0.538)	(0.389)	(0.201)	(0.190)
No. females aged 6–12	0.408	−0.494	−0.0392	−0.288
	(0.643)	(0.361)	(0.193)	(0.185)
No. females aged 13–17	0.193	−0.687*	−0.00239	−0.302
	(0.929)	(0.402)	(0.319)	(0.219)
No. females aged 18–60	0.865	−0.177	−0.112	−0.433*
	(0.868)	(0.447)	(0.364)	(0.232)
No. females aged 61+	2.087	−2.151*	0.759***	0.120
	(1.263)	(1.131)	(0.286)	(0.459)

(Continued)

Table A2. Continued

	Years of education aspirations		Years of education attainments	
	(SR)	**(LR)**	**(SR)**	**(LR)**
Shock-drought	−0.863**	−0.279	0.0344	−0.179
	(0.364)	(0.354)	(0.120)	(0.235)
Shock-flooding	−0.761	0.285	−0.0104	−0.405
	(0.521)	(0.622)	(0.155)	(0.250)
Shock-erosion	−0.672	−1.975***	−0.491**	−0.710**
	(0.701)	(0.735)	(0.226)	(0.327)
Shock-frost	−0.737	0.684	0.170	0.192
	(0.504)	(0.560)	(0.159)	(0.216)
Shock-pests on crops	−0.817	0.371	−0.0304	0.210
	(0.612)	(0.505)	(0.180)	(0.293)
Shock-crop failure	−0.234	0.195	−0.0509	0.215
	(0.382)	(0.307)	(0.106)	(0.198)
Shock-pests on storage	1.891*	0.710	−0.218	−0.0890
	(0.997)	(0.774)	(0.221)	(0.588)
Shock-pests on livestock	0.555	1.311**	0.215	0.219
	(0.524)	(0.596)	(0.161)	(0.347)
Constant	16.58***	8.545***	2.126	0.371
	(4.443)	(2.856)	(1.341)	(1.076)
R^2	0.219	0.312	0.864	0.924
N_g	193	193	193	193
N	386	386	386	386

Robust standard errors in parentheses, clustered at child level * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A3. Impact of PSNP on Educational Aspirations and Actual Attainments—Cut-Off Points

	Aspirations		Actual education	
	(SR)	(LR)	(SR)	(LR)
DID_Y4	0.0559*	0.0293	0.0556	−0.0423
	(0.0311)	(0.0227)	(0.0738)	(0.0737)
R^2	0.214	0.257	0.607	0.719
DID_Y5	0.0629*	0.0414*	0.126*	−0.0731
	(0.0324)	(0.0243)	(0.0727)	(0.0583)
R^2	0.172	0.271	0.632	0.863
DID_Y6	0.0629*	0.0414*	0.170**	−0.00305
	(0.0324)	(0.0243)	(0.0686)	(0.0589)
R^2	0.172	0.271	0.471	0.855
DID_Y7	0.0629*	0.0259	0.147**	0.00450
	(0.0324)	(0.0277)	(0.0630)	(0.0650)
R^2	0.172	0.278	0.334	0.791
DID_Y8	0.0629*	0.0361	0.0162	0.0318
	(0.0324)	(0.0293)	(0.0385)	(0.0738)
R^2	0.172	0.256	0.141	0.661
DID_Y9	0.0671*	0.0533*	−0.0110	0.105
	(0.0343)	(0.0322)	(0.0111)	(0.0719)
R^2	0.221	0.238	0.0714	0.507
DID_Y10	0.0671*	0.0533*		0.139**
	(0.0343)	(0.0322)		(0.0647)
R^2	0.221	0.238		0.365
DID_Y11	0.136**	0.0688		0.0989*
	(0.0537)	(0.0649)		(0.0510)
R^2	0.211	0.197		0.239
DID_Y12	0.146***	0.0688		0.0746**
	(0.0528)	(0.0649)		(0.0350)
R^2	0.223	0.197		0.155
DID_Y13	0.0466	0.162*		0.0564*
	(0.0928)	(0.0843)		(0.0309)
R^2	0.193	0.247		0.109
DID_Y14	0.0747	0.164*		0.0122
	(0.101)	(0.0852)		(0.0122)
R^2	0.184	0.293		0.0769
DID_Y15	0.0747	0.164 ^**		0.0122
	(0.101)	(0.0852)		(0.0122)
R^2	0.184	0.293		0.0769
N_g	193	193	193	193
N	386	386	386	386

Robust standard errors in parentheses, clustered at child level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ *Notes:* The table depicts the DID coefficients from the estimation of the impact of PSNP on educational aspirations and actual educational attainments at different cut-off points. The first column indicates that the years of educational aspirations or attainments is greater than or equal to the specific number. For instance '4' indicates the years of aspiration or attainment is greater than or equal to 4 years, whereas '15' indicates 15 or more years of educational aspiration or attainments. In addition, all the regressions are conducted after controlling for child, household and climatic variables.
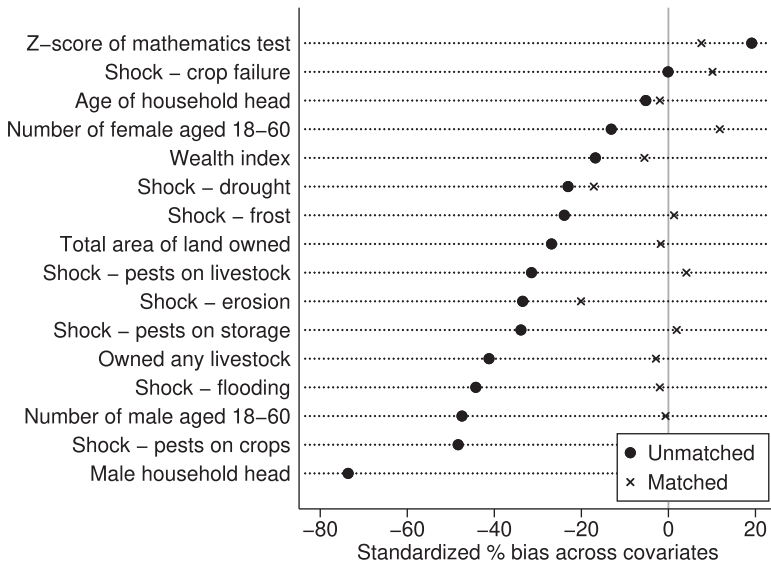
Figure A1. Checking for Balance After Matching. *Notes:* The figure indicates the standardised percentage bias across the covariates for the matched and unmatched samples. Zero indicates absence of bias for each of the covariates listed on the *y*-axis and can be seen that the percentage bias for the matched sample is closer to zero.