International Labour Organization

ILO Working Paper 18

12 / 2020

More is more. Livelihood interventions and child labor in the agricultural sector

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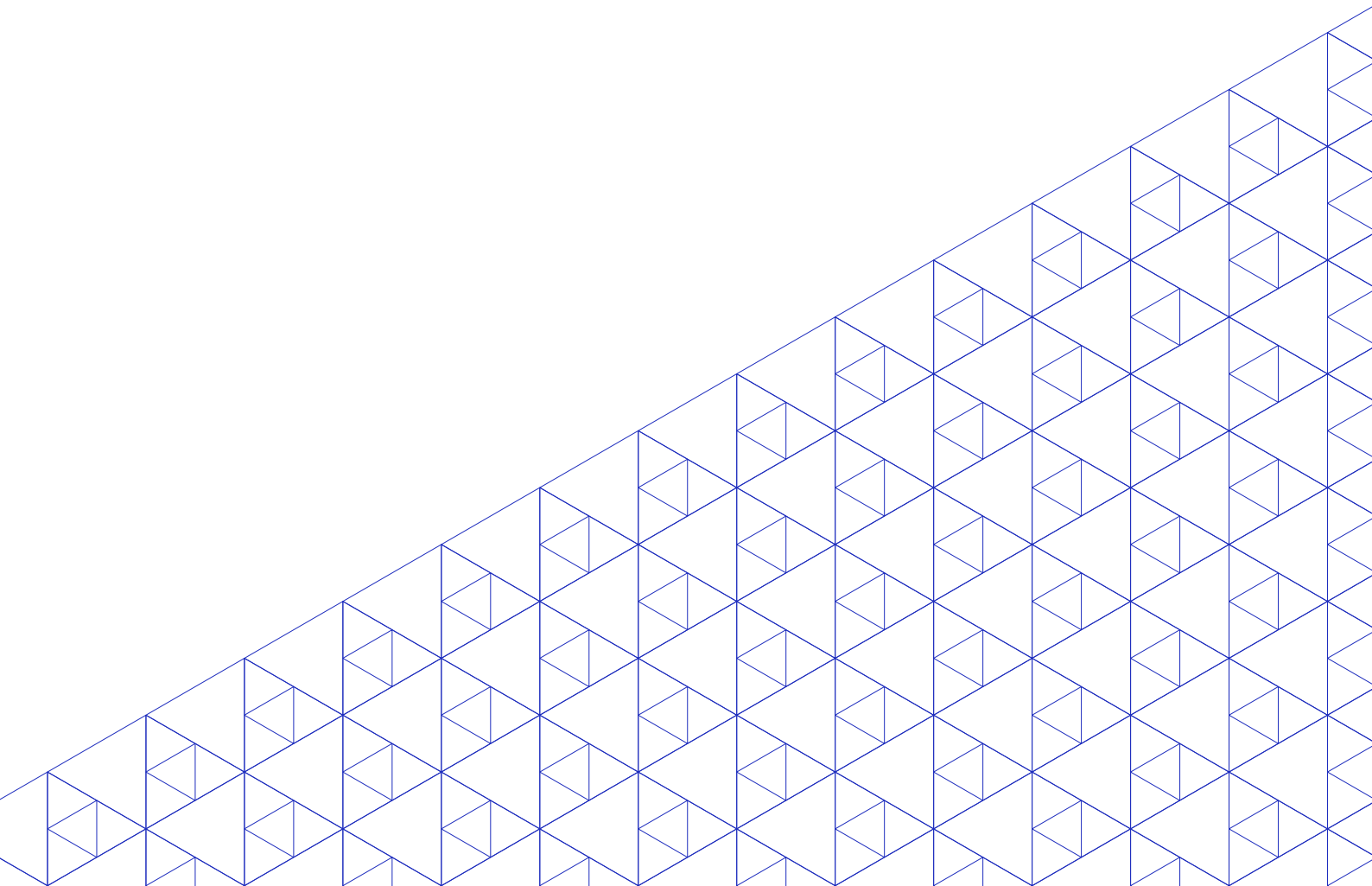

ISBN: 9789220337523 (print)
ISBN: 9789220337530 (web-pdf)
ISBN: 9789220337547 (epub)
ISBN: 9789220337554 (mobi)
ISSN: 2708-3446

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Authorization for publication: SAMANS Richard Marc, Department Director, RESEARCH

ILO Working Papers can be found at: www.ilo.org/global/publications/working-papers

Suggested citation:
Chiodi, V., Escudero, V. 2020. *More is more. Livelihood interventions and child labor in the agricultural sector*, ILO Working Paper 18 (Geneva, ILO).

Abstract

What works to reduce child labor in agriculture? In this paper, we evaluate two randomized livelihood intervention programs, aimed to reduce child labor, particularly in its most exploitative forms, in rural areas of Peru and the Philippines. In the first randomized experiment, we evaluate a livelihood intervention provided to farmers in Peru that use the labor of their children on their family farms, accompanied by an education intervention aimed to improve the quality of schools and an awareness-raising intervention. In the second randomized experiment, we evaluate the incremental effect of the livelihood intervention implemented within a similar program in the Philippines, focused on the sugarcane agricultural sector. We find that when livelihood interventions were provided alone, they did not manage to improve economic conditions, and hence generally failed to reduce child labor rates in rural areas. However, when the livelihood intervention was combined with measures to improve the quality of education in Peru, we see a reduction in hazardous child labor and child labor overall. Awareness-raising interventions, aimed at changing the perceptions of parents through community interaction, appear to have also had an effect in the reduction of child labor, and these effects were reinforced by education interventions. Results indicate that a comprehensive approach including livelihood support with education and awareness-raising components is a more effective way to reduce child labor and hazardous labor for children in the agricultural sector.

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Introduction[1]

Child labor continues affecting an exceedingly large share of children worldwide. An estimated 152 million children aged 5 to 17 years were victims of child labor[2] in 2016 (ILO, 2017a). Although this figure has decreased during the last decade, child labor remains a pressing issue affecting 1 of every 10 children in the world, and a persistent driver of intergenerational vulnerability. Moreover, child labor weights disproportionately more on the poor and it is predominantly concentrated in rural areas. Of all children of 5-17 years of age who are in employment, 71 percent work in agriculture, and the share is even higher (83 percent) for those aged 5 to 11 years. It follows that being engaged in child labor also means for many children being exposed to hazardous labor.[3] In fact, around half of the children engaged in child labor, suffer also from hazardous work. This figure is even higher in the agricultural sector (ILO, 2017a) in many countries. This is the case of Peru and the Philippines, which motivates the focus of this paper.

We evaluate the effects of two programs implemented in 2011 to reduce child labor, particularly in its most exploitative forms, in rural areas. The first program, "Semilla", was implemented in three departments in Peru: Huancavelica, Junin and Pasco, which are predominantly rural and above the national rates of poverty and child labor. Three interventions of the Peruvian program are the focus of the impact evaluation: First, the livelihoods intervention, which aims to improve directly the outcomes of the agricultural activities performed by farmers who use the labor of their children on their family farms, through various agriculture and production services (e.g. improvement of crops, agricultural technical assistance, support for generating value added to products, etc.). Second, the Multi-Grade (MG) intervention, an educational model designed primarily for the rural sector, which aims to contribute to improving the quality of schools through a combination of various interrelated services (e.g. teacher training, teaching materials and textbooks, etc.). Third, a cross-cutting awareness-raising component which encourages communities to reduce the use of child labor in agriculture and to take a more active role in the school. For the purposes of the impact evaluation, these awareness-raising activities are considered part of both interventions, as they cannot be disentangled from them.

The second program, the "Livelihoods, Education, Advocacy and Protection against Exploitative Child Labour in Sugarcane (ABK3 LEAP)", was implemented in 17 sugarcane-growing provinces in the Philippines, with the objective of reducing exploitative child labor in sugarcane-growing areas in the country. The impact evaluation of the Philippines program focuses on the income diversification intervention included as part of the livelihood intervention of the program, which aimed to increase the disposable income and assets of beneficiary households in order to keep children in school and out of hazardous child labor. It focused on improving the productivity of crops that families already grew (including sugarcane), introducing other short-term agricultural and husbandry activities and running small sari-sari (variety) stores. This program also provided a range of other interventions (e.g. education, youth employment, social protection, advocacy,

[1] We would like to thank Hugo Ñopo (GRADE) and Lorenzo Guarcello (ILO) for insightful comments, Johannes Brehm for significant contributions and excellent research assistance and to Magnus Bjørnbekk and Leopoldo Miotto for research assistance during the initial stages of the research. The evaluations of the programs presented in this study were prepared initially for the International Labour Office and the United States Department of Labor. Funding for these reports was provided by the United States Department of Labor. Thanks are due to Peter Wichmand for his support throughout the development of the evaluations. The responsibility for opinions expressed in this article rests solely with the authors, and publication does not constitute an endorsement by the International Labour Office of the opinions expressed in it.

[2] Table 19 in the Appendix provides all definitions of key variables. Child labor refers to "work that deprives children of their childhood, their potential and their dignity, and that is harmful to their physical and/or mental development" (ILO, 2002). Children in child labour is a narrower category than children in permitted child work. Whether or not child work is indeed child labour depends on whether children are below the minimum age according to ILO Convention No. 138 (1973), and whether the type of work they perform falls outside permitted light work, otherwise classified as a worst form of child labour, or as hazardous work according to ILO Convention No. 182 (1999).

[3] According to the ILO Convention No. 182, children in hazardous work includes those involved in any activity or occupation that, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children (ILO, 2017a). See also Table 19 in the Appendix.

capacity building and awareness-raising), which cannot be analyzed independently. As a result, we are assessing the incremental effect of the livelihoods intervention on participants.

The main questions we seek to answer with this paper are, first, whether livelihood support interventions are effective in reducing child labor in rural areas. Second, whether the effectiveness of the livelihood support is reinforced when combined with education interventions focused on improving the quality of schools; and third, whether livelihood support benefits from awareness-raising interventions aimed at changing the perceptions of parents through community interaction. Although the livelihood support interventions implemented as part of the broader programs in Peru and the Philippines are not identical, their objectives coincide, and their characteristics are sufficiently close for us to be able to exploit their similarities to compare their effects.

A large body of literature has investigated the relationship between child labor and family income. One line of research finds that families cannot afford to do without child labor if their income from other sources is low or if the household faces borrowing constraints (e.g. Baland and Robinson, 2000; Dehejia and Gatti, 2005; Fallon and Tzannatos, 1998; Grootaert and Kanbur, 1995; and Ranjan, 2001). For example, Edmonds (2005) finds that child labor tends to increase and school attendance decline while families are going through difficult economic times. Following this line of reasoning, the opposite relationship should hold – as family income increases, child labor should decline while school attendance increase. This "luxury axiom" posits that parents are altruistic and have a strong preference for leisure and schooling of their children (Basu and Van, 1998; Parsons and Goldin, 1989). Therefore, increases in wealth should lead to an income effect, which encourages the consumption of normal goods, including child leisure and schooling.

In a way, this strand of the literature rationalizes the idea, demonstrated empirically by Baland and Robinson (2000), that child labor constitutes an inefficient allocation of resources since it does not take into account the potential future gains from a well-educated child. However, parents are not always able to allocate their resources in an optimal way across time because of diverse constraints leading to a strong preference for the present. For example, families in developing countries cannot afford to send their children to school since they rely on the additional income. Several empirical studies show that this inefficiency especially occurs in poor rural areas where people are highly dependent on agricultural activities (Ksoll et al., 2016). As agricultural activities are highly volatile (owing to their cyclical nature) and highly vulnerable to external shocks, such as droughts and floods, farmers often use child labor as a means to cope with income shocks and smooth their effects (Beegle et al., 2006).

A second strand of the literature on the relationship between child labor and family income endorses the "wealth paradox" according to which children in poor families endowed with productive assets are more likely to be in work (Bhalotra and Heady, 2003; Parsons and Goldin, 1989). Particularly, child labor tends to increase during periods of economic growth in households that have access to land. This research points to the existence of an additional substitution effect whereby increases in wealth, in the form of workable land, raise the opportunity cost of children's leisure and schooling, thereby increasing the incidence of child labor. For example, in the context of Vietnam, Edmonds and Turk (2004) find that households who have their own businesses are more likely to have their children engaged in labor. Illiquidity in land markets and labor market rigidities may explain this wealth paradox. To avoid the negative consequences of unexpected shocks, households in rural areas prefer to maintain the level of child labor and avoid other types of investment (Carter and Barrett, 2006; Rosenzweig and Binswanger, 1993). Studies have found that the risk of moral hazard, shirking and theft is perceived to be lower in the presence of child labor than with hired labor (Deolalikar and Vijverberg, 1987; Foster and Rosenzweig, 1994).

It follows from these findings that as child labor is often used by households as a buffer against shocks, policies to increase risk-coping strategies are likely to reduce child labor. The question is what other options a household may have to face volatility and income shocks? In line with the programs we analyze in Peru and the Philippines, improving technical knowledge in agricultural practices is one of the available strategies

for improving farmers' productivity and income.[4] Yet, the evidence in this regard is neither extensive nor consistently positive. Feder et al. (2004) found no impacts from farmer training programs in a study over a period of nine years in Indonesia, where the benefits of training appear to be neutralized by climatic shocks or other types of risks affecting vulnerable households. This contrasts with a study by Karlan and Valdivia (2010), which evaluated an intervention in Peru implemented by FINCA Perú that complemented a group lending program for female micro-entrepreneurs with training services. They found that, although the overall effect of the program on child labor was not statistically significant for either boys or girls, it had a positive effect in the number of hours girls dedicated on average to school and schoolwork. An even clearer effect was found by the evaluation of the "Fund for Investments in Telecommunications (FITEL)" – which provided at least one public telephone in each of the 6,509 rural villages that lacked communication services – in Peru (Beuermann, 2015). It found that phone access generated sharp increases in income through higher prices earned by farmers for their agricultural production, and a reduction in agricultural costs that translated into a reduction in child work in marketplaces.

Also relevant for the study of the two child labor programs of this paper is the role of education in the relationship between child labor and family income. As mentioned above, the literature does not unanimously support the rational premise that household decisions regarding children's education and work are based on the perceived tradeoff between the immediate returns on employment and the expected future returns on education. Nevertheless, the empirical conventional education literature has been built upon this premise by specifically looking at the reduction of direct and indirect costs of education. This is the first wave of impact evaluations on the subject, which explored the demand side of education, namely the positive impact of transfers on school attendance and their (indirect) impact on child labor through income and substitution effects (Raju, 2006). In this regard, impact evaluations of input-based programs (which provide scholarships, school meals, free school uniforms and textbooks) have been found to decrease absenteeism and dropout rates significantly, thereby reducing child labor (Ranzani and Rosati, 2014; Ravallion and Wodon, 2000; Skoufias et al., 2001). Likewise, several CCTs that incorporate conditionalities on school attendance have shown positive effects on school attendance, coupled in many instances with a reduction of child labor (Skoufias et al., 2001; Yap et al., 2009; Bourguignon et al., 2003). However, that schooling substitutes for child labor is not the final word on the subject. In fact, some impact evaluations have shown that school attendance may rise without any reduction in child work (de Hoop and Rosati, 2012; de Hoop et al., 2017); or that even if hazardous child labor is reduced, hours in education appear to increase along other forms of child employment (Edmonds and Shrestha, 2014). The findings highlight the fact that interventions could result in an increase of children combining education and work. This makes the case for the implementation of other interventions alongside education to reduce child labor, as in the case of the programs evaluated in this paper.

It is important to note that although less numerous, there are also some studies (e.g. Andre et al., 2019) that find that even if families are compensated with an adequate monetary incentive, working children are often not enrolled in school – i.e. demand for education is inelastic to income. How programs are designed thus determines the effect that conditional cash transfers have on child labor. Too short or meager incentives could lead either to a failure to increase schooling enrollment rates, or to a joint increase in schooling and child labor. In the latter case, additional hours of child labor would be necessary to finance the additional schooling (de Hoop et al., 2017; Kye and Miae, 2016).

More directly related to our study, recently, new questions have been raised as to whether it is the quantitative level of school inputs or the way these sources are utilized that determines schooling decision-making at the household level. As a result, supply-side interventions (e.g. school accessibility or the indirect costs of schooling) have been increasingly emphasized in a second wave of impact evaluations, which look at the quality of education. For example, Andisha et al. (2014); de Hoop and Rosati (2012); Duflo (2001); and Rosati and Rossi (2007) find an increase in attendance rates in the face of improvements in school infrastructure,

[4] Another strategy cited in the literature is the extension of health and accident insurances, which can reduce the amount of child labor in developing countries, due to the lower impacts of economic shocks on households (Landmann and Froelich, 2015).

teacher training and textbook quality. However, education is not a perfect substitute for child labor. For instance, de Hoop and Rosati (2012) find that new schools in Burkina Faso increased time spent by children both in education and in employment. Hence, it is essential to focus explicitly on the causal mechanisms between the increase in school enrollment and the reduction in the child work participation rate, as resting on the assumption of the positive education-child labor spillover effect might be misleading.

It is therefore not surprising to see that there is no consensus on the effects of education (demand and supply) on child labor. In particular, since there is an underlying difficulty in assessing the causal relationship between the two. Indeed, the relationship between family income, adult work and child work is not straightforward, as it will depend on intra-household allocation decisions that are hard to predict (Lavecchia et al., 2016). For example, existing norms and the interactions within a community may have an impact on household decision-making, especially when it comes to investment decisions (Macours and Vakis, 2009). Understanding this strand of the literature is thus also central for our paper, as the two programs we evaluate include awareness-raising components aimed at changing the perceptions of parents regarding education and child labor through community interactions. In this regard, the literature has found that community interactions can shape particular norms on child labor and schooling decisions (Strulik, 2008), which can ultimately explain why two communities with the same level of poverty and same observable characteristics can make very different decisions regarding child labor – going beyond purely path-dependent explanations (Strulik, 2013). For instance, using data from the World Bank and administrative surveys, Ray (2000) shows that a Peruvian child is less likely to engage in child labor than a Pakistani child, ceteris paribus. Similar situations are observed in India, where states with similar levels of poverty (for instance Kerala and Rajasthan) have very different school enrollment rates (Kingdon and Banerji, 2009). In this regard, behavioral economics can contribute to the study of child labor decisions. It helps understand why the classical model of family income and education cannot fully explain individuals' choices as it fails to acknowledge the limitations of full rationality assumptions (Lavecchia et al., 2016). For example, cognitive developments and lack of information have been found to lead individuals (especially young people) to discount wrongly future educational outcomes (Lavecchia et al., 2016), which may explain why parents might choose child labor over education.

To sum-up, although there have been a number of impact evaluations on separate livelihoods and educational interventions, the evidence remains inconclusive with regards to (i) the effects of livelihood interventions targeting rural areas and focusing on agricultural practices, and (ii) the direct impact of supply-side education programs on child labor. Moreover, the literature is scant with regards to the impact on child labor and school attendance from projects that combine both livelihood and education interventions. As such, one strength of our paper is that we provide evidence on two similar livelihood interventions implemented in different sectors (one on the broader rural sector and the other a specific agricultural sector) and different contexts (as the prevalence of child labor is different in Peru and the Philippines, and both countries have different levels of development). Second, our paper contributes to narrowing the knowledge gap on the combined effects of livelihoods and supply-side educational interventions on child labor in rural areas. A third value added of our paper is that our impact evaluation design allows studying the whole range of household economic activities, which helps drawing conclusions on the correlations between adults' and children's activities. More generally, our paper contributes to the knowledge base on the relationship between child labor and livelihood support provided to the hiring family farms, and the linkages with education and awareness raising.

To evaluate the impact of both interventions, we use a randomized experimental design, where the assignment of the households to intervention and control groups was done through a two-step randomization process. In the case of Peru, the first randomization was done at the community level, then within the intervention at the household level. In the case of the Philippines, the first randomization was done at village or barangay level, then within the intervention at the household level. In terms of the comparison groups, there are three groups in Peru: households in communities that receive a livelihoods intervention; households in communities that receive livelihoods and education interventions; and households in communities that do not receive either of these interventions. Both treated communities in Peru are also provided with awareness-raising on child labor. In the Philippines, we have one treatment group that receives

the livelihood intervention and a control group made up of households that do not receive this particular intervention. In the case of the Philippines, both treatment and control groups receive several other interventions as mentioned above, so we would be assessing the incremental effect of the livelihood intervention on participating households.

One main conclusion that emerges is that, when significant, the impacts of the livelihoods and combined livelihoods and education interventions are relatively marginal. Still, some interesting effects emerge. On the one hand, the evaluation of the Peruvian intervention shows that the effects of the combined interventions outperform those of the livelihoods intervention delivered alone, in terms of the main objective of reducing child labor and hazardous child labor. In terms of education outcomes, however, the results of the education approach show a relatively low effectiveness to meaningfully improve key educational outcomes in relation to school enrolment, attendance, and completion in the medium term. On the other hand, the livelihoods intervention is shown as more effective when delivered alone than when delivered in combination with the education intervention in terms of children's education, adult work, and household behavior, including women's appreciation of the value of education and condemnation of child labor. Interestingly, both the combined approach and the stand-alone livelihood intervention show that around the mid-point of the implementation of the program, there was a reduction in the participation of children in hazardous activities explained by an intra-household reallocation of hazards (i.e. adults assuming more hazards at work while children reducing them while working). Finally, neither the combined approach nor the stand-alone livelihood intervention leads to higher agricultural diversification, an increase in the use of technology or a greater adoption of improved agricultural practices.

Moreover, in the case of the Philippines, we find virtually no incremental effects of the income diversification intervention. Participating in income diversification activities had no effect on child labor nor on school enrollment and attendance. However, a trade-off was observed between a rise in small-scale family agriculture and a slight decline in business activities. This would seem to signal a shift towards agricultural activities from non-agricultural activities, with no change in the overall income and financial circumstances of the households concerned. Finally, as in the case of Peru, the findings of the Philippines show that sources of income did not become more diversified for the overall population as a result of the intervention.

Looking at the findings from the two evaluations together, we can argue that the livelihood support does not appear to be as effective in reducing child labor in rural areas, as the literature points out outside the agricultural sector. Moreover, education interventions aimed at improving the quality of schools do leverage the potential effects of livelihood support, but only in terms of certain outcomes and not on those related to children's education as it would be expected by the standard literature. The key question is thus, what is driving this lack of effects? Some suggested answers arise by looking at the results of the two evaluations along with the impact evaluation surveys. First, the evaluations show that the programs were unable to boost the productivity of the farms and diversify the activities of the households, which was expected to be the steppingstone into the betterment of the children's outcomes. This lack of effects on income diversification might be related to the fact that rural farmers lack capital and financial resources, which is a natural barrier for income diversification. Moreover, while the programs promoted diversification, the increase in the number of activities may impede realizing economies of scale and economies of specialization, which in turn may have weakened economic results. Finally, part of the lack of observed impact may be explained by factors relating to the role played by income diversification strategies in household economic dynamics. In this respect, our analysis seems to suggest that awareness-raising interventions aimed at changing the perceptions of parents through community interaction can indeed play a role as suggested by the literature.

▶ 1 Background

1.1 Study population

In Peru, 1.8 million children aged 5 to 17 were working in 2013, accounting for almost a quarter of the total population in this age range, according to the National Household Survey (Encuesta National de Hogares, ENAHO) (INEI, 2013). Poverty is one of the main drivers drawing children, particularly young ones, into work in Peru. Whereas 55.8 percent of working children aged 5-13 live in poor households, the percentage is only 27 percent for similarly aged children who do not work. However, the role of poverty in driving children to work decreases with age, and the percentage of working and non-working children living in poor households converges, for children aged 14 to 17.

Whether households live in rural or urban areas is another central factor explaining child labor in Peru.[5] In fact, the majority of children (5-17 years) in employment in Peru (70.3 percent) are working in agriculture, fishing or mining (ILO, 2017c). Likewise, rural areas have the highest child labor rates in the country. Of all children aged 5 to 13 who are in employment, 75.9 percent of boys and 74.5 percent of girls live in rural areas, compared to 24 and 25.5 percent, respectively, in urban areas. As in the case of poverty, the role of the spatial divide as a driver of child labor is lower for older children (14-17 years of age). For these children, the proportions in employment between rural and urban areas are closer together – 53 and 47 percent, respectively. However, the rural-urban divide becomes more relevant for these older children when looking at hazardous labour. Whereas around 70 percent of working children aged 14-17 are in hazardous child labour in the country (according to the number of hours worked), this share rises to 86.3 percent in rural areas.

Unfortunately, child labor has a negatively lasting effect on children as it severely threatens their scholastic success (Blanco Allais and Hagemann, 2008; ILO, 2017c). School drop-out and absenteeism are some of the most common detrimental scholastic effects, which particularly affect older children living in rural areas. Whereas for the 5-13 age range the attendance rate of non-working children is only 1.1 percentage points higher than that of working children, this difference increases to 11.7 percentage points for the 14-17 age range (INEI, 2013). Combining work and school can weigh heavily on children, particularly on rural children, who unsurprisingly combine work and school more often than urban children – 39.6 percent compared to 9.5 percent, respectively. To address these challenges, the Peruvian project we evaluate in this paper, targeted poor rural households living primarily off agricultural activities. The project was carried out through a partnership between the local NGO Desarrollo y Autogestión (DyA) as primary grantee, Centro de Estudios y Promoción del Desarrollo (DESCO) and World Learning, thanks to the funding from the United States Department of Labor (USDOL) and the technical assistance of the ILO. The central objective of the project was to contribute to the prevention and eradication of indigenous and rural child labor[6], mainly in its most exploitative forms (ILO, 2017c).

The project targeted 6,500 children through the provision of educational services and their 3,000 families, through livelihoods support services. It operated in 30 rural districts of seven provinces of the departments of Huancavelica, Junin and Pasco, which suffered from the higher rates of poverty and child labour than the national average. The Sierra highlands and the Selva lowlands constitute the two main productive regions in Peru. Hence, the interventions areas are fairly representative of rural Peru where child labor remains the

[5] The definition of child labor in the Peruvian national legislation is slightly different to the international definition provided by ILO Conventions No. 138 and No. 182. See Table 19 in the Appendix for details.

[6] The implementing partners established a definition of child labor and child work which differed slightly from Peruvian legislation but that is in line with the ILO Conventions No. 138 on the minimum age for admission to employment and No. 182 on the worst forms of child labor (ILO, 2017c). See also Table 19 in the Appendix.

most present. The targeting strategy of the project was based on a three-step approach. First, it selected these provinces and departments based on national statistics (ENAHO and ESCALE). Second, it selected 130 communities served by Multi-Grades schools within the determined geographical areas. Finally, it selected participant households who met three main eligibility criteria: (i) had a child in a Multi-Grade school, (ii) their main economic activity was farming, and (iii) had access to land for cultivation. Nevertheless, the program set slightly different eligibility criteria for lowland and highland communities, which included mainly different agricultural products, and slightly less stringent requirements in terms of ownership of the land. Moreover, for the highlands, it added the requirement of having agriculture as the main economic activity.[7]

The population targeted by the project was on average 21 years old. Children, on the other hand, displayed a mean age of 9.5 years. Men constituted the (slight) majority of the population of the study (53 percent), but this proportion was lower than that of all household heads where 70 percent were men. Additionally, 95 percent of all household heads were farmers. Concerning land ownership, 70 percent of households owned their land. Furthermore, 28 percent of all children did not work according to national legislation. Whereas 29 percent of the children had completed primary education, only 17 percent of all mothers had achieved an equivalent educational level. Nonetheless, each child had repeated the last year of schooling on average 1.98 times. The children spent on average 23 minutes to arrive to school and most of the children went to MG schools equipped with several teachers.

As in Peru, child labor[8] remains a considerable challenge in the Philippines, where an estimated 2.1 million children aged 5 to 17 were working in 2011, which represents 8 percent of all children in this age range (Philippine Statistics Authority, 2015). Like in Peru, child labor heavily relies on age. While 6.5 percent of children aged 5 to 9 were in child labor, the rate is much higher for 10 to 14-year olds (35.3 percent), and is the highest for children aged 15 to 17, who account for 58.3 percent of all children in child labor.

As in the case of Peru, the majority of children in child labor (58.4 percent) are working in the agriculture sector. Specifically, the sugar cane industry remains a major contributor to child labor in the country, employing an estimated 60,000 to 200,000 children (NSO and ILO, 2014; Philippine Statistics Authority, 2015). For 61.9 percent of the total working children, working implies hazardous conditions.[9] Additionally, child labor remains a major obstacle for educational success in the Philippines. In fact, 64.6 percent of the total working children aged 5 to 17 also attended school, which as seen in the case of Peru can have detrimental scholastic effects, such as school drop-out and absenteeism, which particularly affect older children. Indeed, in the Philippines, attendance rate was the lowest for working children aged 15 to 17 (42.4 percent for boys and 52.3 percent for girls) (NSO and ILO, 2014).

The project implemented in the Philippines that we evaluate in this paper was implemented to address these challenges, with the particular goal of reducing exploitative child labor in sugarcane-growing areas in the Philippines. It included several services directly provided to children and their households to achieve this aim, organized around four different components: education; livelihoods support, youth employment, and social protection; advocacy, capacity-building and awareness-raising; and research. The program was implemented by a partnership of World Vision (WV), as primary grantee, Child Fund International (CF), and the Educational Research Development Assistance Group (ERDA), who received funding from the United States Department of Labor (USDOL) and technical assistance from the ILO.

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7 The different requirements included: While in the lowlands, agriculture had to be the main activity of the household, in the highlands agriculture only had to be the main activity for one family member. The crops supported by the project in the lowlands included coffee, cocoa and achiote, while in the highlands are barley, pasture, potato, wheat and beans. While lowland farmers had to own their land, highland farmers could either own or rent. Highland farmers had also to be experienced farmers, as opposed to lowland farmers who did not have any experience requirement. While lowland farmers' land was at least one-hectare large, highland farmers' had no land size criteria.

8 The definition of child labor in the Philippines' national legislation differs slightly from the international definition provided by ILO Conventions No. 138 and No. 182. See Table 19 in the Appendix for details.

9 See Table 19 in the Appendix for a detailed definition.

The entire project targeted 54,000 children engaged in or at risk of entering exploitative child labour in the sugarcane industry, as well as their households (28,090), located in 11 provinces in the Philippines. These 11 provinces were selected among the 17 sugarcane-growing provinces based on a weighed ranking that included information on: i) sugarcane production, ii) number of farms, iii) annual per capita poverty threshold (2009), iv) poverty incidence among the population, v) number of individuals in poor households, vi) net primary school enrolment, vii) number of elementary school drop-outs, viii) elementary school classroom-pupil ratio, and ix) rural population. This selection process also allowed collecting baseline data for 20,409 individuals belonging to 3,276 households, which is the basis for our evaluation.

The group was composed by 10,154 adults and 8,801 children aged 5 to 17, of which close to 76 percent of children were 5 to 14 years old and 24 percent 15 to17 years old. Moreover, 52 percent of the sample were men and the total age average was 24 years (38 for adults and 11 for children). Despite high literacy rates at 91 percent among adults, only 1 every 4 adults completed high school and only 1 every 5 completed elementary school. As such, the vast majority of adults lacked formal training in numeracy or literacy as well as vocational training. Interestingly, 20 percent of adults declared that overly high costs were the reason hindering them from gaining an education. As for the children, 86 percent were enrolled in school. However, a large gap can be observed between younger and older children's enrolment rates, which stood at 93 and 66 percent, respectively. Regarding economic activities of the households, two distinct groups emerged: households who did not grow crops and those who grew only one crop, representing between 42 and 43 percent of the sample each. The remaining 15 percent of households grew two or more crops. Finally, of all the household heads, 50 percent were engaged in sugarcane activities, and 22 percent on other agricultural activities, which included mainly crops such as banana, rice and corn. This indicates that the sampled population had, for the most part, limited economic diversification and limited formal training and education.

1.2 Description of the programs and selection of target and control groups

The case of Peru

As described above, child labor in Peru is driven mainly by whether the household lives in rural areas, and by its poverty incidence. Thus, the Peruvian project sought to reduce child labor through the direct provision of services that increased and stabilized households' disposable incomes. It was expected that this would, in turn, lower the relative cost of education, thus encouraging families to send children to school. Additionally, through the improvement of education in local schools, the project aimed to render schooling more attractive for the children and their parents. Lastly, the project team sought to complement these efforts through communication strategies that informed households about the costs of child labor and the beneficial effects of education. Hence, the Peru's project included three strategies:

1. The livelihoods strategy, aimed at improving the outcomes of the agricultural activities carried out by farmers who used their children's labor in their farms. This strategy included various services, such as agricultural technical assistance, training of extension workers, and support for generating added value to agricultural products and boosting market access.
2. The Multi-Grade (MG) intervention was implemented along the livelihoods strategy to improve teaching practices of Multi-Grade schools and increase teaching supplies. MG schools are common in rural areas. They are characterized by featuring a single teacher for all ages, who teach in a single classroom. The intervention included teacher workshops, mini-libraries and working with communities to promote girls schooling.
3. The awareness-raising component was an integral part of the livelihoods strategy and MG intervention. All participants of the livelihood strategy received information concerning child labor's negative effects and were asked to commit to eliminating child labor. Meanwhile, communities receiving MG interventions benefitted from awareness-raising activities through workshops and school fairs.

Within the Peruvian intervention, we aim to evaluate the effects of two different groups of participants: (i) participants who benefitted only from the livelihoods intervention, and (ii) participants who benefitted jointly from the livelihoods support and the education intervention (the Multi-Grade component). Broth groups of participants received the awareness-raising component of the project.

To estimate the effects, we started by randomly selecting 117 communities from the 130 project communities. To assess the different effects, we then divided communities randomly into two treatment and one control group, each group with the same number of communities:

1. The first group is the first treatment group, T1, or livelihood support group. Households in the communities of this group received solely the livelihood intervention; which included support to improve their agricultural activities and other measures to diversify their income. Additionally, the households received the awareness-raising component of the project.
2. The second group is the second treatment group, T2, or livelihoods and MG group. Households in the communities of this group received both the livelihood support and the MG intervention, as well awareness-raising trainings.
3. The third group is the control group, C, where none of the households in the communities received the livelihood support or the MG intervention.

Meanwhile, the selection of households for the three groups T1, T2 and C was carried out through a three-step process. A summary of the outcome of these processes is presented in Table 1. First, within the treated communities, a list of all households with children enrolled in school was created, based on administrative data from the Ministry of Education (list A). Second, from this list, project staff identified households that could fulfill the project's eligibility criteria, which amounted to 1,970 households (list B). Third, staff then visited these households and applied a detailed survey to identify households who effectively met the eligibility criteria. Based on this, a final list of eligible households was produced (list C), which amounted to 1,610 households. Participant households for groups T1 and T2 were randomly selected from list C. Finally, to select households for the control group, the same method was applied on households within the communities, which were randomly selected to be in the control group.

▶ Table 1. Households in the beneficiary and control groups in Peru's project

Final list of actual beneficiaries (list C)	Groups	Households	MG Schools
Beneficiaries	Group T1	370	38
	Group T2	665	39
Control group	Group C	575	40
Total		**1,610**	**117**

Source: ILO (2017b).

Given that participation was randomized at both the community and participant household levels, the three groups are by design statistically similar, and as such, any differential impact between them could be, ceteris paribus, attributed to treatment. We test this hypothesis below to ensure this comparability exists in practice. We exploit this strategy in this paper to assess three different types of effects: first, by comparing T1 to C, we are able to evaluate the impact of the livelihoods intervention combined with awareness-raising intervention; second, by comparing T2 to C, we are able to derive the combined effect of the livelihoods and MG interventions, combined with awareness-raising. Finally, by comparing T1 and T2, we will be able to assess any impact attributable to the education intervention.

Table 2 shows how comparable were participant households across the two treatment groups and the control group. Column 1 reports the mean of the control group and column 2 its standard deviation. In columns 3 and 4, we present the group T1's coefficients and p-values, while column 5 and 6 present the respective information for group T2. There are no statistically significant differences (at 5 per cent significance level) across groups in any of the characteristics surveyed.

▶ **Table 2. Statistical similarity across treatment arms in Peru's project**

Variable	Control mean	Control Std Dev	Coeff T1	p-value T1	Coeff T2	p-value T2
Source: Administrative data from the Ministry of Education used to create list A						
Age	9.57	2.31	0.16	0.23	-0.10	0.38
Education level (=1 if primary)	0.29	0.45	-0.04	0.31	0.01	0.67
Mother education level (=1 if primary)	0.17	0.38	-0.00	0.97	0.03	0.23
No working child	0.27	0.45	-0.02	0.51	0.03	0.27
Gender (=1 if male)	0.53	0.50	-0.02	0.43	0.01	0.82
Enrollment status at school	1.99	0.57	0.01	0.67	0.00	0.99
Type of school	2.13	0.48	0.12	0.37	0.05	0.64
Source: Detailed survey applied to list B						
Gender (=1 if male)	0.50	0.50	-0.00	0.89	-0.00	0.96
Age	20.96	16.38	0.97	0.13	0.44	0.43
Time takes to get to school	23.75	27.92	-4.39	0.28	2.00	0.74
Land size	6.79	25.26	-0.05	0.99	-1.16	0.68
Land ownership	0.70	0.46	-0.04	0.66	-0.04	0.60
HH head is farmer	0.96	0.20	-0.00	0.99	-0.05	0.25
Benefits from livelihood	0.16	0.36	0.03	0.54	-0.06	0.26

Note: Robust standard errors are clustered at the MG school level. Significance: *: p<0.1; **: p<0.05; ***: p<0.01. Source: ILO, (2017b).

The case of the Philippines

As seen above, child labor also remains a central concern in the Philippines, where limited progress has been achieved so far, in spite of recent efforts. Similar to the case of Peru, the project assessed in the Philippines had an overarching goal to reduce exploitative child labor. As in Peru, child labour in the Philippines is a mostly rural and agricultural phenomenon, in particular in sugarcane-growing areas. However, while the Peruvian and Philippine projects share a common goal, they diverge in their means to achieve it. The Philippine project had a broader strategy encompassing four different arms: (i) education; (ii) livelihoods, youth employment and social protection; (iii) advocacy, capacity-building and awareness-raising; and (iv) research. While comprehensive, this design made it more difficult to identify beneficiaries who participated in particular arms of the project, which impeded an evaluation of the isolated effects. Therefore, solely the livelihoods intervention was chosen as the subject of this impact evaluation. An additional advantage for evaluating the livelihoods intervention is the clear theoretical grounding on which to build a theory of change. It posits that income diversification would increase households' disposable income and assets, which would, in turn, reduce the need for farming families to have their children working and would thus decrease exploitative child labor.

It is important to note that the livelihoods strategy in this case differs slightly from the Peruvian approach. It is based on a more complete income diversification strategy whereby a household received support to diversify their livelihoods beyond the agricultural sector. Within the agricultural income diversification component, participants received support to improve the productivity of crops that families already grew (including sugarcane) and to introduce other short-term agricultural and husbandry activities such as vegetable

gardening and animal husbandry (that could be done in the sugarcane off-season). Moreover, this livelihoods strategy included a non-agricultural component, which provided various services such as support to: youth entrepreneurship, running small sari-sari (variety) stores, vending of off-farm products and small-scale production of handicraft and other native products for which raw materials could easily be found in the local area (e.g. abaca products). All these activities are provided to improve the livelihoods of households employing children, and as such we consider it as well as a (more comprehensive) livelihoods strategy (ILO, 2017b).

The impact evaluation of the Philippine program used a sample of the entire population of 8,815 households that constituted the first cohort of participants of the project. Sample selection followed a two-step randomization procedure like in Peru. First, randomization was performed at the village or barangay level, which allowed for the creation of a control group C and treatment group T. This first randomization already ensured that villages in the treatment and control groups were similar in all aspects, except from participation in the livelihoods support intervention of the project. As a second step, all households from the villages of the treatment group T were randomly divided in half, where one half became the actual treatment group T1 and the other the control group within treated villages, T0. The same was done among households of the villages in the control group C, where half of the households in the control villages were kept and the other half were dropped from the analysis. This double randomization process produced the total sample size of 3,276 households divided into three groups of similar size:

1. The first group is the treatment group T1, composed of treated households within treated villages or barangays. This group benefitted from the livelihoods support described above, but it also received a range of other interventions (e.g. education, youth employment, social protection, advocacy, capacity building and awareness-raising), which cannot be analyzed independently.
2. The second group is the control group T0, composed of non-treated households within treated villages or barangays. Although these households did not receive the livelihoods support, they benefitted from the other interventions that the T1 also benefitted from.
3. The third group C, was instead the pure control group, composed by households located in villages that did not participate in the livelihoods intervention but, as the T0, benefitted from the other interventions that the T1 also benefitted from.

We exploit this strategy in this paper to assess two different types of effects: first, by comparing T1 to C, we are able to evaluate the incremental direct impact of the livelihoods intervention; second, by comparing T0 to C, we are able to derive the peer effect of the livelihoods intervention of the project. Given that participation was randomized at both the village and participant household levels, the three groups are by design statistically similar, and as such any differential impact between them could be, ceteris paribus, attributed to treatment. Table 3 summarizes the entire population and sample population numbers and Table 4 checks the comparability of the groups.

It is important to highlight, that although the sampling procedure was carried out correctly, the program team implementing the evaluation in the ground had to conduct several modifications due to attrition caused by the typhoon Haiyan, which struck the Philippines on November 8, 2013. As a result, 634 households, 17 barangays and 2 provinces had to be dropped from the impact evaluation since these were the areas where livelihoods were significantly affected by the climate shock. Nonetheless, power calculations confirmed that the key outcome variables could reach the same statistical power by expanding the sample by 500 households in each group while keeping a total sample of no less than 4,100 households. The affected households could be replaced thanks to the initial randomization of the entire population of 8,815 households. The final corrected sample amounted to 4,254 households, which is above the minimum power requirement of 4,100 households. The success of these corrections represents in our view a value added of our paper, given the innovative methodologies used to implement such corrections successfully.

▶ **Table 3. Philippines study population**

Survey Units		Intervention		Control	Total
Entire population	Barangays	43		43	86
	Households	4,291		4,524	8,815
Original sample (baseline)	Barangays	43		43	86
	Households	1,087 (T1)	1,114 (T0)	1,075 (C)	3,276
Final sample (endline)	Barangays	34		35	69
	Households	1,422 (T1)	1,447 (T0)	1,385 (C)	4,254 (>4,100)

Source: ILO (2017c).

The balance check presented in Table 4 confirms that the treatment and control groups were statistically similar. We can observe that there are no statistically significant differences (at the 5 percent level) across characteristics, with the exception of whether households own a farm and, as it is to be expected, whether the household received the livelihood support (both significant at the 10 percent level). We attribute this to chance given the low level of significance and the small magnitude of the point estimate.

▶ **Table 4. Statistically similarity across study groups in the Philippines program**

Variable	Control (T0) mean	Coefficient T1	Observations
Men	0.25	0.02	2,534
	[0.43]	(0.06)	
Household owns the farm	0.11	0.06*	2,534
	[0.31]	(0.03)	
Farm size	5.80	- 2.55	2,534
	[52.1]	(4.12)	
Head of household is a farm labourer	0.34	-0.10	2,534
	[0.47]	(0.09)	
Most pressing need of the household is food	0.82	0.02	2,534
	[0.38]	(0.04)	
Most pressing need of the household is water	0.25	0.04	2,534
	[0.44]	(0.01)	
Most pressing need of the household is having a job	0.317	-0.01	2,534
	[0.47]	(0.06)	
Most pressing need of the household is medical	0.30	-0.07	2,534
	[0.46]	(0.05)	
Most pressing need of the household is having shelter	0.45	0.06	2,534
	[0.50]	(0.07)	
Most pressing need of the household is having support	0.22	0.01	2,534
	[0.41]	(0.06)	
Source of information: radio	0.40	-0.05	2,534
	[0.49]	(0.05)	
Source of information: TV	0.38	-0.01	2,534
	[0.49]	(0.07)	
Source of information: Neighbors	0.23	-0.01	2,534
	[0.42]	(0.05)	

Variable	Control (T0) mean	Coefficient T1	Observations
Household was recently served by a welfare agency	0.38 [0.49]	-0.12 (0.09)	2,534
Household is a member of any organization	0.09 [0.29]	0.01 (0. 03)	2,534
Household received livelihood services	0.16 [0.37]	-0.08* (0.05)	2,534

Note: Robust standard errors in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01. Column 1 corresponds to the control group T0 mean and column 2 to the coefficient variable comparing the control group T0 and the treatment group T1. Column 3 reports the number of observations. Source: ILO (2017c).

▶ 2 Empirical methods

2.1 Timeline

The livelihoods intervention of the Peruvian project began in October 2012 following the agricultural calendar, with the two rounds of livelihoods support being provided in August and October 2013. Meanwhile, the Multi-Grade interventions were launched in August 2013. The impact evaluation design was finalized in February 2013, with the midline surveys being carried out between March and April 2014 and the endline surveys between March and May 2015. Due to the gap between the two programs' start dates, some households had not received the treatment for the planned duration of 12 months by the time of the midline survey. As such, in order to ensure that the first group of recipients of the livelihood support (who started participating in October 2012) had participated during 30 months, endline surveys were pushed forward and carried out only between March and May 2015. This timing of the intervention also ensured that the remaining beneficiaries of the livelihoods support, as well as the recipients of the MG intervention, had participated at least 20 months before measuring effects.

The livelihoods intervention of the Philippine project occurred around the same time but followed a slightly different structure. Contrary to the Peruvian project, the impact design production and the intervention selection occurred between March and December 2012 before the livelihoods intervention began. In this case, the selection of the different groups took place from April to September 2012. As a result, the livelihoods intervention began between March and September 2013 and lasted until September 2015. The endline survey was conducted between November 2014 and February 2015, after the end of the typhoon season 2014-2015, which means that the impact was measured between 13 and 19 months after the start of the services, depending on the communities concerned.

2.2 Empirical analysis

The sample selected to measure the effects of both programs was chosen to ensure adequate statistical power to test the null hypothesis that the livelihoods intervention (as well as the education and awareness-raising interventions in the case of Peru) had no effects on child labor rates. It was expected that the hypothesis would be rejected as, by enhancing households' livelihoods and improving the quality of schooling, child labor rates would decline, particularly hazardous child labor rates.

The idea behind the livelihood support interventions of both programs was that by increasing livelihood support and disposable income, the need for child labor would be reduced in the medium term (12-24 months) thanks to the increased productivity and production and the willingness to send children to school. In the longer term (36 months), the enhanced farm management, production and diversification would further reduce the need for child labor, ultimately significantly reducing or even ending households' use of child labor. It is important to note that reductions in child labor rates were only expected to materialize in the longer-term, i.e. after 36 months. None of the programs achieved this timespan, and so there is reason to question the endline surveys' capacity to capture the total impact on child labor.

In the case of Peru, and additional expectation in the medium term (12-24 months) was that MG interventions enhanced student academic performance and enhanced the role of parents in their children's schooling, avoiding grade repetition and decreasing drop-out rates. As for the longer-term (36 months), we expected child labor to decline as more children remained in school.

The estimation model was based on the ordinary least squares regression model of the following form:

$$y_i = \alpha + \beta * Treat_i + \pi_c I_c + \mu_i$$

where y_i is our outcome variable for household i, the $Treat_i$ variable indicates whether the household i belongs to the treatment group. In the case of the Philippine program, this variable can take the value of 1 or 0 depending on whether the household was assigned to the treatment or control group. In the Peruvian program, where there are two treatment groups T1 and T2, $Treat_i$ takes the value of 1 if the household was assigned to T1 or T2 treatment, and the value of 0 if it was assigned to the control group, C. In both programs, the $Treat_i$ variable was derived from a randomization process as discussed earlier in the paper. Therefore, by construction, the variable is uncorrelated with the residual of the estimation equation, μ. The causal parameter of interest, β, which in this case would correspond to child labor, education or income, will thus be correctly identified by the ordinary least-squares estimation. Finally, the variable I_c corresponds to the community where the household lives in the case of Peru, and to the barangay pair (or village) in the case of the Philippines.

Validity of the randomization

Attrition became a considerable concern in the Philippine study due to the destruction caused by typhoon Haika and the consequent need to replace households in the program. The initial list of households gathered to select the total population that were part of the first cohort of the program allowed for a relatively straightforward replacement of households, which was central to achieve the same statistical power attained before replacement, by surpassing a sample population of 4,200 households. In order to ensure high retention rates, 72 enumerators were deployed in the field. The strategy provided a highly satisfactory completion rate (99 percent) and the study hence suffered from low attrition rates despite the necessary modifications caused by the typhoon. In terms of power calculations, our ex-ante power calculations for the Philippine program indicated that we needed 86 clusters (barangays), with 25 subjects per cluster, to reach a power of 0.8. The damaged livelihoods caused by the typhoon necessitated modifications to maintain the intervention's statistical power. Hence, new power calculations suggested that we needed a total population of 4,100 subjects belonging to 69 barangays, with 40 subjects per barangay. Low intra-cluster levels and elevated take-up levels allowed for adequate minimum detectable effects (MDEs). The programs' final sample consisted of 4,254 households. Hence, the sample sizes were considered sufficient to test the null hypothesis.

The Peruvian program experienced little challenges concerning attrition rates, as summarized in Table 5. The surveys' response rate (RR) is close to 100 percent for the B list as well as for the C list, with a total of 9,856 individuals, deriving from 1,970 households. Considering the extended duration between the initial survey (profiling) and the endline survey, the response rate is remarkable and higher than similar studies. We only observe one exception to this trend, which is the relatively lower response rate of the T2 intervention group in the list C. A number of robustness checks were carried out [10] to understand whether this lower response rate, as well as the differential response rates (of around 6 percentage points) between the T2 intervention group and both the T1 and the control groups, could present any harm to the identification strategy. The robustness checks indicated that the differences did not represent any significant bias. In terms of power calculations, our ex-ante power calculations indicated that we needed 117 clusters (communities) in total, with a minimum of 15 subjects per cluster and 78 subjects per calculation of differences in outcomes, to

[10] Robustness checks were carried out on: (i) child labour as defined by national legislation and the program's definition, and stratified by gender; (ii) hazardous child labour on average and stratified by gender; (iii) child work defined by national legislation and the program's definition and stratified by gender; and (iv) participation in domestic chores stratified by various activities, animal-related activities and care-taking. See Table 19 in the Appendix for the definitions of main variables.

reach a power of 0.8. Additionally, each group included at least 38 clusters, which is significantly higher than the required number of 30 clusters to reach statistical power. Our calculations also suggest that to perceive the minimum detectable effect (MDE), we needed a significance level of 95 percent, and compliance rates of minimum 0.9 for the treatment groups and perfect compliance for the control groups.

▶ Table 5. Response rate for control and treatment groups of Peru's program

Group	List of potentially eligible households (list B)			Final list of eligible households (list C)		
	Initial survey	Responses	RR	Initial survey	Responses	RR
Control	701	700	99.8%	575	574	99.8%
T1	579	578	99.8%	370	370	100%
T2	691	689	99.7%	665	625	93.9%
Total	1,971	1,967	99.9%	1,610	1,569	97.5%

Source: ILO (2017b).

▶ 3 Findings

This section presents the results of the evaluations of the Peru's and Philippines' programs to assess whether the livelihood support interventions are effective in reducing child labor and hazardous child labor in rural areas, and whether the effectiveness of the livelihood support is reinforced when combined with education interventions focused on improving the quality of schools. An additional research question developed towards the end of the section aims to study whether livelihood support interventions may benefit from awareness-raising components aimed at changing the perceptions of parents through community interaction. To answer the questions, we present below detailed evidence of the programs impact on child labor, child education, economic activities and household perceptions. Table 19 in the Appendix provides all definitions of key variables.

3.1 Child labor

As summarized in Table 6, in the case of Peru, we observe remarkable reductions in hazardous child labor rates and child labor during the midline survey. While the mean of hazardous child labor rates shows a non-statistically-significant decrease for the participants who received the livelihoods support combined with awareness raising (T1 group), it decreases by 13 percentage points (at 5 percent significance level) for the participants who benefitted from the additional education support (T2 group). In terms of the effects on child labor, we find that the Peruvian program had no statistically significant impact on child labor and child work when defined according to the program's definition. However, when using the Peruvian legislation's definition (which is less stringent than the internationally accepted definitions of child labor and child work for children aged 12 to 14 years – see table 19 in the Appendix), we find that the program reduced child labor by 10 percentage points on average for households in the T2 group (at 10 percent significance level). All these results taken together appear to point to a partial transformation from hazardous child labor into permitted child labor.

In addition, we find non-statistically significant effects of the program on hours worked by children, on injuries and illnesses, and on the number of children who work to help out the family, including by performing domestic chores in the household. Interestingly, we find a statistically significant reduction by 12 percentage points in the probability of working for children who affirm liking to work in group T2.

All in all, these results show that the Peruvian intervention appears to have had a positive effect at the midpoint of the evaluation timeline by reducing the prevalence of hazardous child labor as well as child labor for the T2 treatment group.

▶ **Table 6. Effects of the Peru's program on child labor, hazardous child labor and other activities at the midline survey**

Variable	Control mean	T1		T2	
		Coeff.	Obs.	Coeff.	Obs.
Hazardous child labor	0.81	-0.09	2,149	-0.13**	2,688
	[0.39]	(0.10)		(0.06)	
Child labor legal definition	0.85	-0.07	2,149	-0.10*	2,688
	[0.35]	(0.11)		(0.05)	
Permitted child work legal definition	0.11	-0.00	2,149	0.01	2,688
	[0.32]	(0.04)		(0.03)	

Variable	Control mean	T1		T2	
		Coeff.	Obs.	Coeff.	Obs.
Child labour program's definition	0.84	-0.08	2,149	-0.05	2,688
	[0.36]	(0.11)		(0.06)	
Permitted child work program's definition	0.16	0.09	2,149	0.05	2,688
	[0.36]	(0.11)		(0.06)	
Worker child	1.00	0.00	2,150	0.00	2,689
	[0.03]	(0.00)		(0.00)	
Hours per week	26.83	-1.84	2,149	0.25	2,688
	[15.36]	(4.37)		(2.89)	
Hours per day	3.83	-0.26	2,149	0.04	2,688
	[2.19]	(0.63)		(0.41)	
Illness and injuries	0.98	0.00	2,149	0.00	2,688
	[0.13]	(0.01)		(0.01)	
Children work to help family	0.83	0.11**	2,149	0.07	2,688
	[0.38]	(0.05)		(0.06)	
Children like work	0.23	-0.19***	2,149	-0.12**	2,688
	[0.42]	(0.04)		(0.06)	
Domestic chores	0.92	-0.01	2,149	0.02	2,688
	[0.27]	(0.05)		(0.02)	

Note: This table provides the Intention to Treat (ITT) estimations for the outcome variables listed. Robust standard errors in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

The positive effects found at the midpoint of the evaluation, grow stronger during the endline survey (Table 7). While, the differences between T1 and the control group remain non-statistically significant for child labor variables, households in the T2 group, appear to have indeed benefited from the program. In particular, the effects show that the program induced a large reduction in hazardous labor rates by 17 percentage points (albeit only at the 10 percent significance level), which is all the more welcomed given the high share of children participating in hazardous child labor in the control group (83 percent). Moreover, while child labor decreased by 16 and 14 percentage points, according to the national legislation and the program's definitions, respectively; permitted child work rates (according to the program's definition) increased by 14 percentage points (again only at the 10 percent significance level). As mentioned above this points to a partial transformation from hazardous child labor into permitted child labor.

In terms of hours worked, we observe a highly significant reduction of around 3.7 hours worked by children per week for households in the T2 group. Per day, this reduction equated to 0.5 fewer hours worked for children in group T2. In spite of this reduction, the total number of hours worked remains right at the accepted level by the national legislation (24 hours per week for children aged 12-14). In terms of the rate of illness and injuries endured by children as a result of work and child labor, results are non-statistically significant for either treatment group, in line with results of the midline survey. Meanwhile, households in the T1 group, experienced a statistically significant increase by 4 percentage points in the probability of working for children who work to help family; and a large and statistically significant increase by 17 percentage points in the probability of working for children who affirm liking to work. This latter result reversed the decrease observed in this variable when assessing the midline survey.

To sum up, the livelihood intervention – when combined with the education intervention focused on improving the quality of schools – successfully reduced the number of hours worked by children, as well as the prevalence of hazardous child labor and child labor.

▶ **Table 7. Effects of Peru's program on child labor at the endline survey**

Variable	Control mean	T1		T2	
		Coeff	Obs	Coeff	Obs
Hazardous child labor	0.83 [0.38]	-0.00 (0.07)	2,156	-0.17* (0.1)	2,663
Child labor legal definition	0.86 [0.35]	0.00 (0.06)	2,156	-0.16* (0.09)	2,663
Permitted child work legal definition	0.13 [0.34]	-0.01 (0.05)	2,156	0.03 (0.02)	2,663
Child labour program's definition	0.86 [0.35]	-0.00 (0.06)	2,156	-0.14* (0.09)	2,663
Permitted child work program's definition	0.15 [0.35]	0.02 (0.07)	2,156	0.14* (0.09)	2,663
Hours per week	27.77 [14.49]	-2.55 (3.24)	2,156	-3.72*** (1.39)	2,663
Hours per day	3.97 [2.01]	-0.36 (0.23)	2,156	-0.53*** (0.20)	2,681
Illness and injuries	0.57 [0.50]	0.09 (0.08)	2,156	-0.09 (0.14)	2,663
Children work to help family	0.91 [0.28]	0.04** (0.017)	2,156	0.02 (0.03)	2,663
Children like work	0.26 [0.44]	0.17** (0.07)	2,156	-0.05 (0.06)	2,663

Note: This table provides the Intention to Treat (ITT) estimations for the outcome variables listed. Robust standard errors clustered at the community level in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

Contrary to the Peruvian program evaluation design, the Philippine program only included an endline survey. Therefore, no comparison between the midline surveys of both programs can be made. The endline survey, however, allows us to compare results between the two programs to get some insights concerning the final effects of a livelihoods intervention provided alone, with no awareness-raising support or an education intervention such as the one provided by the Peruvian program to the T2 group.

Table 8 presents the results of the Philippines program on a variety of child labor outcomes. The program did not produce any statistically significant effects on either child labor or hazardous child labor rates. In terms of the rate of working children, the treatment group experiences a marginal non-significant effect. Similarly, the rate of non-working children provides marginal non-significant results and the rate of child labor shows no significant or noticeable effects. The hazardous child labor rate too remains practically unaltered as a result of the program. Hence, we cannot reject the null hypothesis that the livelihoods intervention had an impact on child labor rates and the hazards that children are exposed to.

▶ **Table 8. Impact of livelihoods intervention of the Philippines program on child labor**

Outcome variable	T0 Mean	Coefficient T1	Observations
Permitted child work	0.41 [0.49]	-0.01 (0.03)	6,690
Non-working children	0.59 [0.49]	0.01 (0.03)	6,690

Outcome variable	T0 Mean	Coefficient T1	Observations
Child labour	0.40	-0.00	6,690
	[0.40]	(0.03)	
Hazardous child labour	0.39	-0.01	6,690
	[0.49]	(0.03)	

Note: This table provides the Intention to Treat (ITT) estimations for the outcome variables listed. Robust standard errors in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

3.2 Child education

At midpoint of the evaluation, the Peru's program produced limited effects on education rates for children. The findings presented in Table 9 report small and non-significant effects on school enrollment and attendance. There is one exception for households participating in the T1 group, where we observe a 3 percentage-point increase in the probability of children aged 12 to 17 years to go to school.

▶ **Table 9. Effects of Peru's program on education at the midpoint of the evaluation**

Variable	Control mean	T1		T2	
		Coeff	Obs	Coeff	Obs
"Younger" child goes or ever went to school	0.99	0.01	1,057	-0.01	1,374
	[0.09]	(0.00)		(0.01)	
"Older" child goes or ever went to school	0.97	0.03**	970	-0.01	1,174
	[0.16]	(0.01)		(0.02)	
"Younger" child currently or ever enrolled in education	0.99	0.01*	1,057	-0.01	1,374
	[0.12]	(0.01)		(0.01)	
"Older" child currently or ever enrolled in education	0.91	0.07	970	0.04	1,174
	[0.29]	(0.04)		(0.03)	
Initial level male	0.57	-0.02	1,067	0.01	1,326
	[0.50]	(0.06)		(0.08)	
Initial level female	0.54	-0.05	1,031	0.04	1,301
	[0.50]	(0.11)		(0.05)	
Primary completed male	0.26	0.03	1,067	0.02	1,326
	[0.44]	(0.06)		(0.04)	
Primary completed female	0.26	0.08	1,031	-0.01	1,301
	[0.44]	(0.16)		(0.05)	
School absences "younger" children	0.49	0.26	1,047	-0.10	1,360
	[1.97]	(0.71)		(0.13)	
School absences "older" children	0.36	-0.30	898	0.11	1,069
	[1.24]	(0.18)		(0.50)	

Note: This table provides the Intention to Treat (ITT) estimates for the outcome variables listed. Younger is defined as children aged 5 to 11 years, and older by children aged 12 to 17 years. Robust standard errors in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

However, effects start to materialize towards the end of the evaluation timeline as shown by Table 10 that presents the effects of the Peruvian program on schooling during the endline survey. Following from the midline assessment, results remain small in magnitude and non-statistically significant concerning whether the children attended (regularly or not) school, or whether they achieved any level of education. Likewise, effects on children's enrollment in education are small and non-significant. Where we do observe effects, significant at 5 percent level and of non-negligible magnitude, is on children's absences from school for households in the T2 group. In particular, we observe a statistically significant reduction in the number of children's school absences. Relative to the number of absences observed in the control group, this negative effect would imply cutting absenteeism by half. Importantly, absenteeism is reduced for both younger and older students in the T2 group by 0.18 and 0.12 days, respectively, in a fortnight. Finally, the probability of children missing school due to illnesses is reduced for households in the T2 group by 5 percentage points. As expected, the findings confirm that the combined approach of livelihoods, education and awareness-raising produce better outcomes in education. While effects have not materialized in terms of school completion (possibly because these effects take more time), they are clear in terms of reduced absenteeism for children of all ages.

▶ Table 10. Effect of Peru's program on schooling rates at the endline survey

Variable	Control mean	T1		T2	
		Coeff	Obs	Coeff	Obs
Child goes or ever went to school	0.99	0.01*	2,156	-0.03	2,663
	[0.09]	(0.00)		(0.02)	
"Younger" child goes or ever went to school	0.91	0.01	864	-0.04	1,030
	[0.10]	(0.00)		(0.03)	
"Older" child goes or ever went to school	0.99	0.00	1,083	-0.03	1,323
	[0.09]	(0.00)		(0.02)	
No education child	0.03	0.00	2,140	-0.01	2,636
	[0.16]	(0.04)		(0.02)	
Initial level child	0.53	-0.04	2,140	-0.03	2,636
	[0.50]	(0.06)		(0.04)	
Fifth year of primary school child	0.10	-0.03	2,140	-0.01	2,636
	[0.30]	(0.03)		(0.03)	
First year of secondary school child	0.32	0.03	2,140	0.04	2,636
	[0.47]	(0.06)		(0.04)	
Fifth year of secondary school child	0.03	0.03	2,140	0.003	2,636
	[0.16]	(0.02)		(0.02)	
Superior technological institute child	0.00	0.01	2,140	-0.00	2,636
	[0.04]	(0.01)		(0.00)	
"Younger" child currently or ever enrolled	0.91	0.03	864	-0.03	1,030
	[0.28]	(0.04)		(0.04)	
"Older" child currently or ever enrolled	0.93	0.01	1,083	-0.01	1,323
	[0.26]	(0.03)		(0.03)	
Number of school absences during the last 15 days	0.20	-0.02	2,057	-0.10**	2,532
	[0.96]	(0.08)		(0.05)	
Absences "younger" children	0.28	-0.02	785	-0.18**	924
	[1.28]	(0.17)		(0.07)	

Variable	Control mean	T1		T2	
		Coeff	Obs	Coeff	Obs
Absences "older" children	0.23 [1.16]	-0.00 (0.15)	1,000	-0.12** (0.05)	1,215
Reason for absences: work and school	0.01 [0.09]	0.01 (0.01)	2,156	0.00 (0.01)	2,663
Reason for absences: illness	0.04 [0.19]	-0.00 (0.04)	2,156	-0.05*** (0.02)	2,663

Note: This table provides the Intention to Treat (ITT) estimates for the outcome variables listed. Younger is defined as children aged 5 to 11 years, and older by children aged 12 to 17 years. Robust standard errors clustered at the community level in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

Unlike the livelihoods intervention of the Peruvian program (T1 group), the Philippine intervention appears to have induced no significant effects on enrolment rates (Table 11). Indeed, there are no observable impacts on whether the children ever attended school, achieved some elementary education, completed elementary education, completed different high school levels, completed high school or remained enrolled at school. We also observe no large and significant impacts on whether the student was present at school during the morning, afternoon, or both.

▶ Table 11. Effects of the Philippines livelihoods intervention on school attendance

Outcome variable	Control mean	Coefficient	Observations
Ever attended school	0.98 [0.13]	-0.00 (0.00)	6,656
Some elementary	0.60 [0.49]	-0.00 (0.02)	6,690
Elementary complete	0.03 [0.16]	0.00 (0.01)	6,690
Some high school	0.20 [0.40]	0.00 (0.01)	6,690
High school complete	0.03 [0.17]	-0.00 (0.01)	6,690
Currently enrolled	0.88 [0.33]	0.01 (0.01)	6,548
Enrolled morning	0.04 [0.20]	-0.01 (0.01)	6,690
Enrolled afternoon	0.02 [0.13]	0.01 (0.01)	6,690
Enrolled both	0.80 [0.40]	-0.00 (0.02)	6,690

Note: This table provides the Intention to Treat (ITT) estimations for the outcome variables listed. Robust standard errors in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

3.3 Adult activities

At midpoint, the Peruvian program affected adult activities substantially (Table 12). With regards to the effects of the program on the probability of adults to be exposed to dangerous working conditions, we observe a remarkable highly significant 20 percentage point increase among adults living in households who benefitted from the livelihoods intervention (T1) and a 14 percentage point increase among individuals living in households who benefited from the combined approach (T2), albeit only significant at the 10 per cent level. When looking at gender differences with respect to this variable, we observe that while women and men contribute to the significant increase in dangerous working conditions of adults in the livelihoods group (T1), only women contribute to the increase in dangerous working conditions in the T2 group. Interestingly, we observe considerable reduction of injuries and illnesses for all groups, despite the observed increase in dangerous working conditions. In a nutshell, there is an increase in the probability of adults to be participating in hazardous activities (although with a lower probability of enduring injuries and illnesses). If we combine these results with those for children at the midpoint, we see an intra-household reallocation of work-related hazards. Whereas adults assume more hazards at work, children are considerably less affected by hazardous labor. Moreover, it seems that this reallocation of hazards is assumed equally by adult men and women when the livelihoods support is provided alone, but it is assumed mainly by adult women when all programs are provided jointly.

▶ **Table 12. Effects of Peru's program on adult work, danger and injuries at the midpoint of the evaluation**

Variable	Control mean	T1		T2	
		Coeff	Obs	Coeff	Obs
Dangerous working conditions adult	0.63	0.20***	2,337	0.14*	2,914
	[0.48]	(0.06)		(0.08)	
Dangerous working conditions adult male	0.70	0.16**	1,081	0.09	1,359
	[0.46]	(0.07)		(0.08)	
Dangerous working conditions adult female	0.57	0.25***	1,256	0.19***	1,555
	[0.50]	(0.05)		(0.10)	
Injury or illness due to work adult	0.53	-0.16***	2,337	-0.06	2,914
	[0.50]	(0.08)		(0.08)	
Injury or illness due to work adult male	0.58	-0.20**	1,081	-0.12	1,359
	[0.50]	(0.08)		(0.11)	
Injury or illness due to work adult female	0.48	-0.11	1,256	-0.01	1,555
	[0.50]	(0.08)		(0.07)	
Unprotected work adult	0.82	-0.06	2,337	0.01	2,914
	[0.39]	(0.05)		(0.02)	

Note: This table provides the Intention to Treat (ITT) estimations for the outcome variables listed. Robust standard errors in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

Interestingly, most of the increasing effects in dangerous working conditions observed at the midpoint of the evaluation, are no longer observable when assessing the endline survey of the Peruvian program (Table 13). What is more, when looking at households in the T1 group, some of the detrimental effects previously observed are reversed for men (while they remain non-significant for women and the overall group). For example, the number of adult men in the T1 treatment group working under dangerous conditions significantly decreased, by 13 percentage points. Moreover, working men in the same group experienced a 15 percentage point reduction in hazardous work compared to the control group.[11]

[11] Unfortunately, there is not information to assess the effects of the Philippines program on adult work, so this section presents only the impact of the Peruvian program.

▶ **Table 13. Effect of Peru's program on adult work at the endline survey**

Variable	Control mean	T1		T2	
		Coeff	Obs	Coeff	Obs
Adult work	0.73 [0.45]	-0.06 (0.07)	2,823	-0.01 (0.05)	3,458
Agricultural activity adult	0.57 [0.50]	-0.04 (0.11)	2,823	-0.06 (0.07)	3,458
Dangerous working elements adult	0.60 [0.49]	-0.00 (0.07)	2,823	-0.01 (0.05)	3,458
Dangerous working conditions adult	0.68 [0.47]	-0.04 (0.06)	2,823	-0.03 (0.04)	3,458
Dangerous working conditions adult men	0.77 [0.42]	-0.13** (0.06)	1,260	0.02 (0.04)	1,507
Hazardous work adult	0.70 [0.46]	-0.06 (0.06)	2,823	-0.02 (0.04)	3,458
Hazardous work adult men	0.79 [0.41]	-0.15** (0.07)	1,260	0.02 (0.05)	1,507
Injury or illness due to work adult	0.43 [0.50]	0.04 (0.11)	2,823	-0.05 (0.07)	3,458
Unprotected work adult	0.73 [0.45]	-0.05 (0.07)	2,823	-0.01 (0.05)	3,458

Note: This table provides the Intention to Treat (ITT) estimations for the outcome variables listed. Robust standard errors clustered at the community level in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

3.4 Economic activities and income

Table 14 summarizes the effects of the Peruvian program on activities and income of farmers. In terms of the activities of farmers of the T1 group at the midpoint of the evaluation, results show, first, that farmers increased the number of crops thanks to the intervention, in particular non-certified crops and backyard gardens. Moreover, crop illness rates increased by 26 percentage points, although results are only marginally significant. Interestingly, female farmers in this group experienced a statistically significant increase in decision making about production by 13 percentage points. Finally, there is a reduction in income during the period, which is however non-statistically significant.

Regarding farmers in the T2 group, we find, first, that the number of farmers who abstain from using fertilizers decreased, but that those who abstain from using technology increased, even if the former result is only marginally significant. Although more farmers use fertilizers, crop illness rates increased by 23 percentage points (significant at 5 percent level). A possible reason is the increase in non-certified crops by 11 percentage points. Female farmers in this group also experienced a marginally statistically significant increase in decision making about production. Finally, farmers in this group suffered a more prominent and marginally significant income loss of 605 USD during the period assessed.

▶ **Table 14. Effects of Peru's program on activities and income at the midpoint of the evaluation**

Variable	Control mean	T1		T2	
		Coeff	Obs	Coeff	Obs
Number crops	3.77	1.34***	867	0.19	1,074
	[1.95]	(0.44)		(0.48)	
No use fertilizer	0.56	-0.13	873	-0.21*	1,101
	[0.50]	(0.18)		(0.12)	
No use of technology	0.95	0.04	873	0.07**	1,101
	[0.23]	(0.04)		(0.03)	
Crop illness	0.66	0.26*	822	0.23**	1,024
	[0.47]	(0.13)		(0.09)	
Production decision taken by women	0.13	0.13**	867	0.08*	1,074
	[0.33]	(0.06)		(0.05)	
Backyard garden	0.26	0.28***	867	0.10	1,074
	[0.44]	(0.09)		(0.10)	
Non-certified crops	0.920	0.08**	873	0.11**	1,101
	[0.27]	(0.03)		(0.04)	
Income total	1007.1 [1551.8]	-348.9 (220.8)	873	-604.9* (336.8)	1,101

Note: This table provides the Intention to Treat (ITT) estimations for the outcome variables listed. Robust standard errors in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

Some of these results are strengthened at the endline of the evaluation, while some new interesting results emerge. Table 15 shows that the number of farmers who abstain from using fertilizers decreased further at the endline of the evaluation, and this time results are statistically significant for both treatment groups: we observe a decrease by 17 percentage points for the T1 group and a decrease by 14 percentage points for the T2 group. There are no significant effects in variables related to production (crop production, crop management, etc.) with the exception of a strong and highly significant increase in backyard gardens for T1 and T2 groups by 34 and 21 percentage points, respectively.[12]

In terms of activities, income, debt and savings, we observe strikingly different effects for each treatment group. While farmers in the T1 group are less likely to focus on a single activity, they are also more likely to concentrate their various activities into one single enterprise. In terms of results, we observe that this group experiences a statistically significant loss of savings of around 450 USD. Meanwhile, farmers in the T2 group move from one to two activities and from one to two enterprises (although the latter result is only significant at the 10% level). At the end, this group experiences a large reduction in debt, which is however barely significant. Taken together, these results appear to point to an increase in entrepreneurial activities by households in the T1 treatment group, who needed to use their savings to fund their newly created enterprises. Meanwhile, households in the T2 treatment group appeared to have diversified their activities with encouraging effects in their debt accumulation.

[12] Table 22 of the Appendix presents a more complete set of related results.

▶ **Table 15. Effects of Peru's program on activities and income at the endline survey**

Variable	Control mean	T1		T2	
		Coeff	Obs	Coeff	Obs
Number crops	3,22 [2.12]	0.54 (0.63)	818	-0.03 (0.49)	1,025
No use fertilizer	0.27 [0.45]	-0.17** (0.07)	926	-0.14** (0.07)	1,156
No use technology	0.79 [0.41]	0.12* (0.06)	926	-0.00 (0.06)	1,156
Crop illness	0.56 [0.50]	0.15 (0.15)	754	-0.05 (0.12)	905
Production decision taken by women	0.10 [0.31]	0.06 (0.06)	818	0.02 (0.05)	1,025
Backyard garden	0.23 [0.42]	0.34*** (0.11)	818	0.21** (0.09)	1,025
Non-certified crops	0.77 [0.42]	0.10 (0.09)	926	0.01 (0.06)	1,156
One activity	0.23 [0.42]	-0.09*** (0.04)	2,098	-0.08** (0.04)	2,606
Two activities	0.45 [0.50]	0.11 (0.07)	2,098	0.09*** (0.03)	2,606
One enterprise	0.64 [0.48]	0.37*** (0.05)	413	-0.12* (0.07)	515
Two enterprises	0.36 [0.48]	-0.37*** (0.02)	413	0.12* (0.07)	515
Income total	1,036.5 [1,368.5]	-429.6 (306.1)	823	-350.6 (372.1)	1,034
Amount debts	2,182.6 [7,802.5]	-965.1 (1,074.2)	823	-2,139.1* (1,098.9)	1,034
Amount savings	437.9 [3,516.6]	-446.8** (196.5)	823	-293.5 (256.8)	1,034

Note: This table provides the Intention to Treat (ITT) estimations for the outcome variables listed. Robust standard errors clustered at the community level in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

Turning to the effects of the Philippine program, Table 16 summarizes the effects of the program on business activities, assets, income and crop diversification. Similarly to the Peruvian program, the Philippine program produced a number of statistically significant effects on households' business activities. A business can include small sari-sari (variety) stores, vending of off-farm products, small-scale production of handicraft and other native products. In terms of the number of businesses run by each household, the point estimate is negative, but it is non-statistically significant. However, we do observe a decline in the number of households that operate and cite a business, by 8 and 7 percentage points, respectively. The analysis seems to suggest a possible substitution effect, whereby the treatment groups engage more in agriculture instead of business activities.

In terms of assets, most results are non-statistically significant, with the exception of livestock assets, where we observe a marginally significant increase of 6 percentage points. Furthermore, the households' sources of income did not change as a result of the intervention, as we observe no statistically significant differences between the treatment and control group. We first assess households' annual business income, where we note a large yet non-significant increase. Income derived from pensions, government and NGOs, increases slightly but significantly less than business income, however, both the findings are statistically non-significant. The income from remittances decreases, but again, the finding is non-statistically significant. The income derived from rent experiences a steep increase, yet it only constitutes on average 8.8 USD for the control group. Finally, the treatment group is slightly more likely to be a farmer and own a backyard plot. However, none of the findings reaches at least 90 percent of statistical significance.

Ultimately, the intervention did not alter the income from farm activities, and households were engaged in the same types of businesses across comparison groups except for a marginal decrease in the transport sector. This lack of effects on income diversification might be related to the fact that while the program promoted diversification, the increase in the number of activities may have impeded realizing economies of scale and economies of specialization, which in turn may have weakened economic results. Indeed, specialization may be risky and inefficient, as farmers become dependent on a single crop, exacerbating the uncertainty of potential earnings. However, it can indeed be a valuable approach for small-scale farmers (Hansson et al., 2010). In fact, allowing households to specialize in the most profitable activity, would allow them to increase the possibility of making economies of scale, reducing the cost per unit of input, and raising their income. Taken together, economies of scale and economies of specialization can promote improved financial and living conditions for farmers and reduce the need for child labor (ILO, 2017b).

However, the intervention increased the diversity of vegetables grown in the households' backyard plots in 2013 and 2014. We find that the control group produced on average approximately 2.5 different vegetables, while the treatment group produced on average 0.27 and 0.26 more vegetables in 2013 and 2014, respectively. Both findings are statistically significant at the 10 percent level. Nonetheless, as observed thereafter, the intervention produced small and non-significant impacts on the proportion of vegetables consumed by the households themselves despite producing a larger variety of vegetables. Likewise, the number of different crops cultivated for the years 2013 and 2014 do not attain statistical significance. This may also be explained by the trade-off between diversification and economic specialization discussed above. By increasing the scale of production or improving productivity through specialization, farmers can raise their earnings from agriculture activities, as well as consuming more of the food they produce.

Furthermore, the program produced statistically non-significant effects on the increase in productive activities of households[13], the level of training of adults, and on working conditions.[14] All in all, the analysis suggests a "trade-off" cycle by which households devoted more resources to their agricultural activities at the expense of their business activities. Interestingly, this trend did not affect the income level nor the diversification of sources of income as discussed above.

[13] We did not include productive activities for the sake of brevity. These variables included: sugar cane, not sugar cane, livestock, sari store, transportation, buy and sell, direct vending, construction and personal services. While none of the findings were statistically significant, only the three first variables relating to farm activities experienced marginal increases.

[14] Similarly, to productive activities, these variables were not included for the sake of brevity. The variables in question related to whether households underwent training in the last 12 months and whether they belong to a communal organization. Neither of the impacts were large nor statistically significant.

▶ **Table 16. Effects of the Philippines program on business activities, assets, income and on the variety of vegetables and crops produced or consumed**

Outcome variable	Control mean	Coefficient	Observations
Cite business	0.41 [0.49]	-0.07* (0.04)	2,709
Quantity business	0.52 [0.71]	-0.10 (0.06)	2,709
Operate a business	0.41 [0.49]	-0.08** (0.04)	2,709
Household assets	0.94 [0.24]	-0.00 (0.03)	2,709
Livestock assets	0.63 [0.48]	0.06* (0.04)	2,709
Real estate assets	0.91 [0.29]	0.01 (0.02)	2,709
Farm assets	0.91 [0.29]	0.02 (0.04)	2,709
Income business annual	13,232.5 [37,995.0]	28,628 (22,907)	2,709
Income from pension, gov./NGO	775.2 [1,683.6]	117.4 (117.5)	2,709
Income from remittances	732.0 [3,441.5]	-134.7 (127.9)	2,709
Income from rent	8.80 [127.5]	37.6 (23.0)	2,709
Farmer	0.34 [0.47]	0.06 (0.05)	2,709
Backyard plot	0.73 [0.44]	0.05 (0.04)	2,709
Number of different vegetables 2013	2.48 [2.07]	0.27* (0.16)	2,709
Number of different vegetables 2014	2.46 [2.06]	0.26* (0.16)	2,709
Percentage of vegetables that are consumed 2013 (%)	66.01 [43.64]	4.45 (3.20)	2,709
Percentage of vegetables that are consumed 2014 (%)	66.25 [43.57]	3.75 (3.23)	2,709
Number of different farm crops 2013	0.81 [1.49]	0.25 (0.19)	2,709
Number of different farm crops 2014	0.82 [1.50]	0.26 (0.19)	2,709

Note: Robust standard errors in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

3.5 Household perceptions

Finally, given that the Peruvian program included an awareness raising component, we also measured changes in perceptions due to the participation in the program (Table 17). We observe a marginal increase concerning condemnation of child labor by households headed by women, which is statistically significant only for households who received the livelihoods support alone (T1 group). Indeed, in the control group 98 percent of female household heads declared that they strongly condemn child labour, and 99 percent of women indicated that they value the fight against child labour (as measured by the global dummy variable). These proportions increase by 2 and 1 percentage points (approximating 100 percent), respectively, in the T1 group. Meanwhile, households who received the combined approach show a marginal increase, which is statistically non-significant.

In order to assess the impact on attachment to education, we created an index ranging from 1 to 6, which assesses the relative value households give to education versus labor. We also created a dummy for the value of education to measure the absolute effect. As expected, households of the T2 group experienced a larger (and highly statistically significant) increase in the relative and absolute value they give to education than those in the T1 group. Households in the T2 group experienced a 17 percentage-point increase in comparison with the control group. In sum, these effects show that the awareness raising component performs better in the combined approach than when provided solely with the livelihoods support. This is in line with expectations, as the education support was aimed to improve educational outcomes of children but also to strengthen the roles of the mothers in supporting their education.

▶ **Table 17. Effects of Peru's program on households' perceptions at the endline survey**

Variable	Control mean	T1		T2	
		Coefficient	Obs	Coefficient	Obs
Strongly agree to condemn child labor	0.98 [0.15]	0.02*** (0.01)	822	-0.01 (0.02)	1,034
Value education index 1 to 6	5.128 [0.88]	0.14 (0.25)	822	0.28** (0.12)	1,034
Value education dummy	0.71 [0.46]	0.00 (0.12)	822	0.17*** (0.06)	1,034
Global dummy on the value of fighting against child labor	0.99 [0.11]	0.01* (0.00)	822	-0.02 (0.02)	1,034

Note: Robust standard errors clustered at the community level in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

We also assessed the effects of the Philippine program on households' perceptions and risk-taking, which did not change as a result of the intervention (Table 18). As observed in the table, 53 percent of households in the control group recognized poverty as the main driver of child labor, and 35 percent believed child labor improved children's skills and represented a valuable alternative to school. Among households in the intervention group, slightly fewer households reported poverty as the main reason for child labor and slightly more did not value schooling, however, all these coefficients are statistically non-significant. All in all, despite no significant impacts, a majority of households believed schooling to be the best option for their children. Finally, when assessing the average scale of risk experienced by households, we observe a marginal but non-significant reduction. As a result, we see slightly more households averse to risk and slightly fewer high risk-takers in the intervention group.

This is an interesting finding, as one would have expected income diversification promotion to ensure farmers against risks. Yet, these findings (although statistically non-significant) appear to point to the opposite conclusion. By combining these results with the ones presented above on the lack of observed impact on income diversification, we could conclude that these effects may be explained by factors relating to the way in which income diversification fits into household economic dynamics. Indeed, the fact that households are turning down opportunities for increasing income and participating in different economic activities, and are ultimately feeling more averse to risk, might point out to other types of cost involved in taking up these opportunities. Although we cannot test the causal explanations for this, we can discuss them conceptually. One potential behavioral explanation is habit formation and social norms (Acland and Levy 2015). It can be expected that once households are specialized in one activity (one crop for instance), it is hard for them to innovate (e.g. add other crops or a business). Social norms may also play a part as households may be caught up in their cultural or social identity. Another, non-behavioural explanation may be lack of information. Households may be open to innovate, but they may not see the opportunities of this innovation (i.e. income diversification). The endline survey provided little evidence on which of these factors could be playing a more prominent role.

▶ **Table 18. Effects of the Philippines program on perceptions and risk-taking**

Outcome variable	Control mean	Coefficient	Observations
Poverty main driver of child labour	0.53 [0.50]	-0.04 (0.03)	2,709
Does not value schooling	0.35 [0.48]	0.01 (0.02)	2,709
Average scale of risk	3.61 [1.61]	-0.02 (0.08)	2,709
Low risk-takers	0.26 [0.44]	0.01 (0.02)	2,709
High risk-takers	0.57 [0.50]	-0.00 (0.02)	2,709

Note: Robust standard errors in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

Conclusion and discussion

Child labor remains a considerable challenge in both Peru and the Philippines, affecting around 2 million children aged 5 to 17 in each country. In both these countries agriculture is a central factor explaining child labor, particularly in its most exploitative forms. Importantly, an array of research has shown that the persistence of child labor is closely related to poverty and lack of intergenerational mobility. Two interventions, one in Peru and another in the Philippines, used livelihoods programs to address the challenge of child labor in poor rural areas. In the case of Peru, the program included along the livelihoods support, a schooling intervention and an awareness-raising component. Meanwhile, in the Philippines, the program assessed was more comprehensive, with a variety of interventions, including a livelihoods support, which is the focus of our study. Both programs relied on the theoretical assumption that by increasing households' assets and incomes, the need for child labor would decrease and parents would be more willing to send their children back to school. This paper evaluates these two interventions to assess whether the programs achieved this aim.

To assess the impact of both interventions, we use a randomized experimental design, where the assignment of the households to intervention and control groups was done through a two-step randomization process. In the case of Peru (Philippines), the first randomization was done at the community level (village or barangay level), then within the intervention at the household level. In terms of the assessed groups, there are three groups in Peru: households in communities that received a livelihoods intervention; households in communities that received livelihoods and education interventions; and households in communities that do not receive either of these interventions. Both treated communities in Peru are also provided with awareness-raising on child labor. In the Philippines, there is one treatment group that receives the livelihood intervention and two control groups made up of households that do not receive this particular intervention; the first one withing treated villages, and the second one withing non-treated villages. In the case of the Philippines, both treatment and control groups received several other interventions (e.g. education, youth employment, social protection, advocacy, capacity building and awareness-raising), so we are assessing the incremental effect of the livelihoods intervention on participating households.

While the Peruvian program produced some significant results (in economic and statistical terms), it did not achieve several of the planned outcomes. While, neither the combined approach (T2) nor the livelihood intervention alone (T1) resulted in higher production, an increase in the use of technology or a greater adoption of improved agricultural practices; they had effects on entrepreneurship and agricultural diversification. In fact, households in the T1 treatment group appear to have enhanced their entrepreneurial activities (at the cost of reduced savings), while households in the T2 treatment group appeared to have diversified their activities, reducing their debt accumulation.

In terms of child labor, at midpoint, we observed a clear reduction in hazardous child labor for households who received the combined support (T2 group), accompanied by a simultaneous increase in dangerous and hazardous work performed by adults. This finding seems to suggest an intra-household reallocation of work-related hazards from children to adults. In terms of the effects at the endline, the most significant impacts of the program are those related to child labor conditions, which are stronger when both interventions are provided together (T2) than when the livelihoods intervention is delivered alone (T1). Indeed, the analysis shows that the combined livelihoods and education intervention produced a sizable reduction in hazardous child labor and child labor rates (measured according to both the national legislation and the program's definitions), accompanied by significant reductions in working hours. Meanwhile permitted child work rates increased (according to the program's definition), which points to a partial transformation from hazardous child labor into permitted child labor. In terms of schooling, the most significant effects are those related to absenteeism rates, which are again statistically significant only for households in the T2 group. We find that school absenteeism of both younger and older children declined by around one-sixth of a day in a fortnight (this is 0.18 and 0.12 days, respectively, at a 5 percent significance level), thanks to the education intervention of the Peruvian program. At the same time results remain small in magnitude and

non-statistically significant concerning whether the children attended (regularly or not) school, or whether they achieved any level of education for both treatment groups.

The Philippine program did not produce any notable statistically significant impacts, with the exception of an increase in the variety of vegetables and crops produced or consumed. Interestingly, the program seems to have triggered a trade-off by which the treatment group engaged more in their agricultural activities and less in business activities. As suggested, the decrease in business activities offset any income gained from more agricultural production. Hence, no changes were observed in child labor rates, hazardous conditions nor income levels. The lack of effects on income diversification might be related to the fact that while the program promoted diversification, the increase in the number of activities may have impeded realizing economies of scale and economies of specialization, which in turn may have weakened economic results. Behavioral explanations may also explain the program's lacking impact. Indeed, the fact that households are turning down opportunities to increase income and participation in different economic activities, might point at other types of costs involved in taking up these opportunities. Firstly, habit formation – the difficulty in transitioning from one known habit to new practices – may have hindered the households from using the new practices offered by the Philippine program, such as engaging with business opportunities or cultivating other crops. Social and cultural norms may have reinforced these habits if households were resistant to adopt new practices due to strong feelings of cultural identify (the so-called status quo bias). Non-behavioral reasons, such as risk-aversion, might also have played a role, and in fact results (although statistically non-significant) show indeed an increase in risk aversion. Income diversification means adopting new and unfamiliar practices, which might be seen as involving higher risk. Lack of information could be reinforcing these feelings, as even if households were open to innovate, they may not see the opportunities of this innovation (i.e. income diversification), which enhances their risk aversion.

As observed in this paper, the evidence shows that the actual outcomes did not always reflect the planned outcomes. Importantly, a battery of robustness checks were carried out, which indicates that the lack of effects neither derives from a failure in program implementation nor to heterogeneous effects. On the contrary, the tests confirm that the livelihood intervention when provided as a sole intervention did not manage to improve economic conditions and hence generally failed to reduce child labor rates in rural areas in Peru and the Philippines. Meanwhile, the Peruvian program shows that education interventions aimed at improving the quality of schools do leverage the potential effects of livelihood support. Finally, when looking at the cases of Peru and the Philippines together, our analysis seems to suggest that awareness-raising interventions aimed at changing the perceptions of parents through community interaction can indeed play a role as suggested by the literature, but that these awareness-raising interventions are also reinforced by education interventions. All in all, our paper indicates that a comprehensive approach including livelihood support with education and awareness-raising components is the more effective way to reduce child labor and hazardous labor for children in the agricultural sector.

Appendix

▶ **Table 19. Definition of key variables**

Variable	Definition
Permitted child work and child labor: International definitions	Child labor refers to "work that deprives children of their childhood, their potential and their dignity, and that is harmful to their physical and/or mental development" (ILO, 2002). According to ILO Convention No. 138 (1973) on the minimum age for employment and to ILO Convention No. 182 (1999) on the worst forms of exploitative labor, the minimum age to work is 15 years. For light work which "does not harm health or school work", however, children aged 13 may enter employment. For hazardous work, the minimum age is normally 18, yet 16-year-olds may also work in hazardous conditions under the guarantee of no adverse health effects and limited working hours. All work that does not comply with the above conditions is considered child labor. Children in child labour is a narrower category than children in permitted child work. Whether or not child work is indeed child labour depends on whether children are below the minimum age according to ILO Convention No. 138 (1973), and whether the type of work they perform falls outside permitted light work, otherwise classified as a worst form of child labour, or as hazardous work according to ILO Convention No. 182 (1999).
Hazardous child labor: Definitions used in the paper	Hazardous child labor is defined in accordance with ILO Convention No. 182 (1999), which sets out that children in hazardous work include those involved in any activity or occupation that, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children (ILO, 2017c). In the Philippines, the law prohibits hazardous work for all children below 18 years old. In Peru, children aged at least 14 years [15 years] can also perform hazardous work (or work in hazardous conditions) provided the work is performed for less than 4 [6] hours per day and 24 [36] hours per week. The list of hazardous activities is defined by the Department of Labor and Employment (DoLE) under order N°04 (1999) in the case of the Philippines and by Supreme Decree No 003-2010-MIMDES (2010) in the case of Peru. Coding of the variable: A dummy variable that takes the value of 1 if the child is involved in hazardous activities (specifically under hazardous environments or using dangerous elements).
Permitted child work and child labor: Definitions used in the paper	The paper considers two different definitions of child labor and permitted child work for each country: the legal definition and an operational definition applied by the implementing partners during the development of the study. The programs' definitions is in both cases more stringent than the national definitions and closer to the international definitions. In the case of Peru, both definitions are assessed separately in the paper to provide a view of the changes in terms of effects when implementing different definitions. In the case of the Philippines, only one definition is used in the paper, which includes some aspects of the international definitions and some aspects of the national legislation.

Variable	Definition
Permitted child work and child labor: Legal definition Peru	According to national legislation in Peru, child work is permitted under the following conditions: first, children aged 12 to 14 are allowed to work on non-hazardous activities and under non-hazardous conditions, but only between 7am and 7pm and provided there are no adverse effects on education and health. Second, children aged 14 years can also perform hazardous work (or work in hazardous conditions) provided the work is performed for less than 4 hours per day and 24 hours per week. Third, the same conditions apply to children aged 15 to 17, except that their working hours may be extended to 6 hours per day and 36 hours per week (Article 23 of National Constitution, 2000; National Child Code, 2001). All labor performed by children, which does not fall under the stated conditions is considered child labor under the Peruvian national legislation. Note that national legislation in Peru does not cover home economic activities for children aged 5 to 13. Hence, it is difficult to assess whether this is legal or not. Coding of the variable "permitted child work – legal definition": A dummy variable that takes the value of 1 if the child is involved in permitted child work as defined by the national legislation. Coding of the variable "child labor – legal definition": A dummy variable that takes the value of 1 if the child is involved in child work that falls outside the stated conditions for permitted child work.
Permitted child work and child labor: Program's definition Peru	The implementing partners established a definition of child labor and child work that differed slightly from Peruvian legislation but which is in line with the ILO Conventions No. 138 and No. 182 (ILO, 2017b). In contrast to the Peruvian legislation, all hazardous work or work performed under hazardous conditions is considered as child labor. Children aged 15 to 17 may work a maximum of 4 hours per day and 24 hours per week as opposed to 6 hours per day and 36 hours per week as established in the Peruvian legislation. In addition, work performed by children aged 5 to 11 for more than 4 hours per day outside the family is considered child labor. Coding of the variables: Dummy variables taking the value of 1 if the child is involved in permitted child work and child labor, respectively, as defined internationally.
Permitted child work and child labor: Legal definition the Philippines	The definition of child labor in the Philippines' national legislation differs slightly from the international definition provided by ILO Conventions No. 138 and No. 182. Any work performed by children under the age of 15 is considered child labor if it is done outside the household. Even if done exclusively with family members, it is still considered child labor if it fails to satisfy all of the following requirements: is not hazardous, does not exceed 20 hours per week, does not exceed 4 hours per day and does not involve work between 8pm and 6am (Philippines national legislation 1993; 2003). Note that this definition is not used in the paper. It is stated here for ease of reference so it is clear how different the program's definition is to both, the national and international definitions.
Permitted child work and child labor: Program's definition the Philippines	The implementing partners established definitions of child work and child labor that included some aspects of the international definitions (ILO, 1973; 1999) and some aspects of the national legislation (Philippines national legislation, 1993; 2003; 2004). As stated in the Philippines' national legislation, permitted child work is defined for children aged below 15 years, as any work performed for their family and only with family members, whose nature is not hazardous, they are not working more than 4 hours per day or 20 hours per week and do not work between 8pm and 6am. Furthermore, child work is permitted if children are aged between 15 to 17 years, the nature of their work is not hazardous and they are working less than 8 hours per day or 40 hours per week and are not working between 10pm and 6am. Conversely, any work performed exclusively with family members that does not meet the above conditions is considered child labor. Moreover, for all children under the age of 15, any work outside the household without family members is considered child labor. Coding of the variables: Dummy variables taking the value of 1 if the child is involved in permitted child work or child labor, respectively, as defined above.

Variable	Definition
Differences in definitions between Peru and the Philippines	Whereas there is no minimum limit for child work in the Philippines law, the lower bound in Peruvian legislation is 12 years old. Both of these legal definitions differ from the ILO requirements, which stipulate a lower bound at the age of 13. Program's definitions for Peru and the Philippines also treat the work hazard level differently. Whereas the program in the Philippines recognizes all hazardous work as child labor as long as the person in question is less than 18 years old, the program in Peru considers hazardous work to be acceptable child work if the child is at least 14 years old and works less than 4 hours per day and 24 hours per week.
Other variables included in the model	
Worker child (Peru)	Coding of the variable: A dummy variable that takes the value of 1 if the child is involved in any working activity independently of whether he or she goes to school at the same time.
Children like work (Peru)	Coding of the variable: It is a dummy variable that takes the value of 1 if the child declares that the reason to be working is because he or she likes to work.
Hours per day (Peru)	The average total number of hours worked by the child per day. It includes all working activities (hazardous and non-hazardous).
Hours per week (Peru)	The average total number of hours worked by the child per week. It includes all working activities (hazardous and non-hazardous).
Illness and injuries (Peru)	Coding of the variable: A dummy variable that takes the value of 1 if the child had any injury or had been ill during or after the work activities.
Domestic chores (Peru)	Coding of the variable: A dummy variable that takes the value of 1 if the child is involved in domestic chores. Domestic chores include general housekeeping duties, but also caring for family members or for family animals. This tasks can be carried out in the household, farm, enterprise, building site or kiosk.
Non-working children (the Philippines)	A dummy variable that takes the value of 1 if the child does not work.

Source: ILO (2017c; 2017b).

▶ **Table 20. Effect of Peru's program on schooling rates at the endline survey**

Variable	Control mean	T1		T2	
		Coeff	Obs	Coeff	Obs
Child goes or ever went to school	0.99	0.00*	2,156	-0.03	2,663
	[0.09]	(0.00)		(0.02)	
"Younger" child goes or ever went to school	0.99	0.00	864	-0.04	1,030
	[0.10]	(0.00)		(0.03)	
"Older" child goes or ever went to school	0.99	0.00	1,083	-0.03	1,323
	[0.09]	(0.00)		(0.02)	
No education child	0.03	0.00	2,140	-0.00	2,636
	[0.16]	(0.04)		(0.02)	
Initial level child	0.53	-0.04	2,140	-0.03	2,636
	[0.50]	(0.06)		(0.04)	
Fifth year of primary school child	0.10	-0.03	2,140	-0.01	2,636
	[0.30]	(0.03)		(0.03)	
First year of secondary school child	0.17	0.00	1,920	-0.00	2,383
	[0.37]	(0.04)		(0.03)	
Fifth year of secondary school child	0.26	0.06	1,920	0.07	2,383
	[0.44]	(0.07)		(0.07)	
Superior technological institute child	0.08	0.02	1,920	0.01	2,383

Variable	Control mean	T1		T2	
		Coeff	Obs	Coeff	Obs
	[0.27]	(0.04)		(0.03)	
Level completed child	0.89	-0.13	2,156	-0.02	2,663
	[0.31]	(0.10)		(0.03)	
Start school age 5	0.05	-0.01	2,156	0.03	2,663
	[0.21]	(0.02)		(0.03)	
Start school age 6	0.73	-0.04	2,156	-0.07	2,663
	[0.44]	(0.07)		(0.05)	
Start school age 7	0.01	0.08	2,156	0.04	2,663
	[0.30]	(0.06)		(0.04)	
Children currently or ever enrolled	0.95	-0.00	2,156	-0.02	2,663
	[0.21]	(0.03)		(0.02)	
“Younger” child currently or ever enrolled	0.91	0.03	864	-0.03	1,030
	[0.28]	(0.04)		(0.04)	
“Older” child currently or ever enrolled	0.93	0.01	1,083	-0.01	1,323
	[0.26]	(0.03)		(0.03)	
Number of school absences during the last 15 days	0.20	-0.02	2,057	-0.10**	2,532
	[0.96]	(0.08)		(0.05)	
Absences “younger” children	0.28	-0.02	785	-0.18**	924
	[1.28]	(0.17)		(0.07)	
Absences “older” children	0.23	-0.00	1,000	-0.12**	1,215
	[1.16]	(0.15)		(0.05)	
Reason for absences: work and school	0.01	0.01	2,156	0.00	2,663
	[0.09]	(0.01)		(0.01)	
Reason for absences: illness	0.04	-0.00	2,156	-0.05***	2,663
	[0.19]	(0.04)		(0.02)	
Repeat child	0.22	-0.01	2,156	-0.02	2,663
	[0.42]	(0.06)		(0.04)	
Repeat once child	0.18	-0.05	2,156	-0.01	2,663
	[0.38]	(0.05)		(0.04)	
Repeat twice child	0.04	0.03	2,156	-0.01	2,663
	[0.19]	(0.03)		(0.02)	
Reason to repeat: work	0.00	0.01	2,156	-0.00	2,663
	[0.06]	(0.01)		(0.00)	
Reason to repeat: illness	0.02	-0.00	2,156	0.00	2,663
	[0.14]	(0.01)		(0.01)	

Note: This table provides the Intention to Treat (ITT) estimates for the outcome variables listed. Younger is defined as children aged 5 to 11 years, and older by children aged 12 to 17 years. Robust standard errors clustered at the community level in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

▶ Table 21. Effect of Peru's program on economic activities, income and assets at the endline survey

Variable	Control mean	T1		T2	
		Coeff	Obs	Coeff	Obs
One activity	0.23	-0.09***	2,098	-0.08**	2,606
	[0.42]	(0.03)		(0.03)	
Two activities	0.45	0.11	2,098	0.09***	2,606
	[0.50]	(0.07)		(0.03)	
Three activities	0.31	-0.01	2,098	-0.01	2,606
	[0.46]	(0.07)		(0.05)	
Number crops	3.22	0.54	818	-0.03	1,025
	[2.12]	(0.63)		(0.49)	
Production decision female	0.10	0.06	818	0.02	1,025
	[0.31]	(0.06)		(0.05)	
Backyard garden	0.23	0.33***	818	0.21**	1,025
	[0.42]	(0.11)		(0.09)	
Garden consumption	0.89	-0.14	191	-0.02	229
	[0.31]	(0.10)		(0.10)	
Garden sale	0.073	0.02	191	-0.00	229
	[0.26]	(0.05)		(0.06)	
Crop plague	0.71	0.02	754	-0.11	905
	[0.45]	(0.12)		(0.07)	
Crop illness	0.56	0.15	754	-0.04	905
	[0.50]	(0.15)		(0.12)	
Crop climate issue	0.61	0.18	754	-0.08	905
	[0.49]	(0.12)		(0.15)	
Inactive against plague	0.44	0.15*	926	-0.05	1,156
	[0.50]	(0.09)		(0.09)	
No use fertilizer	0.27	-0.17**	926	-0.13**	1,156
	[0.44]	(0.07)		(0.07)	
No use of technology	0.79	0.12*	926	-0.00	1,156
	[0.41]	(0.06)		(0.06)	
No certification crop	0.77	0.10	926	0.01	1,156
	[0.42]	(0.09)		(0.06)	
Crop for consumption (%)	49.0	13.75*	753	13.92**	904
	[28.8]	(8.06)		(6.68)	
Crop for seed (%)	12.8	4.74*	753	1.98	904
	[12.0]	(2.60)		(1.78)	
Crop for animal (%)	7.55	-6.57*	753	-7.29	904
	[16.6]	(3.86)		(5.20)	
Crop for seed animal (%)	10.2	-0.92	753	-2.65	904
	[9.15]	(1.77)		(2.60)	
Crop for sale (%)	28.2	-9.19	753	-5.60	904
	[32.7]	(10.78)		(8.10)	
Number of enterprises	2.42	-1.04***	413	-0.17	515

Variable	Control mean	T1		T2	
		Coeff	Obs	Coeff	Obs
	[1.31]	(0.22)		(0.30)	
Asset index	-0.10	0.27	823	0.48	1,034
	[1.14]	(0.26)		(0.33)	
Asset index dwelling	-0.09	0.05	823	0.21**	1,034
	[1.05]	(0.31)		(0.10)	
Asset index livestock	0.01	-0.53***	823	-0.28	1,034
	[1.00]	(0.16)		(0.21)	
Asset index properties land	0.13	0.07	823	-0.28	1,034
	[0.83]	(0.14)		(0.18)	
Income 1±	655.8	-65.62	823	110.98*	1,034
	[509.6]	(72.17)		(58.14)	
Income from non-agricultural activities±	380.7	-364.01	823	-461.62	1,034
	[1326.9]	(312.31)		(370.61)	
Income total±	1036.5	-429.63	823	-350.64	1,034
	[1368.5]	(306.07)		(372.13)	
Amounts debts±	2182.6	-965.08	823	-2,139.06*	1,034
	[7802.5]	(1,074.21)		(1,098.86)	
Amount savings±	437.9	-446.83**	823	-293.45	1,034
	[3516.6]	(196.45)		(256.81)	
Ratio income debt	14.6	-9.70*	262	-2.50	349
	[77.6]	(5.33)		(6.73)	
Ratio income 1 debt	11.2	-6.61	262	0.37	349
	[59.2]	(4.60)		(6.02)	
Ratio income savings	17.4	25.05*	386	-5.84	486
	[70.9]	(13.12)		(4.68)	
Ratio Income 1 savings	9.99	25.92*	386	-3.99	486
	[22.9]	(13.44)		(2.90)	
Ratio savings debts	3.21	-3.61*	262	1.24	349
	[22.7]	(1.97)		(5.29)	

Note: This table provides the Intention to Treat (ITT) estimates for the outcome variables listed. ± denotes figures in PEN (Nuevo Sol Peruano). Income 1 is the total of the agricultural adult net income. Robust standard errors clustered at the community level in parentheses and standard deviations in brackets. *: p<0.1; **: p<0.05; ***: p<0.01.

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Acknowledgements

We would like to thank Hugo Ñopo (GRADE) and Lorenzo Guarcello (ILO) for insightful comments, Johannes Brehm for significant contributions and excellent research assistance and to Magnus Bjørnbekk and Leopoldo Miotto for research assistance during the initial stages of the research. The evaluations of the programs presented in this study were prepared initially for the International Labour Office and the United States Department of Labor. Funding for these reports was provided by the United States Department of Labor. Thanks are due to Peter Wichmand for his support throughout the development of the evaluations. The responsibility for opinions expressed in this article rests solely with the authors, and publication does not constitute an endorsement by the International Labour Office of the opinions expressed in it.

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ISBN 9789220337523