Is prohibiting child labour enough? Coffee certification and child schooling in Ethiopia and Uganda

K.T. Akoyi[1]; F. Mitiku[2]; M. Maertens[1]

1: KU Leuven, Earth and Environmental Sciences, Belgium, 2: Jimma Univeristy, Agricultural Economics, Ethiopia

Corresponding author email: kvntakoyim@gmail.com

Abstract:

Private sustainability standards are spreading rapidly in global agri-food value chains as a means of communicating important aspects of safety, ethics and environmental attributes of food production, to consumers. A cross-cutting requirement for most standards is the prohibition of child labour intended to improve child welfare. In this paper, we investigate the child schooling implications in the coffee sector in Ethiopia and Uganda. We use cross-sectional household survey data and probit, tobit, propensity score matching and difference-in-difference techniques to estimate the impact of certification on schooling. We find that FT certification increases the likelihood of children to be enrolled in secondary school by 25% and, primary and secondary schooling efficiency by 10% and 16%, respectively. We find that RA certification has no impact on both school enrolment and schooling efficiency. The results imply that prohibition of child labour alone is not sufficient to improve schooling outcomes and that FT keeps its child welfare promises in South Western Ethiopia and Eastern Uganda. Keywords: private sustainability standards, global value chains, child schooling, smallholder farmers, East Africa

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1. Introduction

The proliferation of Private Sustainability Standards (PSS) in global agri-food value chains in the past two decades is apparent. Coffee is a good example of such an agri-food value chain. Inherent in PSS is information transmission between producers and consumers at opposite ends of global food supply chains, regarding food safety, as well as ethical and environmental aspects of food production, processing and marketing (Holzapfel & Wollni, 2014). The relevance of specific PSS is presented in the promises they make to consumers in high income countries about the producer level welfare and environmental impacts. An important ethical attribute of PSS is the condition that prohibits child labour, thereby communicating to consumers a child-labour-free production and marketing process (Baland & Duprez, 2009). With this requirement, PSS hope to promote schooling of producers' children, by reducing their engagement in work on coffee farms. For example: Rainforest Alliance (RA), *prohibits the worst forms of child labour according to ILO* (Rainforest Alliance, 2017). Similarly, Utz states n*o forced labour or child labour* and requires participating companies to ensure a*ccess to education for children* (Utz-certified (2016). Fairtrade (FT), not only prohibits *forced and child labour*, it also requires the payment of Fairtrade premium (social premium) by coffee buyers to producer cooperatives or plantation workers, for investment in local social development (Fairtrade International, 2017). Furthermore, FT states that *if there are no schools available in the area where children live, all effort should be made to work with national authorities and/or other relevant partners to build schools*. (Fairtrade International, 2011).

These promises raise many expectations among producers and consumers. Considering the cross-cutting nature of the child-labour-free condition in PSS and the persistent poor education outcomes in Africa, it is imperative to investigate whether they indeed live up to these promises. There is a growing body of empirical literature investigating welfare impact of PSS, mostly in the coffee sector but findings are mixed (Bray & Neilson, 2017). Some of them find positive impact on revenue and income (Bolwig, 2009; Jena & Grote, 2017), prices (Dragussanu et al, 2014) and increased per capita expenditure (Chiputwa et al. 2015). Others find limited or no impact on producer welfare (Van Rijsbergen et al, 2016).

Only few studies focus on impact of PSS on child schooling and child labour but mostly using cases from Latin American countries. Most authors find positive effects of FT on child schooling, for example: from Mexico (Gitter *et al.,* 2012); Nicaragua, Peru and Guatemala (Arnould *et al.,* 2009); Chile (Becchetti *et al.*, 2013) and Nepal (Chakrabarty *et al.*, 2011). Other studies on the impact of FT on child schooling and child labour are less optimistic. Mendez et al. (2010) find no effect of FT-Organic certification on child schooling in Central America and Mexico. Baland & Duprez (2009) reveal the tendency of adults to replace children in the export sector while children replace adults in the domestic sector, concluding that FT impact on child labour is ambiguous. In India, some authors document that the FT social premium is used to provide school

uniforms for girls, thereby incentivising them to continue with basic education (Jena & Grote, 2016, Karki *et al.*, 2016). In the literature, we find no evidence from Sub-Saharan Africa (SSA) and yet these findings may not apply to SSA where child schooling and child labour issues still exist, pertinent as they are. Although overall net primary school enrolment in developing countries increased from 83 to 91% and the number of children out of school decreased from 100 to 57 million between 2000 and 2015, 58% of those out of school, live in SSA (UN, 2015). and education remains a key Sustainable Development Goal (SDG) (UN, 2017). In addition, 28% of the 168 million children engaged as child labourers globally, live in SSA (ILO, 2015, UNICEF, 2016).

In this paper, we examine the impact of PSS on child schooling among smallholder coffee producers in Ethiopia and Uganda. We use original cross-sectional household survey data and apply Propensity Score Matching (PSM) and Difference-in-Difference (DD) to reveal the effects of a household's participation in coffee certification on school enrolment and schooling efficiency of their children. In Ethiopia we focus on Fairtrade, Fairtrade-Organic and Rainforest Alliance certified cooperatives in Jimma and Kaffa zones and in Uganda we focus on a double Fairtrade-Organic and a triple Utz-Rainforest-4C coffee certification schemes[1]. All these standards aim at improving producer household welfare, a key determinant of child schooling (Lincove, 2009; Handa, 2004) and prohibit child labour. Our choice of study topic and area is relevant because both countries have invested heavily in education since the mid-1990s but education goals are not yet fully achieved. They also experience high income poverty, 70% in South Western Ethiopia (Mitiku et al, 2017) and 65% in eastern Uganda (Akoyi & Maertens, 2017) and coffee is their most important foreign exchange source – 24% for Ethiopia (Minten, et al, 2014) and 23% for Uganda (UCDA, 2014). In the literature, there is consensus that investment in education contributes directly to human capital development and underpins economic growth and social development in the long run (Mundial, 2006; Handa et al, 2004).

2. Conceptual discussion

Child schooling refers to the process of school-aged children being taught within institutions, usually schools, based on a statutory national curriculum and in reference to common standards. The literature highlights supply side determinants of child schooling as school infrastructure, teachers, and associated school materials. On the demand side, household income and parents' education (Lincove, 2009; Handa, 2004), as well as improving child health, child nutrition and reducing the child's workload (Kremer, 2013; Langsten, 2017), are important. For poor households, whenever school costs are high, parents will be inclined to withdraw their children from school and engage them in wage employment for those in urban areas (Chakrabarty & Grote, 2009; Chakrabarty et al, 2011). For those in rural areas of SSA, it may mean involvement in farm work. In studying impacts of programs on child schooling therefore, authors commonly use indicators such as: school entry captured by ever-enrolment or whether a child was enrolled the previous year; retention or grade

[1] For this paper, Fairtrade and Fairtrade-Organic are grouped together under FT while Rainforest Alliance and Utz-Rainforest-4C are grouped together under RA.

attainment; timely enrolment; and timely progress through education or schooling efficiency (Langsten, 2017). The latter two indicators are particularly important in sustaining children's motivation to continue in school (Kruger, 2007; Gitter et al, 2012). The choice to study the impact of coffee certification on school enrolment and schooling efficiency in the coffee sectors in Ethiopia and Uganda is pertinent and a novelty for several reasons. First, child labour through wage employment in a manufacturing industry is quite different from child labour on parents' farms in rural areas. Second, the certification schemes sampled entail multiple coffee certificates, itself a growing tendency as PSS spread. Third, we use a rich dataset from two important coffee producing East African countries. Lastly we descriptively dis-entangle the channels of effects.

In the next paragraphs of this section, we discuss the possible channels of effects, important for our research areas, both of which are relatively poor, and where FT and RA certifications are between 8 to 14 years old. First, coffee certification might influence child schooling positively or negatively, depending on how it affects income. Some authors highlight the link between higher income and positive schooling outcomes (Gitter et al, 2012; Arnould et al, 2009), arguing that it makes it easier for parents to pay school costs. Low incomes in rural households, however, are correlated with low parental education, asset poverty, poor sanitation and living standards, all of which negatively impact education (Handa, 2004; Lincove, 2009). Higher incomes due to certification may result either from higher prices linked to certification (Mitiku et al, 2017) or from higher yields from intensification of coffee production (Akoyi & Maertens, 2017).

Second, participation in a coffee certification scheme can come with increased work load due to more complex coffee agronomic practices and processing techniques, needed to produce high quality beans. Workload situation could be worse if certification prohibits the use of labour-saving techniques such as chemical weed-killers, thereby increasing household labour demands and their tendency to engage children. The practice in the study areas, of involving children to help on the farms could worsen and could have a negative effect on child schooling, since most smallholder producers rely on family labour. According to survey findings in Uganda, parents engage children in *light farm work* including weeding and picking coffee during the production season. In Ethiopia most parents (64%) agree on the importance of children helping with farm work during peak periods. At such times, they either increase children's working hours on the farms or hire labour but most have limited capacity for the latter option. This implies that certification can act as a double-edged sword, serving as an important source of income to fund education on the one hand, and hampering children's education in cases where it increases work load, on the other (Kruger, 2007; Gitter and Barham, 2008).

Third, FT certification can increase child schooling outcomes due to investment of the social premium in local communities of producers, a condition that coffee buyers of FT certified coffee must comply with. According to survey findings, about 50% of the FT cooperatives in Uganda, invested this money directly in education, particularly school renovation, desks and other school materials. All FT respondents indicated that they find this FT condition most valuable. One way in which investment of the social premium could work to increase child schooling outcome is by representing an exogenous income transfer to participating households,

with which they reduce the cost of education, usually incurred by parents, in terms of tuition, scholastic materials, transport and meals (Omoeva & Gale, 2016). By so doing, it leaves households with income space to hire labour, in case of pressure from coffee production activities. This argument is supported by Valkila & Nygren (2010) who find improvements in local social conditions including education and healthcare.

Fourth, participation in a coffee certification scheme can increase child schooling through awareness raising on the reasoning behind the child-labour-free condition. In our research areas, the FT companies use the cooperative structure, not only to invest in awareness raising but also to conduct group trainings and mobilise peer pressure among members to ensure compliance with certification conditions. This is enshrined in the fifth cooperative principle, which requires a cooperative to invest in training and raising awareness of members and employees, for effective participation (Novkovic & Power, 2005). Such awareness raising activities on the child-labour-free condition lead to a change in preference for child schooling among the participating households. Parents, regardless of their level of education, attach higher value to child education and its long term human capital benefits to own families and society in general. In addition, the co-operative structure has also given rise to several Village Savings and Lending Associations (VSLAs), which help to reduce the negative effects of credit constraints. Credit helps to smoothen household consumption and reduces the pressure of meeting school material costs (Beegle et al, 2003).

In summary, coffee certification might affect child schooling through: 1/ an income effect of which the direction is not clear *a priori*, 2/ a labour substitution effect, of which the direction is not clear *a priori*, 3/ a positive investment effect, and 4/ a positive awareness raising effect.

3. Background and data

3.1 Child education in Ethiopia and Uganda

Despite the big strides made towards achieving the Millennium Development Goals (MDGs), SSA still lags behind in all key indicators. In 2015, the region's projected net primary school enrolment was 80% compared to 91% and Primary School Completion Rate (PSCR) was about 64% compared to 84%, for developing regions. Literacy rate among youth (15-24 years) stood at 71% compared to 89% world-wide (UN, 2015). Between 2000 and 2014, primary school enrolment rate in Ethiopia increased from 53% to 89% (UNESCO, 2017) and that of Uganda, from 85% to 93% (World Bank, 2017), higher than the SSA average of 80%. Such significant increases in enrolment is attributed to the heavy investments by both governments in providing free primary school education, since 1994 and 1997 in Ethiopia and Uganda, respectively. Despite the impressive achievements, challenges remain. In Ethiopia, 32% of school aged children are still out of school and schooling efficiency is rather low, with many repetitions (Education for All, 2015). In Uganda, liberalisation of education service provision had important negative effects on education quality especially in rural areas, mainly due to lack of corresponding investment in teacher training and recruitment (Deininger, 2003). As a result many Ugandans shun rural public schools due to quality issues.

3.2 Data

We study the implications of coffee certification for schooling of children in smallholder households in Jimma and Kaffa zones of South Western Ethiopia and in the Mount Elgon region in Eastern Uganda, both, main Arabica coffee producing regions in east Africa. In Ethiopia, FT and Organic certifications were introduced into our study area in 2005 and RA in 2007. In Uganda, FT was introduced in 2000, organic in 2004 and RA in 2006. We use original cross-sectional household survey data from the two regions, collected in 2014, using a multi-stage stratified random sampling design. We first purposively selected four districts (*woredas*) from Kaffa and Jimma zones, and five districts from Mount Elgon. We then listed all coffee cooperatives in these districts and stratified them according to certification schemes. Within the districts, we selected 11 *Kebeles* in Ethiopia and 21 sub-counties in Uganda. We randomly selected one certified cooperative in each district and one non-certified cooperative in all but one district in Ethiopia. In Uganda within each district, we selected 2 certified sub-counties and two non-certified sub-counties, each with one cooperative. Finally, we randomly selected farmers from the cooperative member lists in Ethiopia and in Uganda, from certified cooperatives and village member lists. The final sample in Ethiopia includes 371 households, 162 certified and 209 non-certified coffee farmers. The final sample size of school aged children in Ethiopia are 861 children - 365 from certified and 496 from non-certified households. The final sample for Uganda includes 600 households, 300 certified and 300 non-certified. The final sample size of school aged children in Uganda are 1694 children - 837 from certified and 857 from non-certified households. We obtained detailed child schooling and child labour (in case of Ethiopia) data.

We used a quantitative structured questionnaire. It includes separate modules on household demographics, land and non-land assets, coffee production and marketing, income from other crops, off-farm

activities and other income. We gathered detailed information on child schooling at individual child level for all children between age six and 18. This includes age of child, school attendance the previous year, intelligence as perceived by household head, frequency of absence from school and reasons why. In Ethiopia, we also gathered information on weekly hours of child labour and perception on importance of schooling.

4. Econometric methods

To assess the impact of a household's participation in certification on schooling of their children, we first apply a probit and tobit models, then Propensity Score Matching (PSM) and lastly the Difference-in-Difference (DD) techniques. For all our models, we start with a reduced form equation of the following type:

$$S_i = \beta_0 + \beta_1 C_i + \beta_2 K_i + \beta_3 X_i + \mu_1 \quad (1)$$

Where S_i represents the following child schooling indicators: 1/ primary school enrolment, measured as a dummy equal to one if in the previous year, a child of age cohort 7-14 years was enrolled in a primary school grade (1-8) for Ethiopia or a child of age cohort 6-12 years was enrolled in a primary school grade (P1-P7) for Uganda, and zero otherwise; 2/ secondary school enrolment, measured as a dummy equal to one if in the previous year, a child of age cohort 15-18 was enrolled in a secondary school grade (9-12) for Ethiopia or a child of age cohort 13-18 was enrolled in a secondary school grade (S1-S6), and zero otherwise; 3/ primary schooling efficiency for the age cohorts 7-14 years for Ethiopia and 6-12 years for Uganda; 4/ secondary schooling efficiency for the age cohorts 15-18 years for Ethiopia and 13-18 years. Schooling efficiency is measured by a proxy variable, school gap for children, which is the ratio of the child's current grade to the child's expected grade, had s/he started school at the right age and gone through school without repeating or dropping out.

Our main explanatory variable of interest, C_i, is a vector of dummy variables indicating the participation of a household in either FT or RA coffee certification scheme. Each of the certification dummies are mutually exclusive since producers hold coffee production contracts with only one certification company/cooperative at a time. In the regression, we control for possible selection bias from observed heterogeneity, by including a large set of observable characteristics. The vector of control variables K_i includes characteristics of the child (age, sex, intelligence, number of siblings of different age cohorts); X_i - the household (sex, age, education, and religion of household head, education of mother, number of adults older than 18 years, land cultivated, livestock units and asset poverty) and; village institutions and accessibility (whether village has a secondary school and the distance to district town). Infrastructure variables are derived from village interviews and distance variables from household interview for Ethiopia and a combination of GPS information from survey plus available GIS Digital Elevation Model (DEM) information on Uganda[2]. We run a set of regressions using

[2] DEM was based on void filled Shuttle Radar Topography Mission (SRTM) data at a resolution of 1 arc-second (USGS, 2015).

probit model estimation for the first two binary schooling indicators, and a tobit estimation for last two indicators that are censored. For all models we use household level clustered standard errors.

We estimate the effects for all outcome variables using PSM (Rosenbaum and Rubin, 1983), combined with a sensitivity analysis that tests the assumption of selection on observables. We estimate the Average Treatment Effect (ATE) of the two certification schemes on the outcome indicators. We first estimate the propensity scores (PS), or the probability of a household to be member of a certified cooperative using a multinomial probit model for the two mutually exclusive treatments/certification at household level and save them. We then merge the saved PS, with child level variables to compute the ATEs. In the multinomial probit model, we only include variables that are not possibly influenced by the treatment or certification – mentioned above. We then use the kernel matching method with the default Gaussian kernel to match households. This allows the use of information from all non-certified/control observations and a weighting function to construct the counterfactual outcome, and reduces variance (Caliendo and Kopeinig, 2008). After matching, we estimate the ATEs as the weighted difference between children of treated and children of matched control households using bootstrapped standard errors.

The validity of PSM relies on two essential assumptions. First, the common support or overlap condition requires that treatment observations have comparison control observations nearby in the PS distribution (Caliendo & Kopeinig, 2008). We only use observations in the common support region. We further assess balancing properties by comparing covariate means between treated and matched controls using two-sided *t*-tests. Second, a strong assumption of conditional independence which requires that given observable variables, potential outcomes are independent of treatment assignment (Lampach and Morawetz, 2016). We test the robustness of our results against violation of this assumption, using a simulation-based sensitivity analysis (Ichino *et al*, 2008).

We apply the DD method on all outcome indicators. Using available information in our dataset regarding the year when a household was first certified, the year when a household first joined a co-operative and the year when a child first enrolled in school, we construct counterfactual groups of both certified and non-certified households before certification. We group households with children of the same age-cohort for the survey year (2014) and before certification started. We set the year of certification at 2006, to ensure relevance for the two schemes in the two countries. To construct child schooling data for the period before certification, we calculate the difference between the child's age in 2014 and the number of years the household has been in certification (2014-2006=8 years). We then create schooling dummy indicators equal to one if this difference is positive and zero otherwise. We use information on year of first enrolment in school and drop out year. If the child was enrolled before 2006 and did not drop out, then the child was enrolled before certification. Based on this procedure, we are able to construct child data for two groups of producers before certification in 2006, one certified and one non-certified. When we combine these with data from the two groups of certified and non-certified households in the survey year in 2014, we end up with four groups of households with four categories of child data.

By calculating the mean of the difference between schooling indicators after and before certification in 2014 and 2006 respectively, for certified and non-certified households, we estimate the effects of certification (Khandker *et al.*, 2010), according to equation *(2a)* of the following type:

$$\boldsymbol{DD = E\left(Y_1^T - Y_0^T | T_1 = 1\right) - E\left(Y_1^C - Y_0^C | T_1 = 0\right)} \qquad \textbf{(2a)}$$

Where, $T_1 = 1$ indicates our treatment (certification), in 2014: $T_1 = 0$ indicates the absence of certification before 2006. Y_1^T and Y_1^C are the respective schooling outcome indicators for children of certified and non-certified households after 2006 while Y_0^T and Y_0^C are the respective schooling outcome indicators for children of certified and non-certified households before 2006. The DD estimator enables us to calculate the unobserved difference in means of the counterfactual outcome indicators between certified and non-certified households, itself a source of selection bias. A very critical assumption in the DD method, similar to that of fixed effects model and panel analysis is the parallel trend assumption, that unobserved characteristics influencing selection into the program are time invariant (Khandker, et al, 2010). We construct four categories of certified and non-certified households that have children in the primary and secondary school age-cohort before and after certification. We repeat the same procedure for schooling efficiency. For this paper, we specify and estimate the following model:

$$\boldsymbol{Y_{iht} = \alpha + \varphi T_{i1} t + \sigma T_{i1} + \tau t + \beta X_j + \rho K_{hj} + \upsilon_{iht}} \qquad \textbf{(2b)}$$

Where, the coefficient φ of the interaction term between the post-certification variable (T_{i1}) and time (t = 0 for 2006 and t = 1 for 2014), yields the average DD effect of certification on the various schooling indicators. By including the variables T_{i1} and t separately, we are able to capture any other mean effects of time and also the effect of being targeted or not, through coefficients σ and τ, respectively. This helps to limit the possible confounding effects of certification and time. We control for a large set of observable time-varying and time-invariant characteristics including household and village level characteristics X_j and child characteristics K_{hj}, that might be correlated with child schooling. The advantage of the DD method is that it relaxes the condition of selection based on observed characteristics. For all the models, we estimate effects of coffee certification on girls and boys separately, within an age cohort. Although we cannot claim to have dealt with all biases, we increase the robustness of our results by separately controlling for treatment, T_{i1} and time, t into our models, thereby limiting the confounding effects of the two variables, treatment and time.

5. Results

5.1 Household characteristics

In table 1 and 2, we present household summary statistics for Ethiopia and Uganda – not described due to word limit.

Table 1: Characteristics of certified and non-certified households in Ethiopia

	Total sample		Non-certified households		FT certified households			RA certified households		
Child characteristics										
Child sample size	1182		681		316			155		
Age of child	12.0	(0.10)	12.1	*(0.13)*	12.1	*(0.50)*		10.6	*(0.30)*	***
Sex of child dummy (1=male)	0.54	*(0.02)*	0.53	*(0.02)*	0.56	*(0.04)*		0.58	*(0.03)*	
Child intelligence (2=average)	2.11	*(0.02)*	2.06	*(0.02)*	2.10	*(0.02)*	**	2.19	*(0.03)*	
Number of girls (0-6 years)	0.30	*(0.02)*	0.32	*(0.02)*	0.31	*(0.03)*	***	0.37	*(0.04)*	
Number of boys (0-6 years)	0.29	*(0.02)*	0.28	*(0.02)*	0.39	*(0.03)*		0.38	*(0.02)*	
Number of girls (7-14 years)	0.47	*(0.02)*	0.47	*(0.03)*	0.53	*(0.04)*		0.56	*(0.05)*	
Number of boys (7-14 years)	0.43	*(0.02)*	0.43	*(0.03)*	0.50	*(0.03)*		0.56	*(0.05)*	
Number of girls (13-18 years)	0.41	*(0.02)*	0.43	*(0.02)*	0.44	*(0.03)*	*	0.23	*(0.02)*	***
Number of boys (13-18 years)	0.61	*(0.02)*	0.65	*(0.03)*	0.51	*(0.04)*	*	0.52	*(0.04)*	
Household characteristics										
Household sample size	405		226		113			66		
Number of adults	3.03	*(0.04)*	3.14	*(0.05)*	2.93	*(0.07)*	***	2.77	*(0.06)*	***
Age of head (years)	45.6	*(0.34)*	45.7	*(0.46)*	46.5	*(0.61)*	**	41.6	*(0.67)*	***
Education of head (years)	3.38	*(0.10)*	3.47	*(0.13)*	3.28	*(0.17)*		3.30	*(0.18)*	
Education of mother (years)	1.52	*(0.08)*	1.27	*(0.09)*	1.78	*(0.15)*	***	2.02	*(0.20)*	***
Female head (% share)	6%		5%		9%		**	4%		
Christian (% share)	67%		83%		59%			19%		***
Muslim (% share)	33%		17%		41%		***	81%		***
Physical assets										
Total area cultivated (ha)	2.74	*(0.08)*	2.84	*(0.12)*	2.88	*(0.09)*		1.99	*(0.10)*	***
Livestock units (TLU)	5.25	*(0.12)*	5.99	*(0.18)*	4.64	*(0.12)*	***	3.13	*(0.21)*	***
Asset poverty										
MPI-assets (% poor)	41%		46%		34%		***	37%		**
Village infrastructure										
Secondary school in village (%)	20%		33%		0%		***	4%		***
Distance to district town (Km)	77.9	*(2.28)*	91.6	*(3.69)*	65.9	*(1.93)*	***	48.0	*(1.26)*	***

Source: Authors' calculation from survey data; ***Notes:*** Standard errors in parentheses; Significant differences between certified and non-certified households indicated by * p < 0.15, ** p < 0.10, *** p < 0.05; Child intelligence according to parents: 1=below average, 2=average and 3=above average; MPI-assets = Multi-dimensional Index for asset poverty - a household is asset poor it does not own more than one radio, TV, telephone, refrigerator, bicycle or motorbike and does not own a car or tractor.

Table 2: Characteristics of certified and non-certified households in Uganda

	Total sample		Non-certified households		FT certified households			RA certified households		
Child characteristics										
Sample size	1694		857		476			361		
Age of child	12.0	*(0.09)*	12.1	*(0.13)*	12.4	*(0.17)*		11.5	*(0.19)*	
Sex of child dummy (1=male)	0.49	*(0.01)*	0.48	*(0.02)*	0.48	*(0.02)*		0.50	*(0.03)*	
Child intelligence (2=average)	2.19	*(0.01)*	2.04	*(0.02)*	2.06	*(0.02)*		2.20	*(0.03)*	***
Number of girls (0-5 years)	0.72	*(0.02)*	0.68	*(0.03)*	0.79	*(0.05)*	**	0.69	*(0.04)*	
Number of boys (0-5 years)	0.60	*(0.02)*	0.58	*(0.02)*	0.63	*(0.04)*		0.61	*(0.04)*	
Number of girls (6-12 years)	0.27	*(0.01)*	0.27	*(0.02)*	0.25	*(0.02)*		0.29	*(0.02)*	
Number of boys (6-12 years)	0.24	*(0.01)*	0.23	*(0.01)*	0.23	*(0.02)*		0.26	*(0.02)*	
Number of girls (13-18 years)	0.18	*(0.01)*	0.17	*(0.01)*	0.24	*(0.02)*	***	0.14	*(0.02)*	*
Number of boys (13-18 years)	0.19	*(0.01)*	0.19	*(0.01)*	0.22	*(0.02)*	**	0 .17	*(0.02)*	
Household characteristics										
Household sample size	508		257		142			109		
Number of adults	4.9	*(0.06)*	4.9	*(0.08)*	5.2	*(0.11)*	***	4.6	*(0.13)*	*
Age of head (years)	48.5	*(0.33)*	47.9	*(0.44)*	51.4	*(0.70)*	***	46.5	*(0.64)*	**
Education of head (years)	8.3	*(0.15)*	9.2	*(0.24)*	7.4	*(0.21)*	***	7.2	*(0.25)*	***
Education of mother (years)	5.6	*(0.16)*	5.5	*(0.15)*	4.88	*(0.22)*	***	6.63	*(0.58)*	***
Female head (% share)	9%		6%		16%		***	5%		
Christian (% share)	94%		92%		95%		*	98%		***
Muslim (% share)	6%		8%		5%		*	2%		***
Physical assets										
Total area cultivated (ha)	1.11	*(0.03*	1.08	*(0.04)*	1.11	*(0.05*		1.21	*(0.06)*	**
Livestock units (TLU)	2.23	*(0.06)*	2.23	*(0.08)*	2.29	*(0.11)*		2.22	*(0.12)*	
Asset poverty										
MPI-assets (% poor)	29%		31%		28%			28%		
Village infrastructure										
Secondary school in village (%)	20%		19%		24%		**	19%		
Distance to district town (Km)	26.7	(0.22)	26.2	*(0.36)*	26.9	*(0.33)*		27.2	*(0.33)*	**

Source: Authors' calculation from survey data; ***Notes:*** Standard errors in parentheses; Significant differences between certified and non-certified households indicated by * $p < 0.15$, ** $p < 0.10$, *** $p < 0.05$; Child intelligence according to parents: 1=below average, 2=average and 3=above average; MPI-assets = Multi-dimensional Index for asset poverty - a household is asset poor it does not own more than one radio, TV, telephone, refrigerator, bicycle or motorbike and does not own a car or tractor.

5.2 Child enrolment and schooling efficiency

In figure 1 to 4 we present a mean comparison of the various outcome indicators for Ethiopia and Uganda. In general, all outcome indicators are higher among FT certified households in both countries.

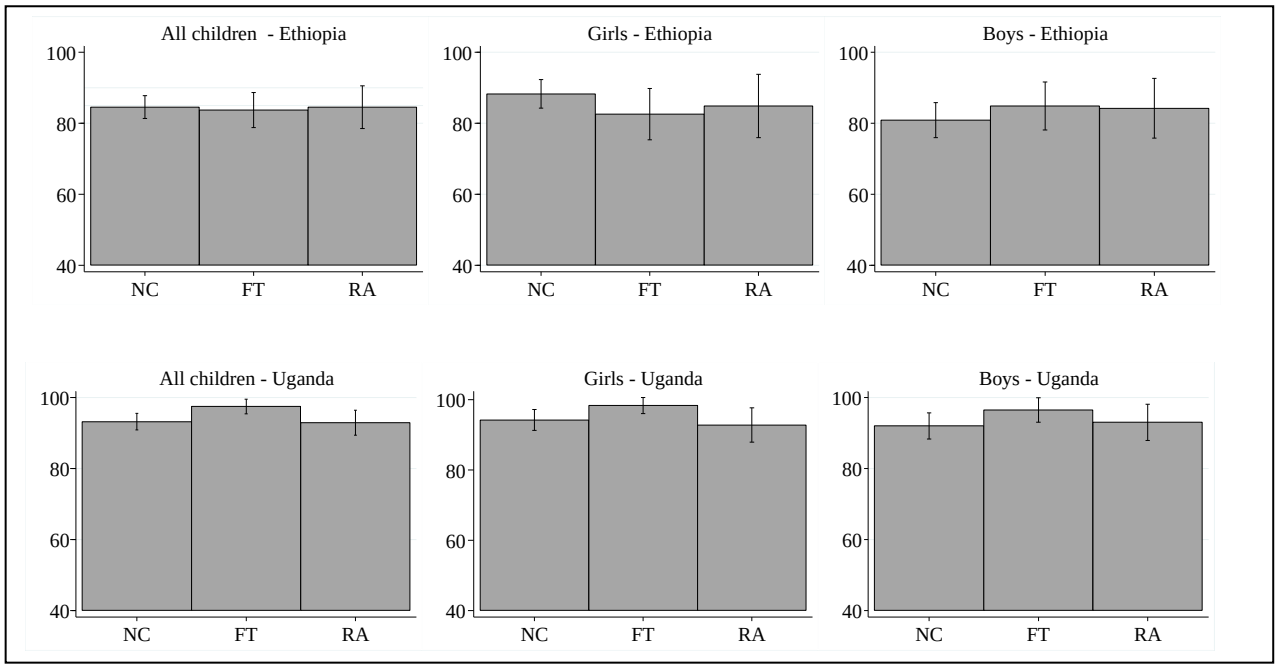


Figure 1: Mean comparison of percentage primary school enrolment; ***Source*:** Authors' calculation from survey data; ***Notes*:** Error bars represent 95% confidence interval; primary school age cohort = 7-14 years for Ethiopia and 6-12 years for Uganda; NC = Non-certified, Fairtrade = Fairtrade or Fairtrade-Organic, RA = Rainforest alliance or Utz-Rainforest-4C.

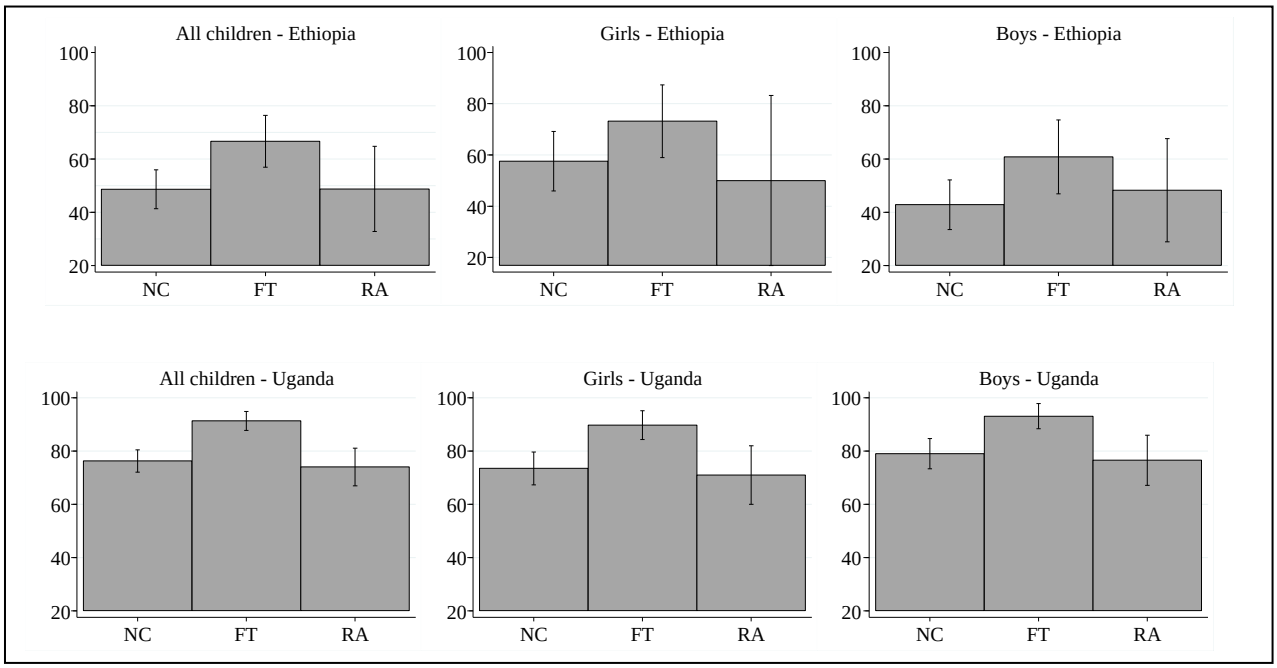


Figure 2: Mean comparison of percentage secondary school enrolment; ***Source*:** Authors' calculation from survey data; ***Notes*:** Error bars represent 95% confidence interval; secondary school age cohort = 15-18 years for Ethiopia and 13-18 years for Uganda; NC = Non-certified, Fairtrade = Fairtrade or Fairtrade-Organic, RA = Rainforest alliance or Utz-Rainforest-4C.

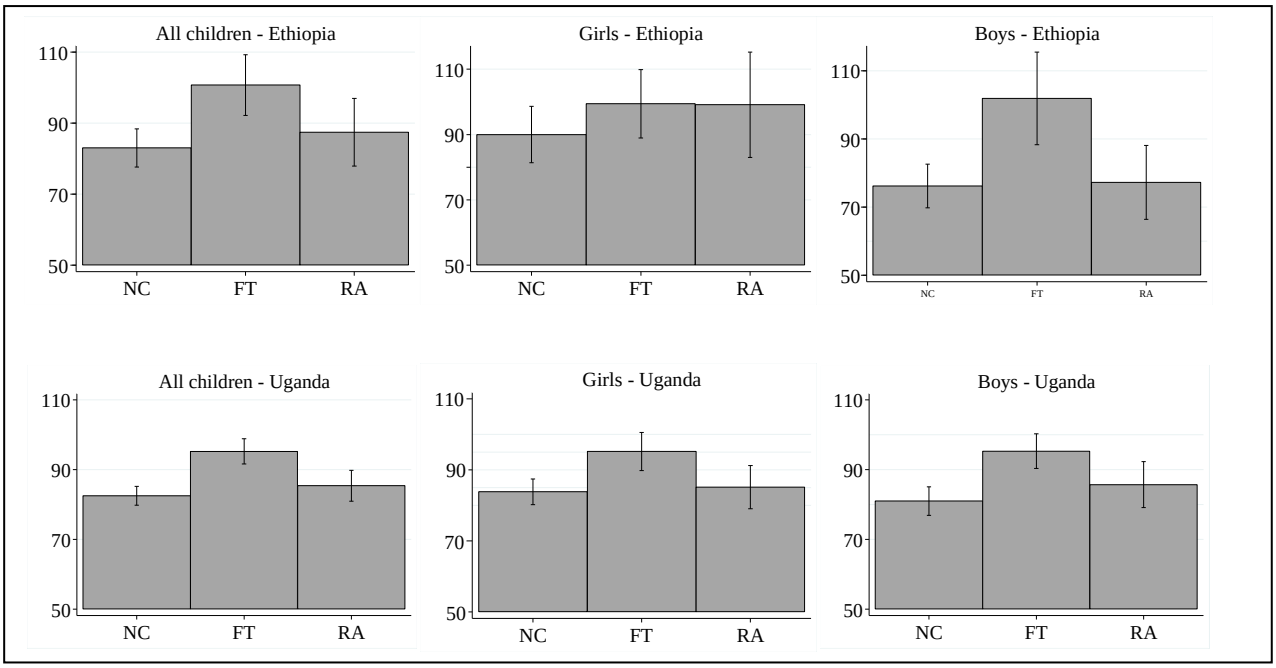


Figure 3: Mean comparison of percentage primary schooling efficiency; ***Source*:** Authors' calculation from survey data; ***Notes*:** Error bars represent 95% confidence interval; primary school age cohort = 7-14 years for Ethiopia and 6-12 years for Uganda; NC = Non-certified, Fairtrade = Fairtrade or Fairtrade-Organic, RA = Rainforest alliance or Utz-Rainforest-4C.

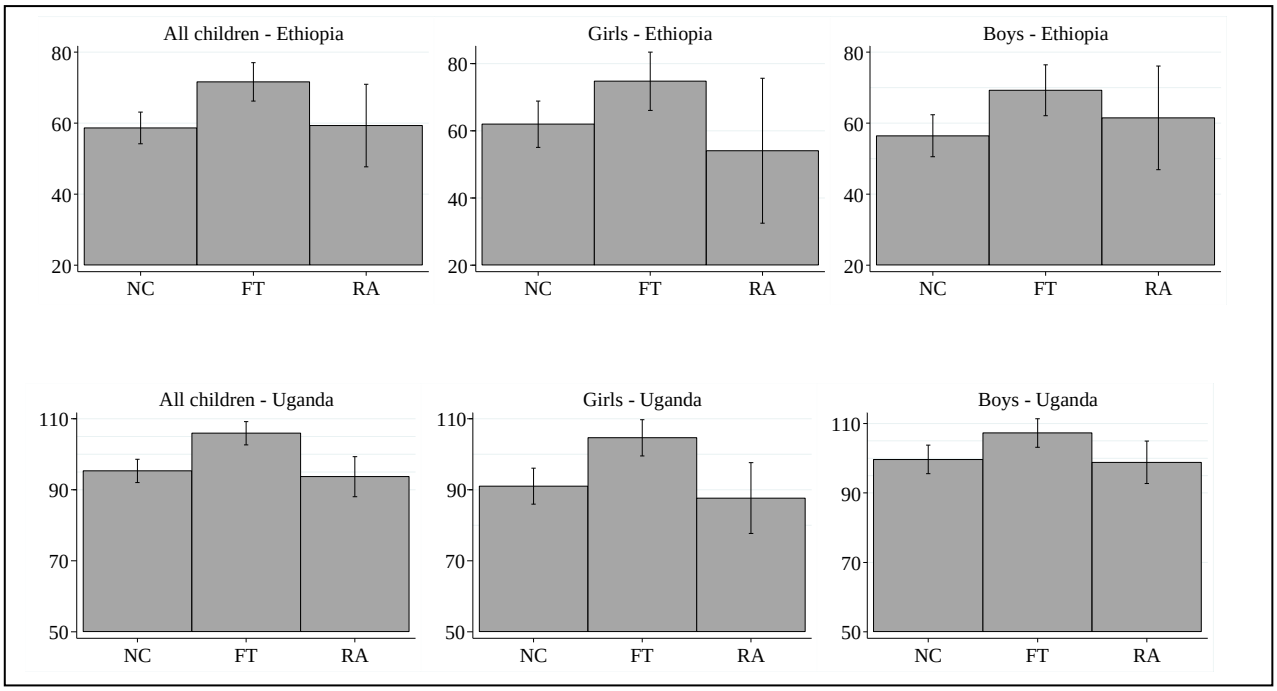


Figure 4: Mean comparison of percentage secondary schooling efficiency; Error bars represent 95% confidence interval; *Source*: authors' calculation from survey data; *Notes*: secondary school age cohort = 15-18 years for Ethiopia and 13-18 years for Uganda; NC = Non-certified, FT = Fairtrade or Fairtrade-Organic, RA = Rainforest Alliance or Utz-Rainforest-4C.

5.3 Econometric results

In table 3, we present a summary of the main estimated effects of FT and RA certification, on the different child schooling outcome indicators from probit and tobit (REG), PSM, and DD estimations, from a combined dataset. We do this for all sampled children within each age-cohort, then for girls and boys, separately (full regression results available on request). Results from all models point in the same direction, indicating the robustness of our results. Based on the propensity score distribution and the balancing properties (available on request), we can conclude that the assumption of common support is largely fulfilled. There are no significant differences at 5% level, between certified and matched control observations for all covariates and all treatment groups. Although results from all models are very similar, we focus our discussion on the DD estimates that likely result in the smallest bias, given that DD enables us to account for both observed and unobserved heterogeneity.

Table 3: Summary of impact of certification on school enrolment and schooling efficiency

	FT certified						RA certified					
	REG		**PSM**		**DD**		**REG**		**PSM**		**DD**	
Primary school enrolment (all)	0.01		0.02		0.02		-0.02		0.01		0.01	
	(0.02)		*(0.02)*		*(0.03)*		*(0.02)*		*(0.02)*		*(0.03)*	
primary school enrolment (girls)	-0.01		-0.00		-0.02		-0.03		-0.01		-0.01	
	(0.02)		*(0.02)*		*(0.03)*		*(0.03)*		*(0.03)*		*(0.04)*	
primary school enrolment (boys)	0.04		0.05	*	0.02		-0.002		0.03		0.01	
	(0.04)		*(0.03)*		*(0.03)*		*(0.03)*		*(0.03)*		*(0.04)*	
Secondary school enrolment (all)	0.20	***	0.17	***	0.25	***	-0.01		0.01		-0.02	
	(0.04)		*(0.03)*		*(0.07)*		*(0.04)*		*(0.04)*		*(0.09)*	
Secondary school enrolment (girls)	0.17	***	0.16	***	0.29	**	-0.06		-0.01		-0.07	
	(0.05)		*(0.04)*		*(0.12)*		*(0.04)*		*(0.05)*		*(0.19)*	
Secondary school enrolment (boys)	0.18	***	0.17	***	0.29	***	0.05		0.03		0.02	
	(0.05)		*(0.04)*		*(0.09)*		*(0.05)*		*(0.05)*		*(0.12)*	
Primary schooling efficiency (all)	0.15	***	0.15	***	0.10	***	0.001		0.03		0.05	
	(0.04)		*(0.03)*		*(0.04)*		*(0.04)*		*(0.02)*		*(0.04)*	
Primary schooling efficiency (girls)	0.09	**	0.10	***	0.10	*	-0.04		0.03		0.10	
	(0.04)		*(0.04)*		*(0.05)*		*(0.05)*		*(0.05)*		*(0.06)*	
Primary schooling efficiency (boys)	0.21	***	0.20	***	0.07		0.03		0.04		-0.02	
	(0.05)		*(0.04)*		*(0.05)*		*(0.05)*		*(0.03)*		*(0.06)*	
Secondary schooling efficiency (all)	0.12	***	0.13	***	0.16	***	-0.02		0.03		-0.004	
	(0.02)		*(0.02)*		*(0.05)*		(0.03)		*(0.03)*		*(0.06)*	
Secondary schooling efficiency (girls)	0.10	***	0.14	***	0.20	***	-0.08	*	-0.01		-0.06	
	(0.04)		*(0.03)*		*(0.07)*		(0.04)		*(0.05)*		*(0.11)*	
Secondary schooling efficiency (boys)	0.10	***	0.11	***	0.13	***	0.03		0.05		-0.03	
	(0.03)		*(0.03)*		*(0.07)*		*(0.04)*		*(0.04)*		*(0.08)*	

Source: Authors' estimation based on survey data; ***Notes:*** Robust Standard errors are report in parentheses. * p < 0.1, ** p < 0.05, *** p < .0.01; REG reports the results from Probit regression for enrolment and Tobit regression for schooling efficiency; PSM reports the Propensity Score Matching results; DD reports the Difference-in-Difference results.

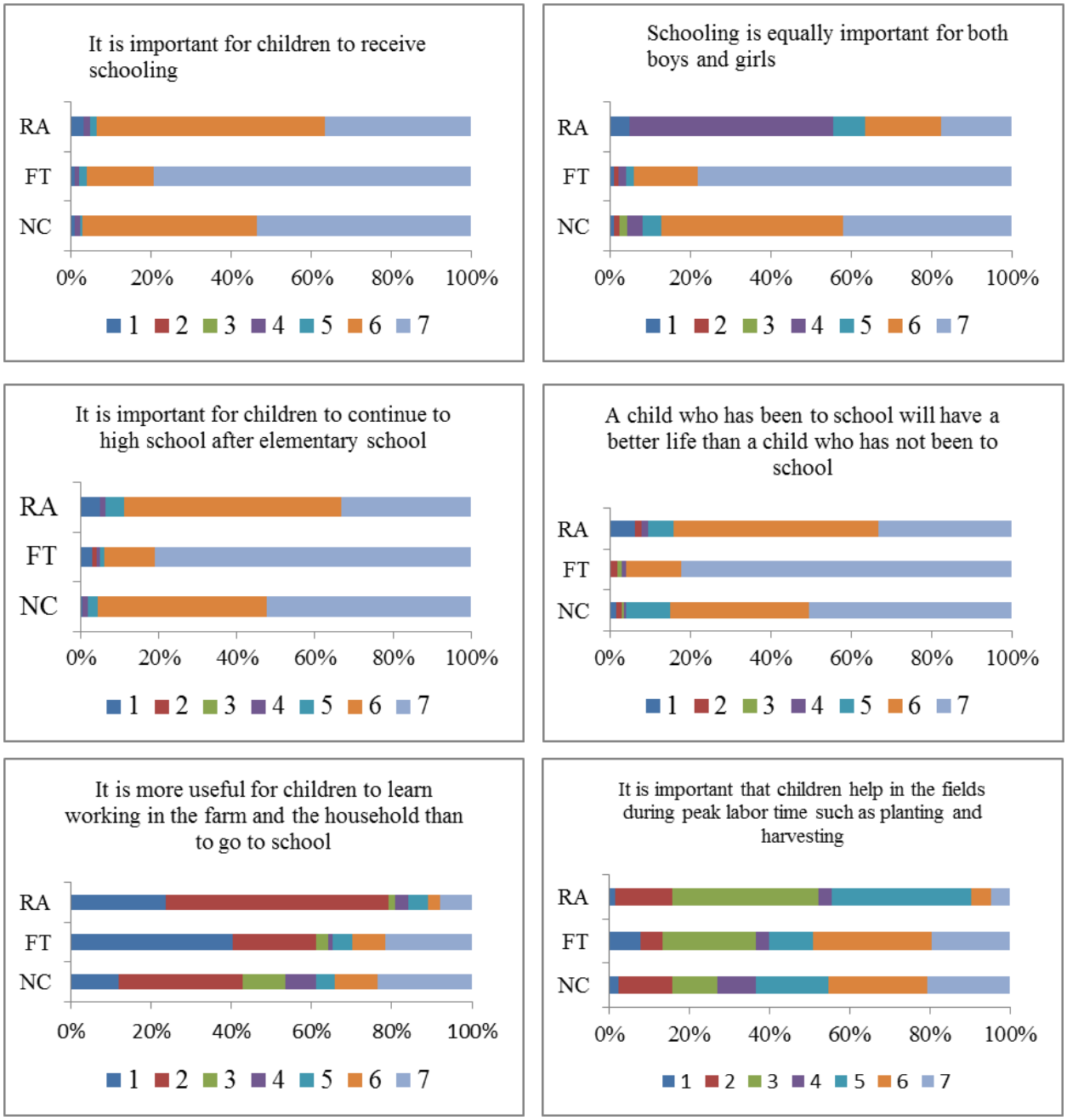
Our results indicate that participation in an FT certification scheme increases secondary school enrolment, schooling efficiency and primary schooling efficiency for all children and girls. Net secondary school enrolment rate increases by 25% for all children and by 29% for girls and boys. Participation in FT certification increases primary schooling efficiency for all children and for school aged girls by 10%. It also increases secondary schooling efficiency for all children by 16%, significant at 1% level. The effect is higher for girls (20%) than for boys (13%). These effects, especially at secondary school level are large, given that net secondary school enrolment in the study area is rather low, 80% in Uganda but only 54% in Ethiopia. We find

that participation in FT certification scheme has no impact on primary school enrolment. We also find that participation in the RA coffee certification scheme has no impact on either net school enrolment or schooling efficiency.

Other factors also influence the probability of a child to be enrolled in secondary school (full regression results available on request). Older children and above average intelligence, have positive effects on secondary school enrolment and schooling efficiency. This is expected since more intelligent children will be more motivated to go to school. There is a positive relationship between children in the age cohort 6-12 and primary school enrolment, while children of age cohort 13-18 have a positive effect on secondary school enrolment but have a negative relationship with primary school enrolment. This could be linked to resource limitations which arise as more siblings move higher in school. Mother's education has a positive effect on primary school efficiency of all children, as well as girls in the primary school age cohort. Educated parents, especially mothers attach higher value to education of their children (Langsten, 2014). Being a Christian positively affects secondary school enrolment of all children and girls. Asset poverty in a household and poor village infrastructure negatively affect school enrolment and primary schooling efficiency. The country also matters. Being in Ethiopia negatively affects both school enrolment and schooling efficiency. Surprisingly, the presence of a secondary school in the village negatively influence the likelihood to be enrolled in school and schooling efficiency, probably due to poor quality of such rural schools.

5.4 Discussion

Our results imply that participation in the FT coffee certification scheme increases the net secondary school enrolment rate and schooling efficiency for both primary and secondary school age cohorts. Participation in the RA coffee certification scheme, however, has no impact and yet, both certification categories prohibit child labour, with the aim of improving child schooling outcomes. These are important effects and are expected according to the conceptual discussion in section 2. They most likely come from a combination of an awareness raising and an investment effects. The FT coffee certification scheme emphasises awareness raising for participating producers, on all the critical requirements of the certificate, through an extensive network of rural cooperatives. The child labour prohibition condition is one of those highly emphasised. FT certified producers are trained through their cooperatives to continuously monitor implementation and are mobilised to exert peer pressure among members to ensure compliance by all and avoid the risk of losing the certificate. Through awareness raising FT producers tend to value education of their children more than non-certified ones. The more favourable perception on the importance of education by FT producers is supported by qualitative data from Ethiopia (Figure 5).



Measurement Scale: 1=strongly disagree, 2=disagree, 3=somewhat disagree, 4=neutral, 5 =somewhat agree, 6 =agree and 7=strongly agree

NC = Non-certified
FT = Fairtrade
RA = Rainforest Alliance

Figure 5: Household perception on child schooling and child labour by certification categories in Ethiopia. ***Source*****:** Authors' calculation from survey data.

We find a positive impact of participation in FT scheme even though complying with certification conditions seems to put higher labour demands on certified producers due to the numerous detailed organic agronomic practices, wet processing of coffee, and the strict child-labour-free production expected of them. The higher labour demands are confirmed by child labour data from Ethiopia. We observe that FT increases child labour, more for boys in productive activities and more for girls in reproductive activities, implying a gender division of labour. RA decreases child labour in productive activities (Table 3). The fact that FT has a positive impact on secondary school enrolment as well as schooling efficiency implies that involvement in these activities does not interfere with the children's schooling and therefore cannot be considered child labour. Such positive impact of certification on schooling has been reported in literature (Arnould et al, 2009; Gitter et al, 2012; Bechetti et al, 2013).

Table 4: Mean comparison of weekly hours spent by school aged children on productive and reproductive household activities by certification category

	Hours spent on Productive activities						Hours spent on reproductive activities				
	TS	**NC**	**FT**		**RA**		**TS**	**NC**	**FT**		**RA**
Primary school aged children (7-14 year age cohort; grades 1-8)											
All children	4.71	4.21	7.57	***	1.92	***	7.73	6.59	10.88	***	10.6
	(0.26)	*(0.30)*	*(0.65)*		*(0.36)*		*(0.45)*	*(0.30)*	*(0.56)*		*(0.30)*
	N=863	N=496	N=223		N=114		N=861	N=496	N=223		N=114
Girls	3.62	3.72	4.8		1.25	***	8.92	7.71	12.69	***	7.06
	(0.35)	*(0.46)*	*(0.75)*		*(0.48)*		*(0.39)*	*(0.49)*	*(0.81)*		*(0.76)*
	N=424	N=245	N=111		N=68		N=422	N=245	N=111		N=68
Boys	5.75	4.69	10.31	***	2.52	***	6.59	5.50	9.09	***	6.52
	(0.37)	*(0.38)*	*(0.99)*		*(0.52)*		*(0.30)*	*(0.33)*	*(0.73)*		*(0.67)*
	N=439	N=251	N=112		N=76		N=439	N=251	N=112		N=76
Secondary school aged children (15-18 age cohort; grades 9-12)											
All children	8.51	8.6	9.38		6.21		9.58	8.95	11.08	*	9.08
	(0.59)	*(0.78)*	*(1.12)*		*(1.58)*		*(0.49)*	*(0.63)*	*(0.98)*		*(1.30)*
	N=319	N=185	N=93		N=41		N=319	N=185	N=93		N=41
Girls	5.22	5.76	4.46		4.5		11.76	10.11	14.88	***	11.09
	(0.69)	*(1.03)*	*(0.90)*		*(2.09)*		*(0.83)*	*(1.01)*	*(1.55)*		*(2.45)*
	N=126	N=73	N=41		N=12		N=126	N=73	N=41		N=12
Boys	10.73	10.46	13.51		6.9		8.14	8.19	7.96		8.24
	(0.84)	*(1.06)*	*(1.70)*		*(0.69)*		*(0.59)*	*(0.79)*	*(1.11)*		*(1.53)*
Sample size	N=193	N=112	N=52		N=29		N=192	N=112	N=52		N=29

Source: Authors' calculation from survey data; ***Notes:*** Standard errors in parentheses; Significant differences between certified and non-certified households are indicated with * $p < 0.15$, ** $p < 0.10$, *** $p < 0.05$; TS=Total sample, NC = Non-certified, FT = Fairtrade or Fairtrade-Organic, RA = Rainforest Alliance.

Another important factor influencing the positive impact of FT certified households on the different schooling indicators comes from the investment effect. Fairtrade certification requires coffee buying companies in high income countries to invest part of the annual profits generated from fair-traded coffee, in the communities where the producers live. These funds are spent by cooperatives on local social development priorities, democratically agreed upon by all members. In our research area in Uganda, FT cooperatives have received the social premium for about 10 years. Most of them (50%) invested the funds in a wide range of projects including "*solar power distribution, scholastic materials and construction of pit latrines"* (GCCE, 2017). All these investments positively affect schooling outcomes directly (through improved school quality

and environment) and indirectly (through school cost reduction). Our results are consistent with others that confirm that any investments which relieves parents from some of the costs of education, has a positive impact on enrolment (Handa et al, 2004; Rawlings & Rubio, 2005). As regards other factors impacting on schooling indicators, education levels of parents imply higher aspirations for the education of their own children, consistent with findings of Nishimura et al (2008) in Uganda and Emerson & Souza (2007) in Brazil.

The lack of impact we find, of participation in RA coffee certification scheme on school enrolment and schooling efficiency can be explained in several ways. First, we argue that an important factor is the limited awareness raising and the priorities during RA implementation. Although RA also prohibits child labour, certified households attach lower importance of child schooling (figure 5). The RA scheme in Uganda for instance, focuses more on an intensive coffee production system to enhance coffee yields while that of Ethiopia prioritises forest conservation. Second, even with high government investment in education, school costs in both countries remain high, especially in Uganda and parents have had to increase their own investment in education, to complement government efforts. If a certification scheme does not make specific efforts to support such investments, it may negatively affect schooling outcomes. In general, differences in the priorities emphasised during implementation, together with extra investment in local schooling, are important factors driving our results.

Our findings are consistent with other studies. For smallholder coffee producers in Mexico, Gitter et al. (2012), conclude that participation in a Fairtrade-Organic coffee co-operative increased girls schooling by about 0.7 years compared to boys of age cohort 16-25. In Ecuador and Mexico, Arnould et al (2007) find that participation of a household in an FT co-operative has a positive impact on children being currently enrolled in primary school. For smallholder FT honey co-operative in Chile, Becchetti et al (2013) find a positive impact of household participation in the co-operative on child schooling, with one additional year of membership in the co-operative raising schooling index by about 1.8% for the age cohort 14-18 and 0.9% for the age cohort 10-18. We find no impact of participation in the RA scheme on either school enrolment or schooling efficiency. We are not aware of other similar studies with which we can compare our results.

6. Conclusion

In this paper, we analyse the impact of participation in FT and RA coffee certification in South western Ethiopia and Eastern Uganda, on child enrolment and schooling efficiency. Our results demonstrate that smallholder participation in FT increases the likelihood of children to be enrolled in secondary school and their schooling efficiency. This is mainly due to a combination of an awareness raising effect and an investment effect. The results imply that 8 years after the introduction of FT certification in the two regions, its positive impact on social development, specifically child schooling, is evident. For RA on the contrary, we find that smallholder participation has no impact on child schooling due to limited awareness raising and lack of extra investment in local social development.

Our results, along with previous findings in the literature, indicate that stating the child-labour-free condition alone is not enough, for PSS to contribute to school enrolment and schooling efficiency. We find that even when RA has the child labour-free condition, and even when participants in these certificates have higher total household income, the scheme generally has no impact on child schooling. Yet, the impact of participation in a FT has a positive impact on secondary school enrolment and schooling efficiency among children of smallholder producers, even when households engage their children more in reproductive as well as productive activities (table 3), and their total household income is lower. Our results imply that unless additional measures are put in place to ensure child schooling, stating the child-labour-free condition as most certificates do may not have an impact.

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