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**The Impact of Coffee Certification on Small-Scale Producers' Livelihoods:
Evidence from Ethiopia**

Pradyot Ranjan Jena

Post-doc Research Fellow, Institute for Environmental Economics and World Trade, University of Hannover, Königsworther Platz 1, 30167 Hannover, Germany; Phone (49) 511 76219569; Fax: 0511-762-2667 e-mail: jena@iuw.uni-hannover.de,

Till Stellmacher

Post-doc Research Fellow, Institute for Environmental Economics and World Trade, University of Hannover, Königsworther Platz 1, 30167 Hannover, Germany

Ulrike Grote

Professor, Institute for Environmental Economics and World Trade, University of Hannover, Königsworther Platz 1, 30167 Hannover, Germany

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Abstract

What is the impact of product certification on small-scale farmers' livelihoods? To what extent does the participation of Ethiopian small-scale coffee farmers in certified local cooperative structures improve their socio-economic situation? To answer these questions, this paper employs household data of 249 coffee farmers from six different cooperatives collected in the Jimma zone of Southwestern Ethiopia in 2009. Findings show that the certification of coffee cooperatives has in total a low impact on small-scale coffee producers' livelihoods mainly due to (1) low productivity, (2) an insignificant price premium, and (3) poor access to credit and information from the cooperative. Differences in production and organizational capacities between the local cooperatives are mirrored in the extent of the certification benefits for the smallholders. 'Good' cooperatives have reaped the benefits of certification, whereas 'bad' ones did not fare well. In this regard the "cooperative effect" overlies the "certification effect".

Keywords – Coffee certification, cooperative, poverty reduction, Ethiopia

JEL code: Q13, Q18, R11, R12,

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1. Introduction

Ethiopia is the origin of Arabica coffee. Coffee is deep-rooted in both the economy and culture of the country. Though coffee is a traditionally worldwide traded cash crop with new markets emerging, many coffee-dependent developing countries such as Ethiopia are struggling with production and marketing of their coffee. In the early 2000s, a historic world market price slump hit millions of coffee farmers hard, especially smallholder producers in Africa and Latin America (Ponte, 2002). The volatility of coffee markets in combination with poor production infrastructure and services have sunk the majority of coffee producers in developing countries in low-input-low-output cycles and structural poverty. In the recent past, due to the interplay between increasing poverty of coffee smallholders in major producer countries and growing demands for healthier and more socially and environmentally-friendly produced coffee in larger consumer countries, certification of cooperatives has gradually gained wider significance worldwide (Petit, 2007; Stellmacher and Grote, 2011). Especially Fairtrade certification is expected to significantly contribute to better livelihoods of smallholder coffee farmers by enhancing their income through premium prices and stabilizing it through minimum prices.

Certification is an instrument to add value to a product. It addresses a growing worldwide demand for healthier and more socially- and environmentally-friendly products and is based on the idea that consumers are motivated to pay a price premium for products that meet certain precisely defined and assured standards (Grote et al., 2007; Wissel et al., 2010). Being able to label a product as 'organic' or 'Fairtrade' and to protect the label from counterfeiting is considered a valuable marketing advantage in today's consumer markets. The price premiums are intended to be used to promote socio-economic change and/or environmental sustainability in the areas of production. In this context, voluntary product certification standards such as Fairtrade are promoted as critical devices to make small-scale farmers in developing countries less vulnerable to volatile 'free' world market prices and to enhance their market integration in order to increase their socio-economic situation.

Each certification concept works on different standards and principles, defined with a set of criteria and indicators (classified in major must, minor must, minimum, or progress requirements) that serve as parameter for verification. The Fairtrade concept essentially consists of a set of social standards following several internationally recognized conventions - particularly those of the International Labor Organization (ILO) - but also considers some basic environmental concerns. Fairtrade certification can only be granted to smallholder coffee producers who have organized themselves in peasant organizations (cooperatives/associations) "which are able to contribute to the social and economic development of their

members as well as their communities and are democratically controlled by their members” (FLO, 2007, pg. 3). The certification process begins with a written application by the producer organization to FLO-CERT. The producer organization will then be physically inspected against Fairtrade standards by a regionally-based FLO-CERT inspector. If the application is accepted, a certificate usually valid for one year is issued to the organization. This certificate can be renewed following re-inspection (FLO, 2007).

Some empirical research has been carried out in the last years to assess the impact of certification on smallholder producers’ livelihoods in the agricultural sector of developing countries. Philpott et al. (2007) show how smallholder coffee farmers in the Chiapas highlands, Mexico, that are certified according to Fairtrade and Organic standards reap economic benefits of certification. Poncelet (2005) shows a positive impact of Fairtrade certification on local cooperatives in terms of capacity building. Focusing on Fairtrade-certified bananas in Costa Rica and Ghana and Fairtrade-certified coffee in Tanzania and Nicaragua, he shows that the bonus received by coffee cooperatives due to certification was used effectively to improve production capacities and to implement social projects e.g. in the areas of education or gender. Dörr (2009) conducted empirical studies on the impact of certification on smallholders’ livelihoods in Northeast Brazil by comparing certified and non-certified smallholders that produce grapes, mango, melon and cashew nuts. Her study shows that certified farmers receive higher net income than non-certified farmers. Certified mango and grapes farmers, for example, received an increased price per kg of 58 percent and 28 percent, respectively.

There are also a number of empirical case studies with critical conclusions towards certification. They hint at its theoretical and practical limitations particularly when applied in developing countries’ rural contexts. Bacon (2005), for example, surveyed 228 coffee smallholders in Northern Nicaragua and shows that although Fairtrade and organic certification has the potential to improve the livelihoods of the coffee smallholders, it does not offset other factors leading to a general livelihood decline for the smallholders. Studies by Parrilli (2000) in Mexico and Tiyapongpattana (2001) in Thailand show that farm-gate prices paid in Fairtrade-certified production systems are not necessarily higher than those in conventional production systems. Giovannucci and Potts (2008) show that effectiveness and impact of certification on social, economic, and environmental performance of smallholder producers depend highly on the local setting which determines the implementation, enforcement, and monitoring of certification schemes.

In Ethiopia, the use of socio-economic, environmental and/or health-concerned certification standards in agriculture is a new phenomenon compared to other countries particularly in Latin America (Stellmacher &

Grote, 2011). In recent years, however, certification of agricultural products in Ethiopia increasingly gained attention of international certification agencies and standard holders, governmental and non-governmental development agencies, and private companies supplying to specialty markets. The overwhelming majority of certification activities in Ethiopia focus on coffee (*coffea Arabica*) which is both: a) the backbone of the countries' economy and income source for millions of Ethiopian smallholders that live in or close to poverty and b) a resource with considerable high potential to be marketed as a specialty gourmet product on the worlds' major coffee markets. Coffee certification in Ethiopia is mainly undertaken within cooperative systems being historically rooted in local Agricultural Service Cooperatives established in the 1970s by the then military *derg* government. Since the 1990s, the ruling coalition in Ethiopia, the EPRDF-led government, promoted restructuring of cooperatives in the coffee sector and formation of coffee cooperative unions as umbrella associations. These unions are legally allowed to by-pass the national coffee auction system since 2001 and the Ethiopian Commodity Exchange¹ (ECX) since 2009, to directly sell to international exporters (McCarthy, 2001; Petit, 2007; Stellmacher, 2007; FDRE, 2008). There are currently six coffee cooperative unions operative in Ethiopia, of which the Oromia Coffee Cooperative Union is the largest in terms of members and production volume.

Despite the growing number and vigor of newly established value chains for certified coffees from Ethiopia with presumably drastic and multidimensional impacts on livelihoods of thousands of coffee producing smallholders throughout the country, there is still a considerable lack of empirical local studies that can substantiate and quantify the welfare impact of certification on small-scale coffee producers' livelihoods in Ethiopia.

This study therefore intends to empirically analyze the welfare impact of coffee certification on small-scale coffee producers in Ethiopia and to evaluate the potential of coffee certification in reducing poverty. The paper probes into the effect of certification on: (1) household income of the smallholder coffee farmers and (2) reduction of their vulnerability to poverty.

The next section describes first the survey area and the data collection process, and then the theoretical underpinning and empirical methods used for the analysis. These include econometric specifications to

¹ Since the fall of the communist *Derg* leadership in Ethiopia in 1988 up to 2009, coffee was sold through a national auction system in Ethiopia. All the exporters were required to sell their coffee to the auction house and buy them again after the bidding meaning that the buyers are the sellers themselves. Since the beginning of 2009 the national auction system was replaced by the Ethiopian Commodity Exchange (ECX) which in essence does similar kind of bidding that national auction system did with one exception that when the coffee is sold to the ECX, it goes into a bonded Exchange warehouse and loses all traceability other than the regional designation and grade (Jimma Times, 2009).

measure the impacts on welfare and the propensity score matching technique. This is followed by descriptive and empirical results and their discussion. The paper concludes with some major results on the impacts of certification on Ethiopian coffee farmers.

2. Data Collection and Methodology

This section starts out with a brief description of the study area followed by a presentation of the sampling design and the procedure of carrying out the survey. A brief discussion of the contents of the questionnaire is provided. The theoretical underpinning of the study that has led to the analytical models of the empirical analysis is laid out in the second part of this section. Finally in the third part, the econometric modeling is explained.

2.1 Survey area and data collection

The empirical study was conducted at several levels. Different sample units were selected from managerial and administrative levels in the coffee value chain as well as from smallholder coffee producers in different coffee cooperatives. The primary data collection in Ethiopia was carried out from September to November, 2009. The field study started with expert interviews conducted with staff of the Oromia Coffee Cooperative Union in Addis Ababa. These interviews served as the basis for selecting the three districts (*woreda*) Limmu Kossa, Gomma, and Manna within Jimma Zone of Oromia Regional State in Southwestern Ethiopia as the survey region. Jimma Zone is one of the major coffee growing zones in Ethiopia. According to the Jimma Zone Agricultural and Rural Development Office, coffee production in Jimma covers more than 20 percent of the total coffee export share of Ethiopia. According to the same source, an estimated 30-45 percent of the population in Jimma is directly or indirectly engaged in coffee production, processing and marketing. As characteristic of Ethiopia, coffee production in Jimma is dominated by smallholder production in traditional extensive agro-forestry systems. Highly fertile soil and regular rainfall in the region allow farmers to grow coffee without fertilizer application. Coffee produced in the three selected case study districts is known as Arabica Limmu, an internationally well-established brand that fetches premium prices. Subsequently, based on information obtained from the Oromia Coffee Cooperative Union, six local coffee cooperatives were selected as case studies. Four of them are certified according to Fairtrade and organic standards and the remaining two are conventional cooperatives.

Our study employs a mix of quantitative and qualitative methods. Structured interviews were conducted with a total of 249 coffee producing smallholders that are members of the selected cooperatives. Out of them, 166 smallholders were members of certified and 83 of non-certified cooperatives. The questionnaire

used in the survey gathered information on main topics like household characteristics, production and marketing of coffee in general, and of garden and forest coffee in specific, characteristics about the cooperatives and about certification.

Furthermore, expert interviews were conducted with cooperative heads and other cooperative representatives. To supplement the data, we applied focus group discussions (FGDs) with another 48 smallholders from four of the six cooperatives. Two FGDs in each cooperative were carried out with six farmers each so that in total, there were eight FGDs. Semi-structured guidelines were used to facilitate the discussions. Finally, additional expert interviews were conducted with members of the ECX in Addis Ababa.

2.2 Analytical framework

To measure the welfare impacts of coffee certification on the rural coffee producers, the empirical part is carried out in two steps in this paper. First, the income effects of certification programs have been estimated using OLS regression and propensity score matching. Second, some insights into the interaction of certification with poverty among the coffee producers are provided by using independent poverty variables in the econometric specification.

The theoretical underpinning of the econometric analysis used in this paper is the following: in standard microeconomic theory, individual welfare W depends on a bundle of goods, an array c , which also includes services and material and immaterial goods:

$$W_i = W_i(c_i) \tag{1}$$

This welfare function differs among individuals and among circumstances. The same bundle of goods can produce different levels of welfare. The welfare function therefore depends not only on the bundle of goods c , but also on factors as age, health, or employment status. If these characteristics are designated as x_i , then (1) can be formalized more precisely as:

$$W_i = W_i(c_i; x_i) \tag{2}$$

In (2) it is assumed that a socially-defined welfare function W exists which gives each individual i a value of individual welfare W_i for every bundle of goods c_i , under consideration of additional factors x_i .

Suppose that the relevant bundle of goods as well as the characteristics x can be observed, and that the individual welfare W_i can be calculated. Even in this hypothetical case, drawing conclusions from these calculations with respect to poverty would be problematic. The leading opinion in poverty research is that the question of whether someone is poor is measured not by the observable living standard but by the possibilities and resources an individual has (Sen, 1981). If a lower standard of living (measured in terms of the socially-defined welfare function) is due (only) to preferences and not based on the restrictions an individual faces, then the individual generally is not considered to be poor. Accordingly, (2) can be rewritten as:

$$W_i = W(c_i^*(r_i); x_i) = W(r_i; x_i) \quad (3)$$

where the resources of individual i are called r_i . Welfare then is directly dependent on a bundle of goods c_i^* which is dependent on resources r_i . The bundle of goods c_i^* may not necessarily be identical with the observable bundle of goods c_i , as preferences of the individual may differ from those preferences implied by the welfare function W defined by society. c_i^* is the result of maximizing the socially-defined function W_i subject to the available resources r_i . Relevant for poverty definitions is this value of W_i which depends on an optimization process theoretically restricted by available resources. This goes in line with the well-known resource definition of poverty by Sen (1981), Hagenaars (1986), Ringen (1988), and Strengmann-Kuhn (2000).

Following this resource definition of welfare, we construct a regression model where certification serves as a resource-augmenting instrument such as -

$$Y_i = \alpha_0 + \alpha_1 C_i + \alpha_2 R_i + \alpha_3 H_i + \varepsilon_i \quad (4)$$

Household income Y is a function of the certification status, C ; productive resources, R ; and household characteristics, H . ε is the error term.

In the second part of the welfare analysis, a poverty measure is employed to unravel whether coffee certification makes a dent on the poverty level of farmers that hinge below the poverty line. We applied the Foster–Greer–Thorbecke (FGT) poverty measure (Foster et al., 1984) using the following formula -

$$P_\alpha = \frac{1}{n} \sum_{i=1}^q \left(\frac{z - y_i}{z} \right)^\alpha \quad (5)$$

where z is the poverty line, y_i is the income of the i th respondent below the poverty line, n is the total population; q is the number of people who are poor, and $\alpha \geq 0$ is a poverty “aversion parameter”.

What in fact this measure captures is the proportional shortfall of income from the poverty line for each poor, i.e.

$$\left(\frac{z - y_i}{z} \right)$$

It is then raised to the power of α to reflect the depth of poverty, summed up over all the poor and normalized by the population size, n . When $\alpha = 0$, this measure is simply the “head-count ratio”. However, with higher values of α such as $\alpha = 1$, it measures the “income-gap ratio” that shows the average shortfall of income and hence the depth of poverty. When $\alpha = 2$, the incidence of poverty is severe.

We consider the proportional shortfall of income from the poverty line for each of our “poor” respondents and use it as a dependent variable in the regression to show whether certification has any impact on poverty reduction. So, the dependent variables are $Y_q = \left(\frac{z - y_i}{z} \right)$ and $Y_q^2 = \left(\frac{z - y_i}{z} \right)^2$. (6)

2.3 Econometric specification

The econometric specification of the analytical framework can be divided into three sections: (i) OLS regression and (ii) propensity score matching are both applied to estimate the income effects of certification programs, and the (iii) poverty-related regression reveals further insights into the interaction of certification with poverty.

(i) Applying the OLS, a reduced form of the specification of equation (4) is estimated as follows:

$$Y = \alpha + \beta_1 Age + \beta_2 Agesq + \beta_3 Edu + \beta_4 Edusq + \beta_5 HHsize + \beta_6 Land + \beta_7 Yield + \beta_8 Experience + \beta_9 Shock + \beta_{10} Cert + \beta_{11} Gender + \beta_{12} Dependencyratio + v_i \quad (7)$$

The variables used in the regression equation (6) are described in Table 1 at the end of this section. The regression equation involves three forms of resources - household characteristics such as age, education, experience, gender, household size, and dependency ratio as human resources; land as physical resources; and certification as institutional resource. Moreover, variables like yield, access to non-farm income, and shocks were used as control variables.

However, the econometric application to cross-sectional data collected from household surveys meant for impact analysis of development strategies, typically suffers from non-experimental bias such as selection bias, measurement error, and simultaneity (Wooldridge, 2002). Each of these biases can create endogeneity. In fact, it suffices to say that cross-sectional data suffer from endogeneity since we often do not know the source of endogeneity. Several methods have been suggested to correct for the endogeneity problem occurring in OLS estimations. These methods are propensity score matching (Rosenbaum and Rubin, 1983; Heckman et al., 1998; Dehejia and Wahba, 2002; Pearl, 2009), the Heckman selection model (Heckman, 1979; Lee, 2001), endogenous switching regression models (Lee and Trost, 1978; Lokshin and Sajaia, 2004) and instrumental variable models (Nelson and Startz, 1990; Imbens and Angrist, 1994; Heckman, 1997; Stock et al., 2002). In this paper, the propensity score matching has been used. It is considered as a useful tool to correct for the selection bias that occurs from omitted variables.

(ii) Propensity score matching (PSM) in essence measures the impact of treatment that is given to a group of households in the presence of a counterfactual control group. The mean difference of the outcome variable in the observed data on both, the treated and the control group, is an unbiased and consistent estimator if there is no selection bias in the sample. However, in a nonrandom sample where a researcher observes the impact of the treatment, the households that have adopted a certain development strategy have often chosen it themselves. This selection bias makes the observed control group an inappropriate counterfactual. PSM finds a counterfactual that controls all other factors except the treatment. PSM is applied through two steps – in the first step, a logit model is estimated with the binary treatment variable (certification status of the farmers in the present study) as the selection variable conditional on basic characteristics of both, the treatment and the control group. Thus, the certification status of each farmer is regressed upon the latter's household-specific and farm-specific characteristics that can affect the decision to certify as independent variables. From this first-stage regression, PSM estimates the propensity scores for each observation. The propensity score of each farmer measures his or her tendency to join certification. The magnitude of a propensity score is between 0 and 1; the larger the score, the more likely the farmer would join the certification program.

The second step is to form two balanced groups based on their estimated propensity scores. Farmers in each group have similar propensity scores. Both the groups can then be compared with respect to the performance based on several matching methods such as 'nearest neighbor' or 'one-to-one' matching. Since similar groups have been found conditional on their basic characteristics, the only factor that cause the performance difference between them is the treatment variable. The difference in the performance between the matched

treated and untreated observations follows a t-test for the statistical significance. If the difference is positive and statistically significant then the treatment is yielding its result. By calculating sampling probabilities from a first stage logit and then forming the treatment and control group based upon these probabilities eliminates the selection bias that might have taken place in the observed data. In a nutshell, PSM creates a valid counterfactual from a nonrandom sample.

(iii) Following the specification outlined in (4) and using the poverty measures in (6) as the outcome variables, the following regression equation is estimated.

$$Y_i = \beta_0 + \beta_1 Age + \beta_2 Agesq + \beta_3 Edu + \beta_4 Farmsize + \beta_5 HHsize + \beta_6 Cert + \beta_7 Experience + \beta_8 Livestock + \beta_9 AccessNFi ncome + \beta_{10} Gender + \beta_{11} Dependencyratio + \beta_{12} weatherrisk + v_i \quad (8)$$

To apply the poverty measures to Ethiopia, a poverty line needs to be specified. Several countries have constructed their national poverty lines based upon the consumption needs. In addition, the World Bank (2001) has set the international standard poverty lines for extreme hunger to moderate poverty for developing countries as 1\$ a day, 1.25\$ a day, and 2\$ a day respectively. The international poverty line of 1.25\$ a day and 2\$ a day has been used to calculate the poverty incidence among the sampled respondents. The dollar value has been converted into Ethiopian birr by using the PPP exchange rate for 2009 and then adjusted for monthly national inflation which existed in 2009 (year of survey). After conversion into PPP exchange rate and correction for inflation, the \$1.25 poverty line translates into 5.47 Birr in Ethiopian currency and the \$2 poverty line into 8.76 Birr.

An overview of the variables used in the econometric specifications is provided in Table 1.

Table 1: Description of variables

Variable name	Description of Variable	Obs	Mean	Std. Dev.
Certification	If the farming household is certified (=1) or otherwise (=0)	249	0.67	0.47
Age	Age of the head of the household in years	249	48	13.94
Agesq	Age of the head of the household squared	249	2497.93	1390.92
Gender	Gender of the head of household (male = 1 and female = 0)	249	.93	.25
HHsize	Total number of household members	249	6.18	1.94
Dependencyratio	Household members below 14 and above 65 years divided by rest of the household member	248	.69	.68
Edu	Education of the head of household in years	249	4.23	3.24
EduSq	Square of education of the head of household	249	28.44	32.24
Exp	Years of experience in coffee farming	249	20	13.19
Farmsize	Size of farm in ha.	247	1.67	1.25
Access to NF income	If the household has access to nonfarm income	249	.12	.33
Total income	Total income of household in birr	249	4804.53	6555.83
Monthly per capita expenditure	Monthly average expenditure of each household member in birr	249	53.30	56.36
Access to credit	Household has access to credit (yes=1, otherwise=0)	249	.23	.42
Yield (kg/ha)	Average yield in coffee production in kg/ha	212	931	762.59
Weathershock	If the household was affected by floods/droughts during the last year (2008-2009)	249	.16	.37
Livestock	Current monetary value of the livestock of the respondents as suggested by the respondents themselves (in birr)	249	4702	4356

Source: Own compilation.

3. Findings

This section presents the findings of the study in three parts. The first part includes the descriptive results. After explaining the socio-economic conditions of the respondents which in fact guide the interpretation of the welfare effects of certification subsequently, the comparative statistics of yield, price, and gross revenues between certified and non-certified channels are presented. The second part shows the econometric results, focusing on the welfare effects of certification. And finally, the qualitative analysis of the study which is aimed at corroborating the empirical results about welfare effects is presented in part three.

3.1 Descriptive results: Welfare and vulnerability of coffee producers

The majority of interviewed households depend on coffee as their main source of cash income. Other sources of income are grains, livestock, fruits and *chat*, a mild narcotic stimulant. Few farmers also work as agricultural day-laborers and are involved in non-farm activities. The average total landholding of the

interviewed farmers is 1.28 hectares, reflecting the dramatic land scarcity in highland Ethiopia. Of this, an average of 0.81 hectares is allocated to coffee cultivation. Both the percentage of people having access to non-farm income and share of coffee income in total income tells a story that needs attention. Only 12 percent of the respondents have access to non-farm income, an indicator that can be taken as the extent of livelihood portfolio diversification and thus a strategy to reduce vulnerability. Income from coffee constitutes 73 percent of the total income showing a high concentration of earnings among the interviewed farmers. The proportion of cash income from other farming activities and non-farm income is around 17 percent and 9 percent respectively. Any shock to coffee production in terms of pest attack or weather disturbances, and price volatility can immediately sink these farmers into deep poverty.

In general, the study area provides a very low level of public services and infrastructure, including transport facilities, schools, health clinics and reliable sources of drinking water that poses a serious challenge to the coffee-growing communities in improving their livelihoods. The feeder roads in all the three districts are of poor quality. There is only one cooperative that is located around an asphalt road which has a clear advantage in transportation, accessing schools and health services, and in opportunities to generate off-farm income. In contrast to this, limited infrastructure of the other cooperatives poses serious constraints to the people as they expressed in the interviews. There are no regular transport services around the cooperatives as most journeys are undertaken by foot. In three cooperatives, respondents in the focus group discussions stated that lack of proper infrastructure has negatively affected the inhabitants; particularly women had been hit worst since they require emergency health assistance during pregnancy and at the time of delivery.

Access to safe water was one of the most frequently cited problems in all the study areas. All producers involved in the focus group discussions stated that they depend on natural spring water for consumption. Thus, women are required to walk some kilometers per day to fetch water. Furthermore, it was found that even though Fairtrade certification regulations claim that the social premium paid by buyers are invested in building rural infrastructure (FLO Annual Review 2010-11, 2011), the cooperatives have not invested in such services. Furthermore, as the Fairtrade specialist from the union interviewed has mentioned “until the certified cooperatives or farmers write a project proposal and submit it to the union, the social premium is kept in the union”. Hence, the certified producers and cooperatives did not really receive much of the social premiums they should have got. Often such an event occurs due to the lack of adequate educational qualification of the cooperatives’ officials who are supposed to produce the proposals to the umbrella union regarding the investment of Fairtrade social premium.

The comparison of gross revenue earned from coffee per ha between the certified and non-certified members shows that the non-certified members have achieved higher earnings than their certified counterparts. This goes against the general expectation that certified farmers are expected to earn more from coffee than the non-certified ones; however, this difference is not statistically significant (Table 2). There are two reasons for this. First, the average values and the mean separation test, as shown in Table 2, indicate that certified farmers in our sample have allocated relatively more land to coffee, yet the yield rate (kg per ha) is lower than that of the non-certified farmers. In fact, the yield rate of coffee reported by the surveyed respondents is highly dispersed across observations. For example, the mean of the yield rate distribution is 941 kg of red cherry per ha as opposed to the median of 779 kg per ha. A part of this dispersion might have occurred due to the non-sampling error. Given the fact that the respondents in rural Ethiopia are highly uneducated and do not really keep record of their produce, it can be assumed that the figures reported by them are not accurate. However, the reported lower yield of the certified farmers is mostly due to their lack of technical know-how in coffee farming. While both the certified and non-certified farmers lack advanced methods of coffee farming in Ethiopia, the lower yield rate on the part of certified farmers shows their relative inefficiency in farming and indicates that the certification system has not improved their production methods. In the focus group discussions, all farmers mentioned that every year they face severe coffee yield losses due to coffee diseases and pests. In trying to deal with these problems, the farmers have tried to consult with the respective development workers but have not found any real solution other than burning the coffee trees which are infected. None of the farmers have reported any use of herbicides, insecticides and fungicides to control the pests and diseases. However, the question whether Ethiopian coffee is ‘organic by default’ is a delicate one since pesticides found their way into the packaging of Ethiopian coffee exports to Japan. Japan, the number ‘one’ buyer of Ethiopian coffee (purchases 20 percent of exports), instituted a ban on Ethiopian coffee when they discovered pesticides on packaging bags (The Africa Group, 2009).

Table 2: Gross margins in certified and conventional channels in Ethiopia

Indicators	Certified	Non-certified	Sample size
No. of households	166	83	249
Total land (ha)	1.7 (0.09)	1.6 (0.15)	247
Land for coffee (ha)	1.20* (0.14)	0.84* (0.09)	236
Yield (kg/ha)	871.45*** (61.5)	1035.4*** (95.08)	212
Price of red cherry from coop. (birr/kg)	3.30 (0.17)	3.21 (0.10)	168
Price of sundried cherry from private trader (birr/kg)	5.54* (0.21)	6.41* (0.28)	185
Net income from coffee (birr/ha.)	4441 (460)	5415 (600)	206

Note: *Significant at 1% level, **Significant at 5% level, ***Significant at 10% level
Source: Own calculations.

The second reason for lower income is the farm gate price received by both groups of farmers. The non-certified cooperatives have paid their members 3.21 birr per kg of red cherry while the certified farmers have received 3.3 birr per kg from their cooperatives. But again, this difference in the average farm gate price received from respective cooperatives by certified and non-certified farmers is not statistically significant. However, the difference in prices paid by the private merchants to certified and non-certified farmers is significant. The prices paid by private traders on average is 6.41 birr per kg of sundried cherry to the non-certified farmers while the same for certified farmers is 5.54 birr per kg. Given the fact that both the certified and non-certified farmers sell 75 percent of their coffee harvest to the private traders, this significant difference in price from the traders causes the difference in gross revenue per ha between the two groups. Upon asking about this low proportion of coffee procured from farmers, the cooperative officials noted that cooperatives are constrained by their ability to buy coffee from the members. Since the financial condition of the cooperatives is not strong enough to procure the entire amount of coffee from the farmers and pay them a higher price, farmers' confidence in their cooperatives is low and also the former's bargaining power with the local traders is less-leveraged.

3.2 Econometric results: The impacts of certification on welfare

The econometric results in this section show first the OLS regression results, followed by the propensity score matching results. Both methods are applied to estimate the income effects of certification programs.

Table 3: OLS regression results

Variables	OLS		
	Per capita income	Log total income	Per capita consumption
Certified	-0.42 (0.84)	-0.01 (0.08)	0.43 (0.35)
Age	-0.40** (0.16)	0.05 (0.06)	-0.17*** (0.08)
Age sq.	0.003*** (0.001)	-0.0006 (0.0007)	0.002*** (0.0008)
Access to NF income	4.61** (1.52)	1.23* (0.24)	0.14 (0.47)
Log farm size	2.06* (0.39)	0.69* (0.14)	0.25 (0.28)
Dependency ratio	-0.10 (0.54)	-0.19 (0.11)	- 0.11 (0.12)
Weather shock	-0.51 (0.56)	0.06 (0.18)	
Education	0.37*** (0.16)	0.12** (0.04)	0.11** (0.03)
Gender	-3.57 (2.04)	0.34 (0.49)	- 0.39 (0.22)
Experience	0.01 (0.02)	0.01 (0.009)	-0.002 (0.01)
Log yield	0.98*** (0.43)	0.40* (0.10)	
Household size	-0.22* (0.06)		0.10 (0.11)
R ²	0.34	0.24	0.11

Note: Standard errors are computed from clustered means. *Significant at 1% level, **Significant at 5% level, ***Significant at 10% level

Source: Own calculations.

There are three outcome variables in the regression results that are reported in Table 3 such as total income, per capita income, and per capita consumption. In the welfare literature, generally three types of indicators are used to measure welfare such as income, consumption that includes both food and non-food consumption, and assets (Hagenaars, 1986; Ringen, 1988). However, in the present study, considering that a majority of the respondents in fact fall below the standard poverty line as earmarked by the World Bank, the asset base of the respondents is quite low to the extent of practical non-significance. Hence, both income and consumption indicators are used for welfare measurement.

The estimated coefficients in Table 3 show that the certification dummy is statistically insignificant for the three specified outcome variables such as “per capita income”, “log total income” and “per capita consumption”. This is contrary to the previous hypothesis from the certification literature; many other studies have established a positive impact of certification on income and/or consumption (Bacon, 2005; Muradina and Pelupessy, 2005; Fromm and Dubón, 2006; Dempsey and Campbell, 2006). However, the

insignificance of certification for the income levels of the farmers actually indicates that there is a failure of the farmers' organizations rather than a failure of certification itself. This aspect is analyzed in more detail in the following sections.

Among the control variables, age and squared age variables are statistically significant for both, per capita income and per capita consumption. Age in level has a negative impact whereas at margin it has a positive impact, or in other words, households headed by younger persons are likely to earn less than the households headed by older persons. However, this can be explained by the fact that the mean age of the sample is 48, so the relatively older farmers are in fact the more experienced and established ones and hence could earn relatively more. Further, access to non-farm income which is a dummy variable taking value 1 if the household has access to non-farm sources of income and 0 otherwise is positive and significant for income outcomes. This is in line with the expectations since previous studies have shown that access to non-farm income in fact reduces poverty by diversifying the income possibilities. The farm size variable is positive and significant which is also expected since bigger farm size not only provides scope for planting a wide range of crops, it also provides employment opportunities to the household members. Education status of the household head is positive and significant meaning that more educated farmers can take better decisions regarding their income portfolios. The coffee yield variable is positive and significant.

However, despite the fact that certification was found to be insignificant in its impact on household income from the regression analysis, the former has some positive impact in terms of dividend payment made by the certified cooperatives.. For example, 65 percent of the certified producers reported to have received a dividend by the certified cooperatives.

The robustness of OLS regression results are checked by the propensity score matching. The propensity score matching is a widely used technique for controlling selection bias that resulted in endogeneity. The results of the first stage logit regression are given in Table 4 while the average treatment effects before the propensity score matching and after it are provided in Table 5.

Table 4: First stage logit results of propensity score matching

Variables	Per capita income
Age	0.11 (0.07)
Age sq.	-0.001 (0.001)
Access to non-farm income	-1.16** (0.53)
Log farm size	-0.17 (0.25)
Dep ratio	-0.23 (0.23)
Weather risk	-0.86 (0.43)
Education	0.18* (0.07)
Gender	-2.86* (1.12)
Experience in coffee production	0.02*** (0.01)
Access to credit	2.34* (0.57)
R ²	0.25
N	246

Note: *Significant at 10% level; **Significant at 5% level; ***Significant at 1% level
Source: Own calculations.

Table 5: Propensity score matching results

Variable	Sample size	Average treatment effect after matching	Average treatment effect before matching
Per capita income	246	-0.15 (1.10)	-1.36* (0.65)
Log total income	246	-0.18 (0.50)	-0.26 (0.26)
Per capita consumption	246	0.79** (0.37)	0.52** (0.25)
Yield per ha	210	-244.38 (167.13)	- 162.59 (109.57)

Note: Standard errors are computed from clustered means. *Significant at 1% level, **Significant at 5% level, ***Significant at 10% level

Source: Own calculations.

Table 5 presents the mean difference of four outcome variables between the matched as well as unmatched certified and non-certified groups, respectively. There is a statistically significant difference in per capita income between the certified and the non-certified farmers when they are unmatched and this difference is

negative meaning the latter group has a higher per capita mean income than the former group. However, after matching the statistical significance disappears. There is no difference in total income between both groups, neither in unmatched nor in matched samples. On the other hand, interestingly, certified group farmers have higher per capita consumption over the non-certified groups and this is statistically significant. This is because there is a high poverty ratio among the coffee farmers in the Jimma region in Ethiopia (our calculation of poverty ratio in the sample is provided in Table 6). In a population where poverty is a rule rather than exception, consumption is unrelated to income. Or in other words, income might fluctuate substantially, but subsistence consumption needs to take place for survival. So, it is not surprising to find that there is a difference in consumption while income differences are negligible between certified and non-certified groups given the fact that the former has on average a larger household (see Table 2). The fourth outcome variable is yield of coffee per ha. The mean difference of yield is not significant between certified and non-certified groups in both unmatched and matched samples; however, the difference is negative meaning that non-certified groups have a higher yield than the certified ones. This is what we also observed from Table 2 where the t-test for the mean difference for the yield rate of coffee of certified and non-certified groups was significant only at the 10 percent level.

It is so far clear that members of the certified cooperatives did not achieve higher economic benefits compared to the members of the non-certified cooperatives. The analysis in both the previous section and the current section establishes that there are two reasons for such insignificant effect of certification – first, the prices paid by the certified cooperatives to their members are not different from the prices paid by the non-certified cooperatives and second, both certified and non-certified farmers sell a substantial part of their coffee harvest, 75 percent to the private traders who incidentally pay a relatively higher price to non-certified farmers. Most of the interviewed farmers have expressed their preference to sell their coffee to the primary cooperative in form of red cherries for wet processing. This is because fresh cherries fetch relatively higher price than the sundried coffee and also due to the farmers' expectation to get a secondary payment from the cooperative as a dividend in a good year when the cooperative makes sufficient profit. According to the farmers, the price of coffee at the beginning of the buying season will start low and then increases as the cooperatives and private traders compete against each other to buy their coffee. However, the financial capital of the investigated cooperatives in Ethiopia is rather limited. That explains why the cooperatives are not able to buy coffee from their own members. Additionally, the premium price does not really reach the certified producers since costs like transportation; processing, taxes, certification and storage, as well as costs specific to the primary cooperatives like debt repayment have to be covered.

Following the FGT method of poverty outlined in (5), the head-count of poor and non-poor respondents is calculated and cross-tabulated according to their certification status. The poverty status of the 249 interviewed coffee producers as shown in Table 6 is striking. Nearly 86 percent of the households fall below the poverty line of \$1.25 per day and 93 percent of them fall below the \$2 per day poverty line. There is no significant difference in terms of poverty incidence between producers belonging to the certified and the non-certified group respectively.

Table 6: Poverty status of producers

Groups	Number of producers	Number of producers below 2 USD/day	Number of producers below 1.25 USD/day
Certified producers	166	159	144
Non-certified producers	83	73	70
Total sample	249	232	214

Source: Own calculations

The estimated coefficients in Table 7 show the expected signs. The resource variables such as access to non-farm income, livestock, and farm size have negative coefficients that are statistically significant meaning that these factors reduce the income gap from the poverty line. Among the household characteristics, education of the household head reduces the income-gap ratio. Age of the household head and its squared term are both significant with the former having positive and the latter negative coefficients, respectively. These variables have the same effect that we found in the income regressions. Households controlled by younger household heads experience a higher incidence of poverty than the households having relatively older heads.

The variable of interest, the certification dummy, has an insignificant effect on reducing the income gap. This has been the finding in all the empirical tests done in the paper. Both the gross margin analysis and the income regressions have also found that certification programs have not achieved expected welfare improvements for the farmers that have adopted them. There is hardly any evidence of price premium in certified marketing chains. What worsens things further is that the certified cooperatives are not even able to buy all the coffee from their members. The finding that is concerning is that a large proportion of the farmers both from the certified and non-certified groups are still hovering around and falling below the extreme poverty line. Taking into consideration that respondents in a survey tend to underestimate their income and overestimate their cost, the percentage of respondents below the poverty line is still alarming.

And as we have observed in the poverty regression, certification has no impact on reducing the income gap between per capita income and poverty line.

Table 7: Regression results on poverty

Variable	Income gap ratio	Income gap ratio square
Certified	0.028 (0.03)	0.02 (0.03)
Age	0.018* (0.005)	0.02*** (0.009)
Age sq.	-0.0002* (0.00004)	-0.0001*** (0.00008)
Access to nonfarm income	-0.17*** (0.08)	-0.23* (0.07)
Log farm size	-.10* (0.01)	-0.12* (0.02)
Dependency ratio	-.003 (0.02)	0.008 (0.005)
Weather risk	.02 (0.04)	0.02 (0.05)
Education	-.02* (0.005)	-0.02* (0.005)
Gender	-.05 (0.04)	-0.07 (0.04)
Experience	-.002 (0.002)	-0.002 (0.002)
Livestock	-0.000* (0.000)	-0.000* (0.0000)
Household size	.011 (0.008)	0.01 (0.01)
R ²	0.25	0.28
N	212	212

Note: Standard errors are computed from clustered means. *Significant at 10% level; **Significant at 5% level; ***Significant at 1% level.

Source: Own calculations.

3.3 Qualitative results: The cooperative effect

Fairtrade certification requires farmers to be a member of a cooperative that functions democratically (FLO, 2007). The certification is only granted to primary cooperatives, not to the farmers directly. On the other hand, although organic certification is issued directly to the farmers, this also in effect requires farmers to be members of some kind of producer organization for convenience in application and inspection procedure as well as sharing of transaction costs. This fundamental requirement of membership of a cooperative to access the certified network makes certification of coffee inevitably interlinked with the cooperative system. This section highlights the organizational aspects in Ethiopian cooperatives that have turned out to be major determinants of the impact of coffee certification on the adopted farmers' livelihoods.

First, the nature of contractual relationship between the cooperative and its members needs to be investigated since the marketing of coffee depends a lot on the cooperatives' commitment on the interests of the members. According to the information gathered from focus group discussions, the price at the producer level is set by the cooperative union² depending on the current price in the ECX. This price is then communicated to the primary cooperatives to be used when purchasing coffee from the member-farmers. However, primary cooperatives add a mark-up to the price instructed by the union in order to compete with the private traders as the latter vie for purchasing coffee from the farmers. Despite of that farmers are heavily involved in transactions with private traders with whom often they have repeated transactions over the years. This nature of market transactions is believed to reduce rewards and increase market risks for small producers (Riisgaard et al., 2008). Contracts in fact deal with future sales and price conditions, therefore providing a safety cover in case of price fluctuation and reducing transaction costs by curtailing costly bargaining with private traders. One of the cooperative's functions is to provide a platform where members cooperate in the form of collective action in order to increase revenues, reduce costs, or reduce individual risks. This is called as horizontal relations among members of a cooperative. The cooperative members interviewed in this study, however, do not recognize themselves as active and participatory members of the cooperative rather they consider the cooperative as a mere buyer of their product. Out of the 244 producers who responded to the question, 30 percent have reported that they had a written contract with the primary cooperatives. Even though a higher proportion of farmers in the certified group have written contracts relative to the non-certified group, their absolute number is small. Moreover, the contracts did not seem to improve the price risk embedded in the coffee market since they do not specify prices at all. As a result, when asked about their marketing related problems, 66 percent of certified cooperative members who have responded to this question stated that they face price fluctuation in coffee marketing. The proportion for non-certified cooperative members is 69 percent. Therefore, absence of contracts which deal with future sales and price conditions results in insignificant price premium and dependence on the private traders.

Second, credit delivery from the cooperative to its members is an important issue since the various forms of upgrading in the production node such as improving product quality, increasing volume, and complying with standards require investments (Elizabeth et al., 2006). Only 23 percent of the respondents have said that they have obtained credit from their respective cooperatives. Comparing between certified and non-certified cooperatives, 32 percent of the former have admitted to have received credit while the same for the latter is only 5 percent. When access to credit is tabulated across the six cooperatives, it is learnt that only two out of the four certified cooperatives have provided substantial credit to their members while the other two

² Cooperative union in Ethiopia is a higher level umbrella union that functions as a advising and facilitating body for the primary cooperatives that are members of the union.

certified cooperatives are as inefficient as the non-certified ones. This underlines the heterogeneity in capacities of individual cooperatives.

An in-depth focus group discussion with the producers in four cooperatives reveals that -

1. The only institution providing financial services to producers in their area is government-supported microfinance. The microfinance institution is at the district level. But the service is very limited and not available to all producers who need credit.
2. The cooperative members try to put aside some portion of coffee as saving instead of cash. Eventually, they sell their coffee when the market price is higher.
3. When the producers face financial problems, they get loans from private coffee merchants. They require the producers to pay back the loan in coffee in the harvesting season. This practice puts the producers at a disadvantage since they sell their coffee at prices set by the private merchants which are usually very low compared to the prevailing market price.

Third, the awareness of the members of certified cooperatives about the functionalities of certification is quite low. Only 45 percent of the members of certified cooperatives have responded that their cooperative is certified and upon asking about the type of certification standard, they could not answer. This goes in line with results from Stellmacher and Grote (2011) who conducted empirical research in coffee cooperatives in other parts of Ethiopia. These two questions were followed by another question such as “What does certification mean?” in the questionnaire. Only 42 percent of the respondents of certified cooperatives gave an answer to this question of which 37 percent said “I don’t know what is meant by certification”, 23 percent have stated that certification conveys the message about the good quality of coffee worldwide, and another 22 percent said it is a kind of certificate from the government for producing good coffee. This finding raises the question of inclusiveness of the members in their respective cooperatives and finally the lack of transparency that is so crucial in the success of any certification standard. Cooperatives are the important organizational links in certified value chain. However, given the institutional weakness of the cooperatives and their inefficiency in explaining the meaning of certification to their members is inimical to the success of certification.

Fourth, an important aspect of capacity building is the provision of certain embedded services such as technical assistance, crucial market information, financial services, trainings and provision of coffee

production and processing equipment that influence the process of upgrading (Elizabeth et al., 2006). With regard to coffee price information provision, the 48 producers belonging to two of the certified and non-certified cooperatives involved in the focus group discussions revealed that any information regarding the prevailing price of coffee in the market is not communicated to them prior to the sale. The cooperatives inform their members about the opening date of their coffee collecting stations for purchase. However, the producers obtain information about the price only when they bring their coffee to collecting stations to sell to their respective cooperatives. The producers affirmed that they mostly depend on each other for such information by giving out any information they got to each other. Moreover, responding to the question “does your cooperative provide any technical training regarding coffee farming?”, only 50 percent of the certified cooperative members reported of having received training from their cooperatives; on the other hand 37 percent of non-certified cooperative members have received training. However, observing provision of training across cooperatives shows that two out of the four certified cooperatives have performed relatively better than the rest as 71 percent and 55 percent of the members respectively have received training from these two cooperatives. This finding leads to existence of a cooperative specific effect in Ethiopia.

Finally, with respect to input provision such as seeds and equipment, only 20 percent of the members from the certified cooperatives and 14 percent from the non-certified cooperatives have confirmed to have received some support. As typical in Ethiopia, the coffee producers surveyed for this research project apply a traditional small-scale coffee production system. Use of chemical fertilizers or pesticides is not widespread. None of the interviewed producers reported any use of chemical fertilizers and pesticides or other chemicals to control coffee diseases, 10 percent of the farmers have used organic fertilizers in their coffee farms. Most of the respondents stated that they have replanted coffee seeds from their own farms to sustainably maintain or increase production except 3.2 percent of them who received seeds from the government and the 0.8 percent who purchased seeds from the market.

The discussion above directs to the fact that there is a strong cooperative effect that needs to be taken into consideration when evaluating the impact of certification on smallholder coffee farmers’ livelihood. Ethiopian coffee cooperatives are fundamentally weak and need to be restructured in order to implement the certification programs more efficiently.

4. Conclusions

Livelihoods of small-scale coffee producers in Ethiopia are based on insecure low input-low output agricultural production systems which make them particularly vulnerable to poverty. Certification of their main cash crop, coffee, is argued to be a recommended strategy to provide them access to markets that allow them generating higher and more stable cash incomes. However, such a strategy only leads to the desired results if the institutions governing and implementing certification are efficient. Ethiopia provides an example how poor organizational structure can blockade the transfer of benefits from certification to farmers.

The findings ascertain that there exists deep-rooted economic poverty among the small-scale coffee producing cooperative members in Southwestern Ethiopia. 86 percent of the interviewed coffee producers fall below the calculated national poverty line of 1.25 dollar a day in our study. When comparing certified with non-certified cooperatives, it becomes evident that certification does not guarantee the members of certified cooperatives a higher coffee price and higher gross coffee revenues. This is mainly due to the fact that first, cooperative members sell most of their coffee production to private merchants instead of to cooperatives themselves, and second, there is no significant price difference between the certified and non-certified cooperatives. As a result, certification does not lead cooperatives to offer any additional services that aim to enhance the position of small-scale coffee producers within the value chain. For instance, the analysis shows that market information is not freely transmitted to the producers limiting the ability of small-scale farmers to successfully participate in upgrading activities. Furthermore, contractual relationships among the producers and the buyers are limited which further reduces the security and continuity in pricing conditions for the producers. With respect to the provision of training and access to credit, although certified cooperatives performed better than the non-certified cooperatives, the proportion of members that receives such services is low.

In short, in Southwestern Ethiopia, certification of coffee cooperatives according to Fairtrade and organic standards has a very low impact on reducing poverty amongst the cooperative members. However, we observe that across the certified cooperatives some have fared better than others, which indicates that there is heterogeneity in organizational capacities within cooperatives. Strengthening the organizational structure of the cooperatives can bring higher functional efficiency in implementing certification schemes' objectives among the small-scale producers. A further obstacle to the success of certification is found to be the low awareness about certification among the coffee farmers. The reasons for this are twofold: first, the level of education among the farmers is low and second, respective cooperatives have not been able to convey the

message to their members effectively. In conclusion, certification of Ethiopian coffee cooperatives alone will not bring significant poverty alleviation to the cooperative members. More focus should be given to increase the technical, financial and human capacities of the local coffee cooperatives to make them stronger and more effective partners in the value chain along with promoting certification.

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