Do Sustainability Standards Benefit Smallholder Farmers Also When Accounting For Cooperative Effects? Evidence from Côte d'Ivoire

Jorge Sellare, Eva-Marie Meemken, Christophe Kouamé, and Matin Qaim

Although many studies analyzed effects of sustainability standards—such as Fairtrade or Rainforest Alliance—on smallholder farmers in developing countries, most did not sufficiently account for systematic differences between certified and noncertified farmers. Certified farmers are typically organized in cooperatives. When sampling only from a small number of cooperatives, as previous studies did, it is not easy to disentangle certification effects from possible cooperative effects. Here, we address this shortcoming by randomly sampling from a large number of cooperatives, thus better capturing existing institutional heterogeneity. In particular, we collect and use data from cocoa farmers in Côte d'Ivoire who are organized in Fairtrade-certified and noncertified cooperatives. Regression models with instrumental variables show that Fairtrade has positive and significant effects on cocoa yields, prices, and living standards. These effects remain significant also after controlling for cooperative characteristics, but the magnitude of the estimates changes. We draw two conclusions. First, in Côte d'Ivoire, Fairtrade certification benefits farmers economically. Second, and more generally, cooperative characteristics are jointly correlated with certification and relevant outcomes, which needs to be accounted for to avoid bias when evaluating the benefits of sustainability standards in the small farm sector.

Key words: Certification, cocoa, cooperatives, Côte d'Ivoire, Fairtrade, sustainability standards.

JEL codes: O12, Q01, Q12, Q13.

Sustainability standards—such as Fairtrade and Rainforest Alliance—are claimed to be effective mechanisms to link smallholder farmers in developing countries to high-value markets while promoting environmentally-friendly and socially acceptable production and trading patterns. Many studies tried to test these claims by analyzing whether certification under sustainability standards actually leads to benefits for farmers. Empirical research was conducted in various countries of Africa, Asia, and Latin America (Dragusanu, Giovannucci, and Nunn 2014; DeFries et al. 2017; Oya, Schaefer, and Skalidou 2018). The results are mixed. Whereas several studies suggest that sustainability standards contribute to higher

This article was invited by the president of the Agricultural & Applied Economics Association for presentation at the 2019 annual meeting of the Agricultural & Applied Economics Association, after which it was subjected to an expedited peer-review process.
Jorge Sellare is a research associate in the Department of Agricultural Economics and Rural Development, University of Goettingen, Germany. Eva-Marie Meemken is a postdoctoral researcher in the Charles H. Dyson School of Applied Economics and Management, Cornell University, USA. Christophe Kouamé is the Regional Director West and Central Africa of the World Agroforestry Center (ICRAF), Côte d'Ivoire. Matin Qaim is a professor in the Department of Agricultural Economics and Rural Development, University of Goettingen, Germany. This study was funded by the German Research Foundation (DFG) through the GlobalFood Program (RTG 1666) and a DFG fellowship (ME 5179/1-1). Additional financial support was received from the foundation Fiat Panis. The authors thank participants at the AAEA 2019 session "New Directions in Research on Agrifood Standards and Rural Poverty," Tom Reardon, Travis Lybbert, and two anonymous reviewers for useful comments.
Correspondence to be sent to: jorge.sellare@uni-goettingen.de.

Amer. J. Agr. Econ. 102(2): 681–695; doi:10.1111/ajae.12015
Published online January 23, 2020

prices and incomes for participating farmers (e.g., Bacon 2005; Jena et al. 2012; Chiputwa and Qaim 2016; Meemken, Spielman, and Qaim 2017; Mitiku et al. 2017; Tran and Goto 2019), other studies find very small or no effects at all (Valkila 2009; Beuchelt and Zeller 2011; Chiputwa, Spielman, and Qaim 2015; Ibanez and Blackman 2016; Akoyi and Maertens 2018). To some extent, differences in effects can be explained by the fact that the studies refer to different countries, to different years, and also partly to different standards. As is well known, the effects of standards can vary between settings with different conditions (Oya, Schaefer, and Skalidou 2018). However, even within one setting, the estimated effects may be unreliable when not properly controlling for confounding factors, such as institutional heterogeneity.

Existing studies on the effects of sustainability standards in developing countries differ substantially in terms of the methodologies used. Whereas much of the early work was rather qualitative and descriptive (e.g., Raynolds 2002; Raynolds, Murray, and Taylor 2004; Bacon 2005; Muradian and Pelupessy 2005; Valkila 2009), more recent studies tried to evaluate the net effects of standards through larger samples and more sophisticated tools of quantitative data analysis (e.g., Jena et al. 2012; Ruben and Fort 2012; Becchetti, Castriota, and Michetti 2013; Chiputwa, Spielman, and Qaim 2015; Ibanez and Blackman 2016; Haggar et al. 2017; Meemken, Spielman, and Qaim 2017; Akoyi and Maertens 2018; Vanderhaegen et al. 2018). However, even these more recent studies did not sufficiently account for systematic differences between certified and noncertified farmers, which may lead to biased impact estimates. One possible source of bias is related to the fact that certification in the small farm sector usually happens through agricultural cooperatives (Oelofse et al. 2010; Fenger et al. 2017; Snider et al. 2017). Oftentimes, being a member of a cooperative is a precondition for smallholders to participate in certification, as the transaction costs can otherwise be prohibitive. However, cooperative membership can also influence farm performance and household welfare without certification (Bernard and Spielman 2009; Ragasa and Golan 2014; Verhofstadt and Maertens 2014). Hence, when evaluating the effects of certification, it is important to account for cooperative effects, which is only possible through proper sampling designs.

Previous studies used different approaches to sample and compare certified and noncertified farmers. Some compared certified farmers who are organized in a cooperative with noncertified farmers who are not members of a cooperative (e.g., Becchetti, Castriota, and Michetti 2013). In that case, it is not possible to disentangle certification effects from possible cooperative effects, as cooperative membership and certification are perfectly correlated. Other studies compared farmers in a certified cooperative with farmers in a noncertified cooperative (van Rijsbergen et al. 2016), or they compared observations from a few certified and noncertified cooperatives (Jena et al. 2012; Ibanez and Blackman 2016; Haggar et al. 2017; Mitiku et al. 2017; Akoyi and Maertens 2018; Ssebunya et al. 2019). Although this has clear advantages, bias through cooperative effects can still occur because cooperatives differ in terms of how they are endowed and how well they function, which may affect outcomes irrespective of certification. A few studies included certified and noncertified farmers from the same cooperative (Chiputwa and Qaim 2016; Meemken, Spielman, and Qaim 2017). While this is a neat approach to control for cooperative effects, it is rarely possible to sample in this way because in most cases, all farmers belonging to the same cooperative are either certified or not certified.[1] In all cases, the number of sampled cooperatives was small, and the few cooperatives included were not selected randomly. Without random selection of cooperatives, external validity may suffer, especially when the criteria for selecting cooperatives are not well explained. For instance, it is possible that sustainability standards have beneficial effects for farmers in cooperatives with very specific characteristics, but that these results are not representative for cooperatives on average. We are not aware of previous studies that were able to properly control for cooperative effects.[2] This is a major drawback, as sustainability standards are strongly promoted by various types of public- and private-sector organizations (Dragusanu, Giovannucci, and Nunn 2014; Meemken et al. 2019). Hence, it is important to better understand whether standards actually deliver on their promise to help smallholder farmers.

[1] Exceptions can occur in large cooperatives in which certification is sometimes implemented only for subgroups of the total membership. However, such comparisons within the same cooperative can suffer from limited external validity, unless a larger number of cooperatives is included.

[2] Recent studies with panel data, such as Meemken, Spielman, and Qaim (2017) and van Rijsbergen et al. (2016), improved the identification of certification effects by better controlling for unobserved heterogeneity at the household level, but not at the cooperative level.

Here, we contribute to the literature by using a sampling design that better accounts for the institutional heterogeneity in agricultural cooperatives. In particular, we collected data from certified and noncertified farmers in a large number of randomly selected cocoa cooperatives in Côte d'Ivoire, West Africa, to analyze the effects of Fairtrade certification. As our sample includes cooperatives with a broad range of characteristics, we reduce the possibility that the results only hold under very specific institutional conditions. In other words, our sampling design increases external validity. Moreover, by comparing results with and without controlling for cooperative characteristics, we can test to what extent ignoring institutional heterogeneity can lead to omitted variable bias.

Côte d'Ivoire is the largest cocoa-producing country in the world, with a global production share of over 40% (International Cocoa Organization 2018). As in other tropical countries, the role of sustainability standards has grown substantially in the Ivorian cocoa sector, with Fairtrade being the most important standard in terms of the number of certified cooperatives and farmers. The aim of Fairtrade is to improve the livelihoods of smallholder producers (Fairtrade 2015). If a cooperative wants to be certified, it has to hand in an application and is physically inspected against the Fairtrade standards, which involve certain rules on labor conditions and agricultural practices, as well as recommendations for capacity building and community development (Chiputwa, Spielman, and Qaim 2015). Fairtrade certification guarantees producers a minimum floor price (for the quantities sold in certified markets) and a Fairtrade premium that is paid to the cooperative to support collective services, such as input supply, agricultural extension, or other cooperative activities. We hypothesize that Fairtrade certification has positive effects on cocoa yields, prices, and living standards of smallholder farm households. Furthermore, we hypothesize that cooperative characteristics are jointly correlated with certification and the outcome variables, so that not controlling for cooperative characteristics leads to omitted variable bias.

Materials and Methods

Sampling Design

Our survey of cocoa cooperatives and farmers was conducted in the Southeast of Côte d'Ivoire, covering the country's traditional cocoa belt. Most of the cocoa farmers in this region are members of cooperatives, which provide inputs and other agricultural services to farmers and through which the cocoa is marketed (Foundjem-Tita et al. 2017). Farmers sell their cocoa directly to the cooperatives that they are members of; side-selling to other traders or middlemen is rare in this region. Important to note is that farmers can choose which cooperative to join, meaning that membership is not determined by geographic location alone. Farmers may decide which cooperative to join based on expected costs and benefits. If a chosen cooperative does not meet expectations, farmers are free to leave and join a different cooperative operating in their vicinity.[3] However, the benefits of membership are not always easy to observe, especially when they relate to parameters other than output price, such as cooperative services in input supply and technical training. In this context, kinship and existing social ties are also important criteria for farmers when they decide which cooperative to join.

To capture a wide range of institutional heterogeneity, we randomly sampled fifty cooperatives in the Southeast of Côte d'Ivoire, differentiating between Fairtrade certified and noncertified cooperatives. For the sampling procedure, we first compiled complete lists of all active cocoa cooperatives in this part of the country, using official national registries (MADR 2017) as well as data and information from Fairtrade and regional extension offices. We also called all listed cooperative headquarters to verify that the cooperative is active and to identify additional cooperatives that might have been missed on the official lists. The final list included fifty-nine Fairtrade certified cooperatives and seventy-four noncertified cooperatives located in three districts of Southeast Côte d'Ivoire, namely, Comoe, Lacs, and Lagunes. From this list, we randomly selected twenty-five certified and twenty-five noncertified cooperatives. Among the twenty-five Fairtrade certified cooperatives, sixteen were additionally certified under UTZ or Rainforest Alliance. We will test for the effect of these other standards in a robustness check. All twenty-five cooperatives that were sampled

[3] While geographical closeness to the cooperative headquarters is not a precondition to join, long distances are impracticable to deliver the cocoa and benefit from cooperative services.

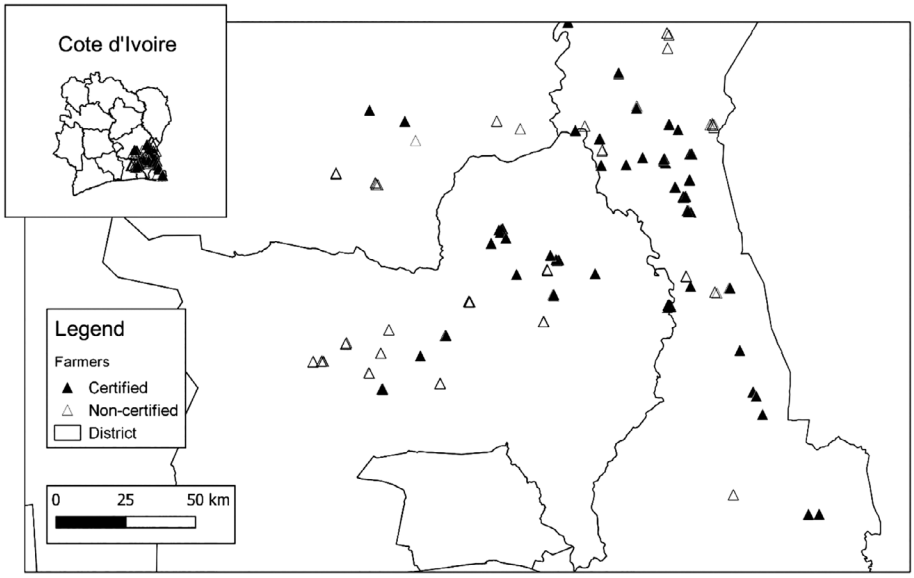

Figure 1. Geographical distribution of sampled farmers by certification status

as "noncertified" were not certified under any sustainability standard.

In Côte d'Ivoire, cooperatives are organized in sections, which are nonlegal geographic groupings that can comprise one or several villages. All cooperatives provided us complete membership lists by section. In small cooperatives with only one section, we randomly selected ten farmers in that section. However, most of the cooperatives had more than one section. In those cases, we first randomly selected two sections in each cooperative and then randomly selected five farmers in each section. Hence, in total we sampled 500 farmers from the fifty cooperatives: 250 who are Fairtrade certified and 250 who are noncertified.[4] The locations of the sample farmers are shown on the map in figure 1. In all three districts, there are overlaps of certified and noncertified cooperatives, meaning that certification is not perfectly correlated with regional characteristics, which is an advantage for the evaluation of certification effects. Moreover, table A1 in the online supplementary appendix shows that the three districts are very similar in terms of average climate and soil conditions.

Survey

All sampled farm households were visited for a personal interview using a structured questionnaire designed and pretested for this purpose. The questionnaire was programmed with ODK (Open Data Kit) for use with tablet computers. The interviews were conducted by local enumerators who were carefully trained and supervised by the researchers. The questionnaire included sections on general household characteristics, asset ownership, production and marketing of cocoa and other agricultural activities, and nonagricultural economic activities, as well as infrastructure and institutional details. To capture household living standards, we asked for details of food and nonfood consumption expenditures (including consumption of own-produced goods). The interviews were conducted with the household head. For the part on food consumption, the person in the household responsible for food purchases and food preparation was additionally asked to join the interview.

In addition to the household interviews, we also designed a cooperative-level questionnaire for interviews with the cooperative leader (director, president, or vice president) in each of the fifty cooperatives. The cooperative questionnaire captured data on personal

[4] Power calculations had indicated that a sample with 500 observations and fifty cooperatives (half in treatment, half in control) is sufficient to identify a 10% treatment effect for yield and living standard at a confidence level of 95% and a power of 80%. For cocoa price, even a 1% effect could be identified with this sample size due to the small observed standard deviation for price in Côte d'Ivoire.

characteristics of the leader and detailed information on the cooperative's size, governance structure, asset ownership, service provision, sustainability certification, operational costs, and cocoa commercialization for the last twelve months prior to the interview. The farm household and cooperative-level interviews were conducted in May and June 2018.

Outcome Variables

We want to analyze the effects of Fairtrade certification on cocoa yields, prices, and farm household living standards. Cocoa yields are measured in kilograms harvested per hectare during the twelve months prior to the survey, as reported by farmers during the interviews. As Fairtrade encourages agricultural training and the adoption of better agricultural practices (Fairtrade 2017), and the Fairtrade premium can be used by cooperatives to provide inputs and other services to their members (Meemken and Qaim 2018; Loconto et al. 2019), we expect certification to have a positive effect on yield.

Cocoa prices are measured in West African francs (CFA) per kilogram. Farmers deliver their cocoa to the cooperative and receive a price that is set by the government independent of product quality. All farmers receive this fixed price at the time of delivery. Later on, certain additional payments can be made by the cooperative based on dividends from selling in certified markets or other types of profits made by better-performing cooperatives (Meemken et al. 2019). Our price calculations include these additional payments per kilogram of cocoa on top of the base price that is set by the government. Given that certified cooperatives often use the Fairtrade premium to make direct payments to their members (Chiputwa, Spielman, and Qaim 2015; Loconto et al. 2019), we expect certification to have a positive effect on cocoa prices.

Household living standard is measured in terms of consumption expenditure expressed in CFA per capita and day. Consumption expenditure is a widely used indicator of household welfare and living standard in the development economics literature (Klasen 2000). We calculate expenditure as the value of all food and nonfood goods and services consumed by the household for specified recall periods. Food consumption was captured through a seven-day recall, covering all food items consumed by the household regardless of whether these were purchased, produced at home, or obtained from other sources. For nonfood goods and services, we used thirty-day or twelve-month recall periods, depending on the particular items considered and typical expenditure patterns. We asked about expenditures for housing, education, clothing, transportation, health care, fuel, entertainment, and other items relevant in the local context. As cocoa is the main source of income for most sample households, we expect that cocoa yield and price gains through Fairtrade certification will also result in positive effects on consumption expenditure, as was previously shown in other geographical contexts (Chiputwa and Qaim 2016; Meemken, Spielman, and Qaim 2017; Tran and Goto 2019).

Cooperative Heterogeneity and Certification

Agricultural cooperatives can be quite heterogeneous in terms of size, structure, asset ownership, leadership capacity, decision-making rules, types of services provided, and various other characteristics. This is also true for cocoa cooperatives in Côte d'Ivoire. Many of these cooperative characteristics may jointly influence farm and household-level outcomes and also whether a cooperative is certified. Hence, not controlling for cooperative characteristics in the impact evaluation may possibly lead to omitted variable bias. To test and control for such bias, we consider a set of cooperative-level variables for which data were obtained through the cooperative leadership survey. In particular, we consider the age and size of the cooperative, the education level of the leader, and whether the leader grows cocoa himself or herself, as well as the number of vehicles owned centrally as a proxy of physical capital. In addition, we look at the number of agricultural service providers (inputs, training, etc.) to the cooperative and the share of cooperative decisions made democratically.

We also collected data for various other cooperative-level variables, many of which proved to be closely correlated with the mentioned ones. Hence, we feel that the chosen set of cooperative characteristics captures the existing institutional heterogeneity quite comprehensively. One aspect to note is that cooperative characteristics can not only influence certification, but can also be influenced by certification. For instance, cooperatives may grow in size after certification through new members entering, or they may intensify their

membership services. We tried to define and measure the cooperative variables in such a way that issues of reverse causality are reduced. For instance, we consider cooperative size at the time prior to certification and measure the number of service providers rather than service intensity. Nevertheless, reverse causality for some of the cooperative characteristics cannot be ruled out completely, which should be kept in mind when interpreting the results.

Regression Models

In order to evaluate the effects of Fairtrade certification, we estimate regression models of the following type:

$$(1) \quad Y_{ijk} = \alpha + \beta \boldsymbol{X_{ijk}} + \gamma FT_{jk} + \theta D_k + \varepsilon_{ijk}$$

where Y_{ijk} is the outcome variable of interest (yield, price, consumption expenditure) for household i in cooperative j and district k. $\boldsymbol{X_{ijk}}$ is a vector of household-level control variables, FT_{jk} is a dummy variable that indicates whether cooperative j is Fairtrade certified, and D_k is a set of district dummies. Even though the three districts are very similar in terms of agroecological conditions, district dummies capture possible differences in terms of infrastructure, market access, and other possible regional factors. Finally, ε_{ijk} is a random error term. For the estimates, standard errors are clustered at the cooperative level.

For the cocoa yield and price models, equation (1) is estimated in linear form. For the consumption expenditure model, the dependent variable is log-transformed due to its skewed distribution. Of particular interest in all models is the coefficient γ. If our hypotheses are true and Fairtrade has positive effects on cocoa yields, prices, and consumption expenditures, this should be reflected in γ being positive and statistically significant.

Equation (1) is estimated without controlling for cooperative characteristics. However, as mentioned above, cooperative characteristics may be jointly correlated with Y_{ijk} and FT_{jk}, which may lead to omitted variable bias in the estimate of γ. Therefore, in a second set of regressions, we estimate models of the following type:

$$(2) \quad Y_{ijk} = \alpha + \beta \boldsymbol{X_{ijk}} + \gamma FT_{jk} + \theta D_k + \delta \boldsymbol{W_{jk}} + \varepsilon_{ijk}$$

where $\boldsymbol{W_{jk}}$ is a vector of cooperative characteristics, and the other variables are as defined before. Here, we are not particularly interested in the estimate for δ, as our intention is not to analyze the role of cooperative characteristics for farm performance and household welfare per se. Rather, we are interested in whether the effects of Fairtrade certification (γ) remain positive and significant also after controlling for cooperative characteristics. Comparing the estimates for γ in equations (1) and (2) can furthermore provide an indication of the direction of bias when not controlling for cooperative characteristics. If γ in equation (2) is smaller than in equation (1), this would indicate that better-endowed or better-performing cooperatives benefit more from certification than less-endowed cooperatives, so that the certification effect in equation (1) would be overestimated.[5]

Dealing with Endogeneity

As cooperatives decide whether they will apply for Fairtrade certification, and farmers choose the cooperative they want to be members of (i.e., they decide whether they want to be members of a certified cooperative), FT_{jk} in equations (1) and (2) may be endogenous, which could lead to biased estimates of γ. The most likely source of endogeneity is unobserved heterogeneity, although reverse causality can also not be ruled out without additional tests. Inclusion of cooperative characteristics in equation (2) may reduce issues of unobserved heterogeneity at the cooperative level. At the farmer level, in addition to standard control variables—such as total land owned, education, age, and market access—we also include measures of farmers' risk aversion (Dohmen et al. 2011) and trust (Naef and Schupp 2009) that may proxy for unobserved factors related to personality.

In addition to including a broad set of control variables, we use an instrumental variable (IV) approach to test and control for endogeneity. This requires finding at least one exogenous instrument that is correlated with Fairtrade certification but does not influence the outcome variables through other mechanisms. We use two instruments. The first instrument is the cell phone network provider of the leader in the cooperative that the

[5] As mentioned, several of the Fairtrade certified cooperatives are also certified under UTZ and/or Rainforest Alliance. To test whether these other sustainability standards have additional effects or change the effects of Fairtrade, we carry out a robustness check where the models in equation (2) are reestimated with an additional dummy to control for double or triple certification.

particular farmer is a member of. The second instrument is the share of Fairtrade certified farmers in a specified neighborhood radius around the respective farmer himself or herself. Both instruments are explained and tested for validity below.

There are three cell phone network providers in the study region—namely, Orange, MTN, and Moov—that all offer similar services at similar costs. For the individual, the choice of which provider to use is mainly a question of the strength of the network signal in the particular location and the provider that peers in his or her own social network use. Positive network externalities occur because all three phone providers offer price discounts for calls and text messages exchanged within the provider's network (Meemken et al. 2019). Hence, it is fair to assume that more information is exchanged within one network than across the networks of different providers. Our data show a significantly positive correlation between the cooperative's leader using Orange and the individual farmer of interest and cooperative being Fairtrade certified (table A2 in the online supplementary appendix).[6] We attribute this to informal flows of information about Fairtrade that are more intense among people using Orange than among people using other cell phone providers. And better access to information about Fairtrade increases the likelihood of certification. In principle, causality could also run in the opposite direction, meaning that Fairtrade certification would affect the choice of which phone provider to use. However, this is unlikely in our case, as people do not seem to switch their phone provider frequently. Out of the twenty-five leaders of certified cooperatives in our sample, only three stated that they had switched their phone provider during the last few years, after their cooperative became certified.

The second instrument, the share of certified neighbors in a 5 km radius around each farmer, was calculated using GPS data.[7] The instrument also captures social network effects, as farmers located closer to several certified farmers are more likely to learn about certification and its possible advantages. Even though farmers cannot get Fairtrade certified individually, they can decide to join (or leave) a Fairtrade certified cooperative, as discussed above. As one would expect, our data show a positive and significant correlation between the share of certified farmers in the neighborhood and their own certification (table A2). Hence, both instruments pass the test of instrument relevance.[8]

For the instruments to be valid, it is also required that they are both not correlated with the outcome variables. Due to some geographic clustering of Fairtrade cooperatives and farmers, it is generally possible that these "Fairtrade" settings have stronger economic activities, better flows of information, or more favorable access to infrastructure and markets. It is also possible that farmers benefit from the agricultural knowledge of their certified neighbors through farmer-to-farmer exchange, even when they are not certified themselves. However, the map in figure 1 shows that the geographic clustering of certified and noncertified farmers is not very pronounced. Moreover, in the models, we control for regional effects through district dummies and variables measuring the distance to roads and other infrastructure elements. Using the falsification test proposed by Di Falco, Veronesi, and Yesuf (2011), we show that both instruments do not influence cocoa yields, prices, and household consumption expenditures through mechanisms other than certification (table A3 in the online supplementary appendix). In addition, we verified that both instruments are not significantly correlated with other regional variables that could affect household welfare, such as distance to schools, distance to roads, or average rainfall in a location (table A4 in the online supplementary appendix). Finally, as we have two instruments for one endogenous variable, we performed formal tests of the overidentifying restriction (tables A5–A7 in the online supplementary appendix). The null hypothesis that the instruments are uncorrelated with the error term cannot be rejected in any of the models. Hence, we conclude that the two instruments are valid.

[6] In some cases, cooperative leaders used more than one network provider. In those cases, we asked them to specify the main provider that they use for most of their cell phone calls and text messages.

[7] We also tested smaller (2 km) and larger (10 km) radii to construct the instrument with similar results.

[8] The share of certified farmers is more strongly correlated with their own certification than the cell phone network provider of the cooperative leader (table A2), so our IV approach primarily controls for farmer-level heterogeneity. Cooperative-level heterogeneity is controlled for through the inclusion of cooperative characteristics in equation (2).

Table 1. Descriptive Statistics for Outcome Variables and Poverty Incidence by Certification Status

	(1) Full Sample	(2) Certified	(3) Noncertified	(4) Mean Difference
Cocoa yield (kg/ha)	540.31	573.58	507.03	66.55***
	(250.36)	(265.70)	(229.76)	
Cocoa price (CFA/kg)	717.34	731.04	703.20	27.84***
	(39.69)	(46.13)	(24.82)	
Consumption expenditure (CFA/capita)	1,074.64	1,173.04	976.24	196.80**
	(901.43)	(974.47)	(812.03)	
Below poverty line (1/0)	0.45	0.37	0.52	−0.15***
	(0.50)	(0.48)	(0.50)	
Observations	500	250	250	500

Note: Mean values are shown with standard deviations in parentheses.
**$p < 0.05$.
***$p < 0.01$.

Results and Discussion

Household Characteristics

General descriptive statistics for the set of socioeconomic variables that we use as household-level controls in the regression models are shown in table A8 in the online supplementary appendix. The two groups of certified and noncertified farmers are very similar in terms of most variables, including total land owned, household size, farmer's age, and education.

More notable differences between Fairtrade certified and noncertified farmers are observed for the outcome variables, which are shown in table 1. We see statistically significant differences for all three outcome variables. Mean cocoa yields are around 540 kg/ha, which is similar to other recent yield estimates for cocoa in Côte d'Ivoire (Wessel and Quist-Wessel 2015). Cocoa yields of Fairtrade certified farmers are around 13% higher than those of noncertified farmers. Fairtrade farmers also obtain higher prices for their cocoa, with a 4% difference on average. While this price difference is small in magnitude, certification seems to be one of the few opportunities to achieve a significant price markup at all. As mentioned, in Côte d'Ivoire, the base price is fixed by the government without any quality differentiation. At the time of the survey, the government price was set at 700 CFA/kg.

Finally, we also observe a difference of around 20% in per capita consumption expenditures between Fairtrade certified and noncertified households. For both groups, mean expenditures are above the national poverty line of 737 CFA per capita and day (World Bank 2018). Nevertheless, 45% of the farm households live below the poverty line, with poverty rates being significantly higher in the group of noncertified households (table 1).

Cooperative Characteristics

Table 2 shows descriptive statistics for the cooperative characteristics, also differentiating by certification status. The average cocoa cooperative is around eight years old and has more than 400 members. Fairtrade certified cooperatives are significantly older than noncertified cooperatives. Certified cooperatives also have better-educated leaders, own more physical assets, and have more providers of services to their members. In terms of democratic decision making, no statistically significant differences are observed. Also noteworthy in table 2 are the relatively large standard deviations for several of the cooperative characteristics. Large standard deviations imply considerable institutional heterogeneity within and across groups, which cannot be captured when only sampling from a small number of cooperatives, as previous studies did.

The comparison between certified and noncertified cooperatives in table 2 suggests that several of the cooperative characteristics are correlated with Fairtrade certification. This is confirmed in column (1) of table 3. As the cooperative characteristics are not normally distributed, we show Spearman's correlation coefficients. Certification is positively and

Table 2. Descriptive Statistics for Cooperative Characteristics by Certification Status

Cooperative Characteristics	(1) Full Sample	(2) Certified	(3) Noncertified	(4) Mean Difference
Age of the co-op (years)	7.70	9.48	5.92	3.56**
	(5.04)	(4.55)	(4.97)	
Co-op members before certification (number)	420.12	511.28	328.96	182.32
	(399.42)	(533.55)	(154.04)	
Share of decisions made democratically	0.39	0.41	0.37	0.04
	(0.15)	(0.16)	(0.13)	
Education of co-op leader (years)	14.34	15.60	13.08	2.52***
	(3.13)	(2.78)	(2.98)	
Leader grows cocoa (1/0)	0.72	0.56	0.88	−0.32**
	(0.45)	(0.51)	(0.33)	
Service providers for inputs, training, etc. (number)	1.56	2.24	0.88	1.36***
	(1.49)	(1.45)	(1.20)	
Co-op vehicles (number)	5.00	8.48	1.52	6.96***
	(6.03)	(6.85)	(1.48)	
Observations	50	25	25	50

Note: Mean values are shown with standard deviations in parentheses.
**$p < 0.05$.
***$p < 0.01$.

significantly correlated with the age of the cooperative, the education of the leader, physical capital, and the number of service providers, and it is negatively and significantly correlated with the cooperative leader's growing cocoa himself or herself. At the same time, several of the cooperative characteristics are also significantly correlated with the outcome variables—cocoa yield, price, and consumption expenditure—as is shown in columns (2) to (4) of table 3. This joint correlation means that the estimated effects of certification on the outcome variables may be biased when not controlling for cooperative characteristics.

Regression Results

Full results of the regression models to estimate the effects of Fairtrade certification on cocoa yield, prices, and per capita consumption expenditure (obtained with OLS and IV estimators) are shown in tables A5–A7 in the online supplementary appendix. We show specifications with and without controlling for cooperative characteristics. For all models, the Hausman test indicates that the OLS and IV estimates do not differ significantly, so that the OLS estimates also seem to be consistent (and more efficient than the IV estimates).

The estimated effects of Fairtrade certification on the three outcome variables are summarized in table 4. Columns (1) and (2) show effects without controlling for cooperative characteristics. The IV estimates suggest that certification increases cocoa yield by 70 kg/ha, which is a gain of 14% compared to the mean yield of noncertified farmers. This yield effect can be explained by certified cooperatives' offering more services to their members, thus improving farmers' access to agricultural inputs, information, and training. Large yield-increasing effects through Fairtrade certification were also shown in a few previous studies (van Rijsbergen et al. 2016; Jena, Stellmacher, and Grote 2017). Other studies that analyzed effects of Fairtrade-Organic double certification found no effects on yield (Jena et al. 2012; Mitiku et al. 2017), or even negative effects (Vanderhaegen et al. 2018), probably because Organic prohibits the use of yield-increasing chemical inputs.

Fairtrade certification also increases the average cocoa price that farmers receive by about 29 CFA/kg, equivalent to a gain of 4% over the mean price received by noncertified farmers. As mentioned, Fairtrade certification seems to be one of the few opportunities for cocoa farmers in Côte d'Ivoire to achieve a price higher than the government-fixed price at all. Finally, Fairtrade certification has a significantly positive effect on per capita

Table 3. Correlation between Cooperative Characteristics, Certification Status, and Outcome Variables

Cooperative Characteristics	(1) Certified[a]	(2) Yield	(3) Price	(4) Expenditure
Age of the co-op (years)	0.421***	0.052	0.351***	−0.047
	(0.002)	(0.245)	(0.000)	(0.299)
Co-op members before certification (number)	0.115	−0.107**	−0.052	−0.090**
	(0.426)	(0.016)	(0.249)	(0.045)
Share of decisions made democratically	0.227	−0.026	0.281***	0.137***
	(0.113)	(0.555)	(0.000)	(0.002)
Education of co-op leader (years)	0.445***	−0.002	0.129***	0.139***
	(0.001)	(0.972)	(0.004)	(0.002)
Leader grows cocoa (1/0)	−0.356**	0.072	−0.098**	−0.047
	(0.011)	(0.107)	(0.029)	(0.292)
Service providers for inputs, training, etc. (number)	0.517***	0.012	0.437***	0.168***
	(0.000)	(0.796)	(0.000)	(0.000)
Co-op vehicles (number)	0.673***	0.066	0.471***	0.133***
	(0.000)	(0.142)	(0.000)	(0.003)
Observations	50	500	490	500

Note: Spearman's correlation coefficients are shown with *p*-values in parentheses.
**$p < 0.05$.
***$p < 0.01$.
[a]Correlations in this column are calculated at the cooperative level.

Table 4. Effect of Fairtrade Certification on Outcome Variables

	Not Controlling for Cooperative Characteristics		Controlling for Cooperative Characteristics	
Outcome Variables	(1) OLS	(2) IV	(3) OLS	(4) IV
Cocoa yield (kg/ha)	63.32**	69.60**	111.75***	106.61**
	(27.20)	(35.27)	(37.27)	(49.66)
Cocoa price (CFA/kg)	26.52***	29.27***	22.11***	25.18***
	(3.86)	(4.23)	(3.38)	(3.69)
Per capita consumption expenditure (log)	0.14*	0.17*	0.15*	0.13
	(0.08)	(0.09)	(0.08)	(0.10)
Household controls included	Yes	Yes	Yes	Yes
Cooperative controls included	No	No	Yes	Yes

Note: Coefficient estimates for the effect of Fairtrade certification (1/0) are shown with clustered robust standard errors in parentheses. Separate models were estimated for each of the three outcome variables. Yield and per capita consumption expenditure models were estimated with 500 observations; price models were estimated with 490 observations. Full model results are shown in tables A5–A7 in the online supplementary appendix.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

consumption expenditure, raising household living standards by 18%. This gain in living standards reflects the combined effects of both higher cocoa yields and higher prices.

Columns (3) and (4) of table 4 show the effects of Fairtrade certification with the cooperative characteristics included as additional controls. The first important result of these alternative model estimates is that certification also has positive and significant effects after controlling for cooperative characteristics. That is, the benefits of Fairtrade certification for farmers are not solely driven by certified cooperatives' being systematically different from noncertified cooperatives. This is an important result, as previous research on

Fairtrade was not able to disentangle certification effects from cooperative effects.

The second important result of these alternative specifications is that some of the estimates in columns (3) and (4) are notably different from those in columns (1) and (2) of table 4. This means that the estimates in columns (1) and (2) suffer from omitted variable bias, as expected, given the joint correlation of cooperative characteristics with certification and the outcome variables. More surprising may be the direction of the bias. For cocoa yield, the effects increase after controlling for cooperative characteristics. Interpreting the IV estimates, the yield gain increases from 70 kg/ha (14%) in column (2) to 107 kg/ha (21%) in column (4). This implies that farmers in cooperatives with less favorable initial conditions (physical capital, leadership education, service providers, etc.) actually benefit more from certification than farmers in cooperatives with more favorable initial conditions. One could have expected the opposite, namely, that farmers in better-endowed cooperatives would benefit overproportionally from certification. However, our results are not implausible: better-endowed cooperatives are more beneficial for farmers with and without certification, but the net effect of certification seems to be larger in less-endowed cooperatives. This is a welcome finding from an equity perspective.

Robustness Checks

As mentioned, several of the cooperatives that are Fairtrade certified are also certified under UTZ and/or Rainforest Alliance (RA). In the analysis so far, we have ignored such double and triple certification, so it is not clear whether the observed effects are really due to Fairtrade alone. In order to test whether certification under one of the other standards changes the findings, we run alternative models in which we control for UTZ/RA through an additional dummy variable on top of the regular household-level and cooperative-level controls. These alternative estimates are shown in table A9 in the online supplementary appendix, with the main results summarized in table 5. UTZ and/or RA certification is not significant in any of the models, whereas the Fairtrade effects on all three outcome variables remain positive, significant, and in the same magnitude as in table 4. We conclude that double or triple certification does not change our findings concerning the effects of Fairtrade.

Given that UTZ focuses on the adoption of improved farming practices, one could have expected that controlling for UTZ would possibly reduce the effects of Fairtrade, especially on yield. However, van Rijsbergen et al. (2016) showed with data from Kenya that there is no difference in yield between farmers who are Fairtrade certified and Fairtrade-UTZ double certified. Chiputwa, Spielman, and Qaim (2015) used data from Uganda and also found no additional benefit when Fairtrade farmers were Fairtrade-UTZ double certified.

Another robustness check relates to possible reverse causality between the cooperative characteristics and Fairtrade certification. As mentioned, in the choice of cooperative characteristics we tried to avoid reverse causality to the extent possible. But changes in cooperative services seem to be particularly relevant for the Fairtrade effect on yield, and we included the number of service providers as one of the cooperative characteristics. We ran additional models in which we controlled for cooperative characteristics but excluded the number of service providers. These additional results, which are shown in table A10 in the online supplementary appendix, are very similar to the ones discussed above.

Conclusion

In this article, we have analyzed whether Fairtrade certification has beneficial effects on smallholder farmers when also controlling for cooperative characteristics. Most of the certification for sustainability standards in the small farm sector happens through cooperatives or other types of farmer groups. Cooperatives differ in terms of their size, structure, human and physical capital endowment, and other institutional characteristics. These cooperative characteristics may influence farm productivity and income with and without certification. At the same time, they may also determine whether or not a cooperative is certified. Hence, not controlling for cooperative characteristics may lead to omitted variable bias when analyzing the net effects of certification. Previous research on the effects of Fairtrade and other sustainability standards could hardly control for cooperative characteristics. Even when using a large number of farm observations, existing studies had typically sampled these observations from only a small

Table 5. Effects of Fairtrade Certification on Outcome Variables, Controlling for Other Standards

	Cocoa Yield (kg/ha)		Cocoa Price (CFA/kg)		Per Capita Consumption Expenditure (Log)	
Outcome Variables	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV
Fairtrade certified (1/0)	116.92***	109.21**	22.74***	25.95***	0.17**	0.14
	(41.60)	(54.52)	(3.57)	(4.32)	(0.08)	(0.11)
UTZ and/or RA certified (1/0)	−15.98	−11.91	−1.93	−3.60	−0.09	−0.07
	(49.49)	(49.72)	(4.10)	(4.76)	(0.14)	(0.13)
Household controls included	Yes	Yes	Yes	Yes	Yes	Yes
Cooperative controls included	Yes	Yes	Yes	Yes	Yes	Yes
Observations	500	500	490	490	500	500

Note: Coefficient estimates are shown with clustered robust standard errors in parentheses. Full model results are shown in table A9 in the online supplementary appendix.
$^{**}p < 0.05$.
$^{***}p < 0.01$.

number of purposively selected cooperatives. We have added to the literature by using a more suitable sampling design. In particular, we randomly sampled farmers from a large number of randomly selected cooperatives. This approach has two advantages. First, it allows controlling for cooperative characteristics in the estimated impact models. Second, due to the large institutional heterogeneity that our data capture, external validity is increased. In other words, we can rule out that our results are driven by the peculiarities of a small number of cooperatives.

The empirical research has focused on the cocoa sector in Côte d'Ivoire, where large numbers of Fairtrade certified and noncertified cooperatives exist in the same regions. Regression models have shown that Fairtrade certification contributes to higher cocoa yields, higher cocoa prices, and higher household living standards (measured in terms of per capita consumption expenditures). The estimated benefits for farmers remain positive and significant after also controlling for cooperative characteristics. However, the magnitude of the effects differs with and without controlling for cooperative characteristics, confirming that estimates that do not account for institutional heterogeneity suffer from omitted variable bias.

Also interesting is the direction of the bias. Better-endowed cooperatives are more beneficial for member farmers than less-endowed cooperatives, which is true independent of certification. But better-endowed cooperatives are also more likely to be certified, which might mean that the benefits of certification might be overestimated when not controlling for cooperative characteristics. However, we find bias in the opposite direction; that is, the estimated effects of certification increase after controlling for cooperative characteristics. This is especially true for cocoa yield, where the effect of Fairtrade certification increases from 14% to 21% after controlling for cooperative characteristics. This unexpected effect can be explained by farmers in less-endowed cooperatives benefiting more from certification than farmers in better-endowed cooperatives, which is good news from an equity perspective and is actually quite plausible in the local context. Better-endowed cooperatives can offer more beneficial services to their members—such as input provision and training—even when not Fairtrade certified. Hence, the additional effect of certification is smaller than in less-endowed cooperatives

where an increase in service provision is possible only through the Fairtrade premium, the better prices in Fairtrade markets, and certification-related organizational support.

The result for the direction of bias may be specific to Côte d'Ivoire and should not be generalized. But the finding that cooperatives and their institutional characteristics matter, and that institutional heterogeneity deserves more explicit focus in future research on the effects of sustainability standards in the small farm sector, is certainly true beyond the concrete study setting. Improved sampling frameworks—such as those suggested here—should be used for data collection to facilitate disentangling certification effects from cooperative effects.

In closing, we mention two limitations of our study that could be addressed in follow-up research. First, while we have controlled for cooperative characteristics, we have not analyzed in detail what particular cooperative characteristics matter most for the size and distribution of certification benefits. This could be a useful extension to better understand under what institutional conditions sustainability standards are most successful in terms of meeting their socioeconomic and environmental objectives. Second, cooperative characteristics influence the benefits of certification, but on the other hand, they may also be influenced by certification. For instance, certification may lead to capital accumulation and to a higher intensity of cooperative services. Although we tried to measure cooperative characteristics in a way that reduces issues of reverse causality, we cannot rule out completely that some level of endogeneity remains. Noteworthy in this connection is that if some of the benefits of certification were channeled through changes in the variables that we used for measuring cooperative characteristics, the estimated effects of certification should decrease after controlling for cooperative characteristics. In our models, the opposite is true—namely, the effects increase after controlling for cooperative characteristics. This is not proof that issues of reverse causality do not exist, but it clearly suggests that any related bias would unlikely overturn the finding that Fairtrade certification benefits farmers after also controlling for cooperative effects. Dealing with endogeneity more rigorously would require panel data with observations of farm, household, and cooperative characteristics before and after certification.

Supplementary Material

Supplementary material are available at *American Journal of Agricultural Economics* online.

References

Akoyi, K Teopista, and Miet Maertens. 2018. Walk the Talk: Private Sustainability Standards in the Ugandan Coffee Sector. *Journal of Development Studies* 54(10): 1792–818. https://doi.org/10.1080/00220388.2017.1327663.

Bacon, Christopher. 2005. Confronting the Coffee Crisis: Can Fair Trade, Organic, and Specialty Coffees Reduce Small-Scale Farmer Vulnerability in Northern Nicaragua? *World Development* 33(3): 497–511. https://doi.org/10.1016/j.worlddev.2004.10.002.

Becchetti, Leonardo, Stefano Castriota, and Melania Michetti. 2013. The Effect of Fair Trade Affiliation on Child Schooling: Evidence from a Sample of Chilean Honey Producers. *Applied Economics* 45(25): 3552–63. https://doi.org/10.1080/00036846.2012.727980.

Bernard, Tanguy, and David J Spielman. 2009. Reaching the Rural Poor through Rural Producer Organizations? A Study of Agricultural Marketing Cooperatives in Ethiopia. *Food Policy* 34(1): 60–9. https://doi.org/10.1016/j.foodpol.2008.08.001.

Beuchelt, Tina D, and Manfred Zeller. 2011. Profits and Poverty: Certification's Troubled Link for Nicaragua's Organic and Fairtrade Coffee Producers. *Ecological Economics* 70(7): 1316–24. https://doi.org/10.1016/j.ecolecon.2011.01.005.

Chiputwa, Brian, and Matin Qaim. 2016. Sustainability Standards, Gender, and Nutrition among Smallholder Farmers in Uganda. *Journal of Development Studies* 52(9): 1241–57. https://doi.org/10.1080/00220388.2016.1156090.

Chiputwa, Brian, David J Spielman, and Matin Qaim. 2015. Food Standards, Certification, and Poverty among Coffee Farmers in Uganda. *World Development* 66: 400–12. https://doi.org/10.1016/j.worlddev.2014.09.006.

DeFries, Ruth S, Jessica Fanzo, Pinki Mondal, Roseline Remans, and Stephen A Wood. 2017. Is Voluntary Certification of

Tropical Agricultural Commodities Achieving Sustainability Goals for Small-Scale Producers? A Review of the Evidence. *Environmental Research Letters* 12(3): 033001. https://doi.org/10.1088/1748-9326/aa625e.

Di Falco, Salvatore, Marcella Veronesi, and Mahmud Yesuf. 2011. Does Adaptation to Climate Change Provide Food Security? A Micro-Perspective from Ethiopia. *American Journal of Agricultural Economics* 93(3): 829–46. https://doi.org/10.1093/ajae/aar006.

Dohmen, Thomas, Armin Falk, David Huffman, Uwe Sunde, Jürgen Schupp, and Gert G Wagner. 2011. Individual Risk Attitudes: Measurement, Determinants, and Behavioral Consequences. *Journal of the European Economic Association* 9 (3): 522–50. https://doi.org/10.1111/j.1542-4774.2011.01015.x.

Dragusanu, Raluca E, Daniele Giovannucci, and Nathan Nunn. 2014. The Economics of Fair Trade. *Journal of Economic Perspectives* 28(3): 217–36. https://doi.org/10.1257/jep.28.3.217.

Fairtrade. 2015. *Scope and Benefits of Fairtrade*. Bonn, Germany: Fairtrade International.

———. 2017. *Fairtrade Standard for Cocoa*. Bonn, Germany: Fairtrade International.

Fenger, Nina A, Aske S Bosselmann, Richard Asare, and Andreas de Neergaard. 2017. The Impact of Certification on the Natural and Financial Capitals of Ghanaian Cocoa Farmers. *Agroecology and Sustainable Food Systems* 41(2): 143–66. https://doi.org/10.1080/21683565.2016.1258606.

Foundjem-Tita, Divine, Ann Degrande, Jason Donovan, Dietmar Stoian, and Christophe Kouamé. 2017. *Baseline for Assessing the Impact of Fairtrade Certification on Cocoa Growers and Cooperatives in Côte d'Ivoire*. Nairobi: World Agroforestry Center.

Haggar, Jeremy, Gabriela Soto, Fernando Casanoves, and Elias de M Virginio. 2017. Environmental-Economic Benefits and Trade-Offs on Sustainably Certified Coffee Farms. *Ecological Indicators* 79: 330–7. https://doi.org/10.1016/j.ecolind.2017.04.023.

Ibanez, Marcela, and Allen Blackman. 2016. Is Eco-Certification a Win–Win for Developing Country Agriculture? Organic Coffee Certification in Colombia. *World Development* 82: 14–27. https://doi.org/10.1016/j.worlddev.2016.01.004.

International Cocoa Organization. 2018. *Quarterly Bulletin of Cocoa Statistics, 2017/18*. International Cocoa Organization. Available at: https://www.icco.org/about-us/icco-news/384-february-2018-quarterly-bulletin-of-cocoa-statistics.html. Last accessed May 8, 2019.

Jena, Pradyot R, Bezawit B Chichaibelu, Till Stellmacher, and Ulrike Grote. 2012. The Impact of Coffee Certification on Small-Scale Producers' Livelihoods: A Case Study from the Jimma Zone, Ethiopia. *Agricultural Economics* 43(4): 429–40. https://doi.org/10.1111/j.1574-0862.2012.00594.x.

Jena, Pradyot R., Till Stellmacher, and Ulrike Grote. 2017. Can Coffee Certification Schemes Increase Incomes of Smallholder Farmers? Evidence from Jinotega, Nicaragua. *Environment, Development and Sustainability* 19(1): 45–66. https://doi.org/10.1007/s10668-015-9732-0.

Klasen, Stephen. 2000. Measuring Poverty and Deprivation in South Africa. *Review of Income and Wealth* 46(1): 33–58. https://doi.org/10.1111/j.1475-4991.2000.tb00390.x.

Loconto, Allison, Laura Silva-Castañeda, Nadine Arnold, and Alejandra Jimenez. 2019. *Participatory Analysis of the Use and Impact of the Fairtrade Premium*. Paris: Laboratoire Interdisciplinaire Sciences Innovations Sociétés.

MADR. 2017. *Répertoire de Sociétés Coopératives*. Abidjan, Côte d'Ivoire: Ministère de l'Agriculture et du Développement Rural.

Meemken, Eva-Marie, and Matin Qaim. 2018. Can Private Food Standards Promote Gender Equality in the Small Farm Sector? *Journal of Rural Studies* 58: 39–51. https://doi.org/10.1016/j.jrurstud.2017.12.030.

Meemken, Eva-Marie, Jorge Sellare, Christophe N Kouamé, and Matin Qaim. 2019. Effects of Fairtrade on the Livelihoods of Poor Rural Workers. *Nature Sustainability* 2: 635–42. https://doi.org/10.1038/s41893-019-0311-5.

Meemken, Eva-Marie, David J Spielman, and Matim Qaim. 2017. Trading Off Nutrition and Education? A Panel Data Analysis of the Dissimilar Welfare Effects of Organic and Fairtrade Standards. *Food Policy* 71: 74–85. https://doi.org/10.1016/j.foodpol.2017.07.010.

Mitiku, Fikadu, Yann de Mey, Jan Nyssen, and Miet Maertens. 2017. Do Private

Sustainability Standards Contribute to Income Growth and Poverty Alleviation? A Comparison of Different Coffee Certification Schemes in Ethiopia. *Sustainability* 9(2): 246. https://doi.org/10.3390/su9020246.

Muradian, Roldan, and Wim Pelupessy. 2005. Governing the Coffee Chain: The Role of Voluntary Regulatory Systems. *World Development* 33(12): 2029–44. https://doi.org/10.1016/j.worlddev.2005.06.007.

Naef, Michael, and Jürgen Schupp. 2009. Measuring Trust: Experiments and Surveys in Contrast and Combination. IZA Discussion Paper 4087. Available at: http://ftp.iza.org/dp4087.pdf. (Last accessed January 10, 2020).

Oelofse, Myles, Henning Høgh-Jensen, Lucimar S Abreu, Gustavo F Almeida, Qiao Y Hui, Tursinbek Sultan, and Andreas de Neergaard. 2010. Certified Organic Agriculture in China and Brazil: Market Accessibility and Outcomes Following Adoption. *Ecological Economics* 69(9): 1785–93. https://doi.org/10.1016/j.ecolecon.2010.04.016.

Oya, Carlos, Florian Schaefer, and Dafni Skalidou. 2018. The Effectiveness of Agricultural Certification in Developing Countries: A Systematic Review. *World Development* 112: 282–312. https://doi.org/10.1016/j.worlddev.2018.08.001.

Ragasa, Catherine, and Jennifer Golan. 2014. The Role of Rural Producer Organizations for Agricultural Service Provision in Fragile States. *Agricultural Economics* 45(5): 537–53. https://doi.org/10.1111/agec.12105.

Raynolds, Laura T. 2002. Consumer/Producer Links in Fair Trade Coffee Networks. *Sociologia Ruralis* 42(4): 404–24. https://doi.org/10.1111/1467-9523.00224.

Raynolds, Laura T, Douglas Murray, and Peter L Taylor. 2004. Fair Trade Coffee: Building Producer Capacity via Global Networks. *Journal of International Development* 16(8): 1109–21. https://doi.org/10.1002/jid.1136.

Ruben, Ruerd, and Ricardo Fort. 2012. The Impact of Fair Trade Certification for Coffee Farmers in Peru. *World Development* 40(3): 570–82. https://doi.org/10.1016/j.worlddev.2011.07.030.

Snider, Anna, Isabel Gutiérrez, Nicole Sibelet, and Guy Faure. 2017. Small Farmer Cooperatives and Voluntary Coffee Certifications: Rewarding Progressive Farmers of Engendering Widespread Change in Costa Rica? *Food Policy* 69: 231–42. https://doi.org/10.1016/j.foodpol.2017.04.009.

Ssebunya, Brian R, Ulrich B Morawetz, Christian Schader, Matthias Stolze, and Erwin Schmid. 2019. Group Membership and Certification Effects on Incomes of Coffee Farmers in Uganda. *European Review of Agricultural Economics* 46: 109–32. https://doi.org/10.1093/erae/jby022.

Tran, Duc, and Daisaku Goto. 2019. Impacts of Sustainability Certification on Farm Income: Evidence from Small-Scale Specialty Green Tea Farmers in Vietnam. *Food Policy* 83: 70–82. https://doi.org/10.1016/j.foodpol.2018.11.006.

Valkila, Joni. 2009. Fair Trade Organic Coffee Production in Nicaragua—Sustainable Development or a Poverty Trap? *Ecological Economics* 68(12): 3018–25. https://doi.org/10.1016/j.ecolecon.2009.07.002.

van Rijsbergen, Bart, Willem Elbers, Ruerd Ruben, and Samuel N Njuguna. 2016. The Ambivalent Impact of Coffee Certification on Farmers' Welfare: A Matched Panel Approach for Cooperatives in Central Kenya. *World Development* 77: 277–92. https://doi.org/10.1016/j.worlddev.2015.08.021.

Vanderhaegen, Koen, Kevin T Akoyi, Wouter Dekoninck, Rudy Jocqué, Bart Muys, Bruno Verbist, and Miet Maertens. 2018. Do Private Coffee Standards "Walk the Talk" in Improving Socio-Economic and Environmental Sustainability? *Global Environmental Change* 51: 1–9. https://doi.org/10.1016/j.gloenvcha.2018.04.014.

Verhofstadt, Ellen, and Miet Maertens. 2014. Smallholder Cooperatives and Agricultural Performance in Rwanda: Do Organizational Differences Matter? *Agricultural Economics* 45(S1): 39–52. https://doi.org/10.1111/agec.12128.

Wessel, Marius, and PM Foluke Quist-Wessel. 2015. Cocoa Production in West Africa: A Review and Analysis of Recent Developments. *NJAS - Wageningen Journal of Life Sciences* 74/75: 1–7. https://doi.org/10.1016/j.njas.2015.09.001.

World Bank. 2018. *Poverty and Equity Brief: Sub-Saharan Africa. Cote d'Ivoire*. Available at: https://databank.worldbank.org/data/download/poverty/33EF03BB-9722-4AE2-ABC7-AA2972D68AFE/Global_POVEQ_CIV.pdf. (Last accessed May 8, 2019).