



## How much more do growers receive for Fair Trade-organic coffee? ☆

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### ABSTRACT

I use a representative sample of coffee growing households in southern Mexico to estimate the price premium and gross income gain from participating in Fair Trade-organic markets through grower cooperatives. For the 2004–2005 season, FT-organic growers received an average premium of 12.8 cents per pound, yielding a gross income gain of 5% of total household income or about 26 dollars per household member. The gain is net of the costs of cooperative participation but not of other costs incurred to become certified and suggests that price premiums alone have a limited potential to increase household returns from growing coffee. More broadly speaking, the finding raises questions about the persistence of substantial price premiums associated with social or environmental labeling initiatives.

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### Introduction

Third party certifications have become a way to inform consumers of a product's attributes and the nature of its production (Hatanaka et al., 2005). Producers can also use certifications to differentiate their products, with examples including certificates of origin (Florida oranges, Parmesan cheese) or those certifying growing practices (e.g., Healthy Grown potatoes). Third party certifications have perhaps most proliferated in the coffee industry where one finds a diversity of certifications with the most well-known being Fair Trade (FT) and organic (Giovannucci and Ponte, 2005).

The last decade has seen FT and organic coffee markets expand and merge. Retail sales of FT coffee in the US nearly tripled from 2003 to 2006, reaching an estimated value of US\$ 730 million; over the same period organic coffee sales in North America also grew substantially (Byers et al., 2008). At the same time, grower cooperatives and trading companies have increasingly appealed to consumers' environmental, health, and ethical concerns by marketing dual-certified FT-organic coffee (Browne et al., 2000). Organic standards focus on environmental aspects of coffee growing like the use of shade trees or chemical pesticides while FT has a strong social component, addressing issues like children missing school to pick coffee. Currently, more than 60% of FT coffee in the US is also organic certified (TransFair USA, 2009).

The difference in price for a certified and uncertified product affects the decision to pursue certification (Kuminoff and Wossink,

2010) and to stay certified (Läpple, 2010). In this sense, price differentials, which I refer to as a price premium, are central to the economic sustainability of producer participation in such markets (Giovannucci and Ponte, 2005). But, they are also relevant to consumers and policy makers concerned about producer remuneration and welfare, especially for producers in developing countries. Surprisingly, quantitative work on FT or organic coffee price premiums is limited. To my knowledge, no work systematically studies the combined FT-organic price premium at the farm level. This is surprising given robust claims by organizations promoting FT and that the highest FT minimum price paid to grower cooperatives is for dual certified FT-organic coffee.

Using a representative sample of 845 coffee growers from southern Mexico, an early leader in FT and organic markets, I assess patterns in participation in FT-organic markets and the price premiums associated with participation. Using community adoption rates of organic practices as an instrument for participation in FT-organic markets, I also test whether endogeneity from grower self-selection into cooperatives selling to FT-organic markets affects the premium estimate. Aside from providing estimates of price premiums and their effect on grower incomes, I add to the literature on certified markets by highlighting issues that can confound identification of farm-level price premiums.

### Key concepts and previous studies

#### *FT and organic coffee certifications and price premiums*

Small-scale coffee growers, defined by the Fairtrade Labeling Organizations International as those who rely primarily on family labor to run their farms, participate in FT through cooperatives.

\* The views expressed here are the authors and should not be attributed to the Economic Research Service or the USDA.

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In this case, cooperatives receive the FT certification, not growers. Because individual certification costs would be excessive, small-scale growers also receive organic certification through cooperatives. Unlike FT, which tends to target practices at the cooperative level, organic standards often require that growers change practices and make additional investments, both of which can translate to higher costs (Calo and Wise, 2005).

The premium for organic coffee that is not FT certified is determined by market forces while FT rules stipulate a minimum price for the contract between the importer and the cooperative. For FT coffee not certified organic, the minimum price for Arabica washed coffee was US\$ 1.26 per pound in the year that the data from Mexico corresponds to (the 2004–2005 coffee season). For FT-organic coffee, which is the focus of this paper, the minimum price was US\$ 1.41. Both prices include a five-cent social premium, which the cooperative retains and uses according to member preferences. If the New York Coffee Exchange “C” (NYC) price exceeds the FT minimum price, the contract price between the FT cooperative and the importer must be at least the NYC price plus the five cent per pound social premium. Because the social premium is retained by the cooperative, there is no reason to expect a FT premium at the farm level in years when the NYC price is above the FT minimum price.

Treating coffee as a competitive commodity market at the production level, one would expect new growers to enter the market and bid any net FT-organic (FTO) price premium to zero as long as uncertified growers can become certified, where the net premium is defined as

$$\text{Net Premium} = \text{FTO Price} - \text{Conventional Price} \\ - \text{Per Unit FTO Certification Cost}$$

Certification costs includes direct costs like certification fees and indirect costs like building infrastructure (a compost bin or fermenting tank) to meet certification standards. If the certified market reduces grower exposure to price risk, as with the FT-organic minimum price, the net premium could even be negative as risk adverse growers would pay to have more stable prices (De Janvry et al., 2010).

Coffee, however, has become a highly differentiated product similar in some respects to wine. Sensorial attributes (aroma, body) and brand reputation (e.g., Colombian coffee) matter to consumers and, by extension, participants in the value chain. In fact, the government of Ethiopia and Starbucks resolved a dispute in 2007 over the country's attempt to trademark coffee from specific geographic areas (Ford, 2007). Donnet et al. (2010) highlight the role of sensory-based quality ratings in coffee marketing and argue that, “quality distinction at the procurement level is the core competence of the specialty coffee firm for product differentiation and innovation” (p. 129). Importers often associate coffee from a specific cooperative (or large plantation) with specific attributes, and it has become common in higher-value markets for a cooperative or plantation's name to appear on the retail package. It is easy to imagine arrangements, possibly involving FT-organic certifications, where differentiation occurs within a cooperative through identifying clusters of growers whose coffee has unique sensorial attributes. Specialty coffee roasters may pay cooperatives premium prices for a reliable and consistent supply of coffee with unique attributes.

Any net certification premium may therefore reflect the bundling of a physically differentiated product with certification. It could also reflect a temporary phenomenon caused by a lagged supply response (organic certification typically takes 3 years). In practice, calculating a net FT-organic premium is challenging as it requires accounting for certification costs, which arise at the organizational level (e.g., increased documentation and inspection

fees) and the farm level (e.g., improving infrastructure). Cooperatives usually incorporate their costs into the price that they pay member growers, making farm level prices net of organizational certification costs. Quantifying certification costs at the farm level requires quantifying and valuing time spent fulfilling standards, most of which is done with family labor that is not paid an explicit wage. Because of data limitations, I focus on estimating gross FT-organic premiums paid to growers, although later I consider the costs of cooperative participation. From here onward, ‘premium’ refers to the gross premium associated with participating in FT-organic markets via grower cooperatives.

#### *Premiums paid for FT or organic certified coffee: previous studies*

Using a sample of 228 coffee farmers in Nicaragua in 2001, Bacon (2005) finds that cooperatives paid US\$ 0.22 per pound more for organic coffee than for conventional coffee. This premium comes from a mean comparison and does not control for selection or other confounding factors. His price data underscore the importance of distinguishing between average premiums and certification premiums. Eleven growers sold coffee via a cooperative to a specialty coffee roaster for US\$ 1.09 per pound but because they sold only a portion of their coffee at this price, the average price received by the 11 farmers over the season (including the coffee sold to the specialty roaster) was US\$ 0.58 per pound, meaning that most of the growers' coffee was sold in non-specialty markets for a much lower price.

Wollni and Zeller (2007) study the average price received by 216 farmers in Costa Rica in 2003. In their empirical model, they control for the endogeneity of marketing channel but take cooperative membership as exogenous, a possibly tenuous assumption since growers self-select into cooperatives, which in turn may depend on unobserved or omitted variables that affect marketing performance. They find that participation in specialty coffee markets provides growers an additional US\$ 0.09 per pound. Because the study mixes certified coffee with highly quality gourmet coffee into an amorphous category of “specialty coffee”, we cannot know if most of the premium corresponds to higher prices offered for unique, high quality gourmet coffee or higher prices for having a specific certification.

Using propensity score matching to create treatment and control groups among coffee growers in central Peru, Fort and Ruben (2009) find no statistically significant differences in prices across conventional FT and non-FT growers or between organic FT and non-FT growers. The result is unsurprising, since it refers to 2007 price data when conventional market prices were near or above the FT minimum price.

In 2005, Giovannucci and Villalobos (2007) surveyed 40 U.S. organic coffee importers accounting for 90% of organic coffee supplied to the U.S. In contracts with grower cooperatives, importers paid an average of US\$ 0.24 per pound more for organic coffee. De Janvry et al. (2010) study Fair Trade premiums paid by importers to a large cooperative in Central America. The study uses several strategies to control for quality and all methods yield similar results: the estimated premium is generally below the premium suggested by the Fairtrade Labeling Organizations' formula (the FT minimum price minus the market price).

I add to the literature on certified coffee by drawing attention to the sources of farm-level price variation and most importantly, by estimating the price premium associated with participating in FT-organic markets through cooperatives. A further contribution is made by placing the income gain from the premium in the context of grower household income portfolios.

#### *Understanding the sources of price differences*

Estimating how much more a grower receives for his FT-organic certified coffee requires careful attention to what affects prices

paid to growers. Small-scale coffee growers sell to certified markets, which are export markets as a rule, through grower cooperatives. FT supports cooperatives in part because of the belief that cooperatives provide growers an alternative to selling to intermediaries who may manipulate local prices to pay growers less. If cooperatives pay higher prices because they use marginal cost pricing when other buyers do not, we would expect growers to receive higher prices from cooperatives, certified or not.

Coffee quality also affects prices paid to growers and certified markets have increasingly demanded higher quality coffee; people like coffee that does good *and* tastes good. If certified markets demand higher quality coffee, certified growers may receive higher prices than non-certified growers even if they sell to conventional markets, which do not recognize certifications. While a coffee bean's 'in cup' attributes such as body and aroma are hard to measure, bean characteristics like humidity and yield are quantifiable. Humidity measures how much of the coffee bean is water; yield is the rate that unshelled coffee converts to shelled, exportable grade coffee. High humidity or low yield means that the buyer purchases more water or shell and less coffee. In markets where growers, not processing plants, wash and dry coffee, buyers routinely measure bean yield and humidity and pay accordingly. Some cooperatives only accept coffee with a certain yield or moisture content. If intermediaries, who buy coffee for conventional markets, buy coffee with lower yield and higher humidity then we should expect them to pay lower prices than cooperatives, regardless of whether the cooperative sells certified coffee.

A thorough analysis of prices received by growers also requires exploring marketing decisions. Fafchamps and Hill (2005) analyze the decision of small-scale Ugandan coffee growers to sell to itinerant buyers at the farm gate or to travel to sell in the local market. Their conceptual treatment explores how wealth and distance to market can affect marketing decisions and performance, especially in the context of imperfect rural credit markets. While insightful, the framework focuses on selling in different spot markets instead of participating in longer-term marketing relationships involved in FT-organic coffee markets. To sell to certified markets, a grower must decide well before harvest season if incurring the cost of joining a cooperative and becoming certified are warranted. Furthermore, the decision will depend on grower liquidity and the nature of contracts, such as the time between product delivery and payment, in addition to price premiums (Blandon et al., 2009).

*What price?*

Discussing the price a grower receives can be problematic since growers often sell to multiple markets. The growers in the sample from southern Mexico were asked the average price that they received for coffee sold to each buyer type: a cooperative, an intermediary, or other. Cooperatives tend to sell to certified markets while intermediaries cannot. I define the average price that farmer *i* receives,  $p_{ai}$ , and the average price from selling to the cooperative,  $p_{ci}$ ,<sup>1</sup> to be

$$p_{ai} = \frac{\text{total revenue}}{Q_i} \tag{1}$$

$$p_{ci} = \frac{\text{revenue from sales to coop}}{q_{ic}} \tag{2}$$

<sup>1</sup> The price  $p_c$  varies across growers of the same cooperative because they may sell at different times, and it is common for cooperatives to adjust their spot prices according to changes in the world market. And even though at a given time the cooperative pays all growers the same price for coffee of a given quality, quality will vary across growers and affect the price that they receive.

**Table 1**  
Number of growers by certification and cooperative participation.

	Cooperative members	Independent growers	Total
All growers	513	332	845
Member of FT cooperative	475	0	475
Member of non-FT cooperative	25	0	25
Organic certified	417	0	417
Transition to organic	77	0	77

where  $q_{ic}$  is the quantity of coffee sold to the cooperative and  $Q_i$  is the total quantity sold over the season. I define the average premium  $\pi_{ia}$  to be the difference in average price with and without certification

$$\pi_{ia} = p_{ia}^{cert} - p_{ia}^{no-cert} \tag{3}$$

It is important to distinguish between an average premium and a certification premium. A grower may receive a 25% price premium for coffee sold to the FT market via his cooperative (the certification premium), but if he sells most of his coffee to intermediaries that do not recognize the certification, the average premium received is  $\frac{.25q_{ic}}{Q_i}$ . Thus, the average premium incorporates the prospect that, even though all of a grower's coffee is certified, he (or the cooperative) may have to sell some to markets that do not value the certification.

**Empirical analysis: Fair Trade-organic coffee in southern Mexico**

I use information from a survey of 845 coffee growers in the states of Oaxaca and Chiapas in southern Mexico. The sample frame includes coffee growing households that were members of cooperatives, most of which sold to FT and organic coffee markets, and households that were not members of cooperatives and remained outside of FT-organic markets. Respondents were chosen at random from lists of both types of coffee growers. The survey occurred in 2005–2006 and asked about the 2004–2005 season, a period when coffee prices had rebounded from historic lows in 2000–2003 to levels in line with prices seen during the 1990s. Barham et al. (2011) use the same data and provide an extensive analysis of household portfolios and economic context. For more information on the survey, see Lewis and Runsten (2007).

Table 1 provides the numbers of growers in groups defined by certification status and cooperative participation. Of growers affiliated with a cooperative, 92% participated in FT cooperatives, meaning that they had access to FT markets.<sup>2</sup> While being organic is not a requisite for selling to the FT market, the cooperatives in the sample worked with organic norms and all cooperative members were expected to transition to organic production and pass the inspection associated with organic certification.<sup>3</sup> Becoming organic certified requires a transition period where growers follow organic norms but cannot sell their coffee as organic. The sample includes 71 coffee growers in transition and 417 certified organic growers. Like organic growers, growers in transition are members of cooperatives and can sell to the FT market through their cooperative.

<sup>2</sup> To be consistent and because the sample weights affect the descriptive statistics very little (see Table 3), the percent and number of growers reported to be in a particular group (cooperative members, organic, etc.) are based on the actual number of growers surveyed, not on a weighted number.

<sup>3</sup> There is a good reason why cooperatives tend to require all members to convert to organic production. The external inspection associated with organic certification involves a visit from the certifier who randomly selects member growers to inspect. If several selected growers do not meet basic certification requirements, it jeopardizes the organic certification of the entire cooperative.

Grower participation in multiple markets and marketing arrangements can preclude separating, for example, the effect of participation in a cooperative from being organic certified. Of the 845 households surveyed, 488 were at least in transition to organic production, all of whom participated in a cooperative. Furthermore, of these 488 growers, almost all of them (93%) participated in cooperatives that sold to the FT market.<sup>4</sup> The empirical focus, therefore, is not to estimate the premium associated with certification independent of the effect of cooperatives on price. Instead, I focus on the difference in prices received by growers participating in FT-organic markets through cooperatives and growers who were not participating in any of these arrangements (not a member of a cooperative and not certified).

The empirical analysis is organized into two stages. First, I estimate the likelihood of participating in a FT-organic cooperative where I use information on the nature of conversion to organic production and cooperative participation to guide selection of what covariates to include. I then estimate the effects of having access to FT-organic markets on marketing performance. When doing so, I first suppose that participating in FT-organic markets is exogenous conditional on the included covariates and estimate the FT-organic premium using OLS. Then I suppose that it is endogenous and control for self-selection using a treatment effects model.

#### Who participates in a FT-organic cooperative?

For the sample, participation in a FT cooperative involves adopting organic standards. I highlight four aspects of the transition to organic production that are likely to affect a grower's decision to participate in a FT-organic cooperative.

1. The process generally takes 3 years to complete. To be clear, there is no "transition" period to become a cooperative member. However, becoming a member requires conversion to organic practices, a process that involves costs. The 3 year period prior to organic certification implies a substantial delay between the time of the investment (or cost) and when the investment starts to yield a return – when the grower can sell his coffee as organic certified.
2. Standards include activities like making a compost bin, which are done once and are relatively independent of the scale of production.
3. Unless growers use no synthetic inputs by default, conversion involves replacing capital with labor (e.g., manual weeding instead of using herbicide).
4. Realizing the gains from organic certification involves active participation in the cooperative.

Given the nature of organic conversion, factors like a grower's planning horizon, scale of operations, family labor endowment, liquidity, and location should affect the decision to go organic. Table 2 defines variables used in a Probit model of whether a household participates in a FT-organic cooperative or is independent (i.e., not participating in a cooperative and therefore not in FT or organic markets), and Table 3 presents descriptive statistics. The omitted category for the location variable from which the variables *Lives in Outskirts* and *Lives in Countryside* are derived is the case where the household lives in the center of the village or town.

Percent T&O is the percent of households in the community, incorporating the sample weights, that are at least in transition to organic certification in 2005. For grower *i*, the community organic adoption rate is calculated supposing that the grower is

**Table 2**  
Definitions of key variables.

Variable	Description
Percent T&O	Percent of growers in the community at least in transition to organic certification
Land in Procampo	Hectares enrolled in 1994 in agricultural support program Procampo
Labor/land	(Males ages 19–64)/(Coffee land)
Coffee land	Hectares of coffee in production
Youngest parcel	Age of coffee plants in the household's youngest parcel
HH members < 13	Members younger than 13 in the household
HH members 13–18	Members ages 13–18 in the household
HH members 19–64	Members ages 19–64 in the household
Max education	Maximum years of schooling for household member age 20 or older
Lives in outskirts	Household dwelling is on the outskirts of town (0/1)
Lives in countryside	Household dwelling is in the countryside (0/1)

**Table 3**  
Descriptive statistics of key variables.

Variable	Weighted mean	Mean	Std. dev.	Min	Max
Percent T&O	– <sup>a</sup>	0.39	0.21	0.10	0.97
Land in Procampo	0.61	0.65	0.82	0	5
Labor/land	0.82	0.78	1.19	0	16
Coffee land	2.39	2.78	3.37	0	45.25
Youngest parcel	15.18	15.62	11.12	1	70
HH members < 13	1.39	1.45	1.42	0	6
HH members 13–18	0.60	0.69	0.93	0	4
HH members 19–64	2.61	2.77	1.64	0	10
Max education	7.30	7.55	4.30	0	20
Lives in outskirts	0.22	0.20	0.40	0	1
Lives in countryside	0.16	0.14	0.34	0	1

<sup>a</sup> Percent T&O already incorporates the sample weights.

not a member of the community. Doing so captures the exogenous behavior of a grower *i*'s neighbors better than when incorporating his decision into the community adoption rate. The variable captures the cost of participating in a FT-organic cooperative for two reasons. Because most cooperatives in the region worked with organic norms and cooperative participation is a practical necessity of becoming organic certified, organic adoption rates reflect how many growers in the community participate in a cooperative, which is likely related to the distance to the closest cooperative office or buying station. In addition, the technology adoption literature suggests that learning from neighbors can lower the cost of adoption, particularly through the provision of information (Conley and Udry, 2010; Bandiera and Rasul, 2006). Because conversion to organic norms is a requisite for participation in most cooperatives in the region, a lower cost of adoption also lessens the burden associated with cooperative participation.

Procampo is an agricultural land-based subsidy program that largely replaced the pre-NAFTA system of price supports. *Land in Procampo*, therefore, measures the household's historic non-coffee agricultural land holdings and receipts of government agricultural payments. *Coffee Land* reflects a grower's scale, which is important since many costs associated with organic conversion are fixed over a large range of farm sizes, meaning that larger farms can spread fixed costs over more production. All else constant, larger growers would therefore be more likely to go organic. However, if larger growers have the liquidity to manage their farms intensively using synthetic inputs, the opportunity cost of going organic (lower yields) may be higher than for traditional, low input growers.

Growers who expect to derive much of their income from coffee in the future should also be more likely to join a cooperative working with organic norms since organic conversion involves upfront

<sup>4</sup> Organic certification of smallholders is impractical outside of the auspices of a cooperative, which is why all growers in the sample who are at least in transition to organic are also members of a cooperative.

costs and delayed returns. The expected role of coffee in a household's portfolio is captured by the age of coffee plants in the most recently planted parcel on the farm (*Youngest Parcel*). Similarly, the ratio of household labor to coffee land (*Labor/Land*) reflects a household's disposition to pursue non-coffee livelihood strategies, with a higher labor to land ratio associated with a greater propensity to work off-farm, possibly in other parts of Mexico or in the US. The maximum years of education among the adults in the household potentially captures the household's human capital and ability to use information about new production practices. The number of household members in each age category captures the household labor endowment and may matter given the greater labor intensity of organic cultivation. It also captures life cycle effects that can affect a household's willingness to undertake longer-term investments like organic certification. A household's location in relation to cooperative headquarters or buying points, captured by *Lives in Outskirts* and *Lives in Countryside*, can affect the costs and benefits of participation.

Table 4 presents the result from a Probit model of whether a grower participates in a FT-organic cooperative or is independent. The variables included are those that the preceding discussion suggested should be important given the costs associated with organic production and cooperative participation. The model is estimated using growers who are members of FT-organic cooperatives and those who are independent.

The Probit model results are generally consistent with the motivation. The likelihood of participating in a FT-organic cooperative increases with farm size for almost all farms in the sample. The turning point on the marginal effect for *Coffee Land* is 23 hectares; only four growers in the sample had more than 23 hectares of coffee in production. The decreasing effect of farm size on FT-organic cooperative participation is intuitive – households with little area are less likely to incur the costs of joining a cooperative and converting to organic production for wealth and scale reasons. Larger farms, on the other hand, likely have the liquidity to afford synthetic inputs that can increase productivity and profitability, which means that they have a higher opportunity cost of going organic.

The percent of growers in a community who are at least in transition to organic production is negatively related to FT-organic

cooperative participation at low rates and positively related at higher rates. When at least 38% of the community is at least in transition to organic, higher community adoption rates have a net positive effect on participation. The results also show that households with more adult labor (*HH Members 19–64*) are more likely to participate in a FT-organic cooperative, which is consistent with the labor intensity of organic production. However, households with a higher labor to land ratio are less likely to join a FT-organic cooperative, possibly reflecting a livelihood orientation towards off-farm labor markets.

#### Price gains from participating in FT-organic markets through cooperatives

I write the average price that a grower receives as a linear function of a base price ( $\alpha$ ), an indicator if the grower is organic certified and participates in a FT cooperative, exogenous covariates  $X$ , and an idiosyncratic term  $\varepsilon$ .

$$p_{ai} = \alpha + \pi_a FTOrganic_i + \beta X_i + \varepsilon_i \quad (4)$$

Except for the linear and quadratic term involving *Percent T&O*, the vector  $X$  in Eq. (4) includes all of the variables in the Probit model and a linear and quadratic term for the size of the grower's cooperative (number of members) to capture scale effects. I use the number of member growers in the sample (incorporating their sampling weights) as an indication of size since growers were selected randomly within regions.

Assuming FT-organic status is exogenous, estimating (4) with OLS and the sample of FT-organic growers and those who are independent would provide the mean effect of participation in FT-organic markets through cooperatives. FT-organic status, however, may be endogenous since growers choose their market and marketing channel. The results from the Probit participation model show that FT-organic growers have larger farms (up to a point) and suggests positive selection – more able growers participate in FT-organic markets. Positive selection implies a positive correlation between the error term in the Probit model of participation in FT-organic cooperatives and the error term in the model of marketing performance (Eq. (4)), which if ignored could bias the coefficient on *FTOrganic* upwards.

One concern is that FT-organic status is correlated with coffee quality. De Janvry et al. (2010) show that controlling for quality reduces the FT premium in most cases, suggesting that coffee entering the FT market has higher than average quality. Regional dummy variables control for differences across regions in coffee quality, labor and transaction costs, and the competitiveness of local spot markets, but not for bean characteristics affected by post-harvest processing practices. Thoroughness in processing varies across growers and affects bean quality. Adding indicator variables for whether the grower has key processing equipment is one method to control for quality. An alternative model, therefore, includes three additional variables: *Drying Patio* (a cement pad for drying coffee), *Cherry Processor* (a machine to process coffee cherries), and *Washing Tank* (a tank for washing coffee beans).

While informative, simply adding processing equipment variables could be problematic; more able growers with better land may invest in processing equipment. In a second variation on the base model, I control for grower self-selection into FT-organic markets using a standard treatment effects model that controls for the endogeneity of a binary participation variable similar to a Heckman sample selection model (Green, 2003, p.787–788). The approach assumes a joint normal distribution between the error term the selection equation (in this case, the Probit model of participation in FT-organic cooperatives) and the error in the outcome equation (in this case, Eq. (4)). One advantage of the approach is that the first stage is non-linear, which likely fits the data better

**Table 4**

Patterns in FT-organic status (dependent variable: indicator for participating in a FT-organic cooperative).

Variable	Marginal effect	SE <sup>a</sup>
Percent T&O	-1.296**	0.541
Percent T&O squared	1.700***	0.530
Land in Procampo (/10)	1.109***	0.225
Labor/land (/10)	-0.497**	0.212
Coffee land (/10)	0.500***	0.120
Coffee land squared	-0.113***	0.036
Youngest parcel (/10)	-0.017	0.015
HH members < 13 (/10)	-0.148	0.121
HH members 13–18 (/10)	-0.398	0.253
HH members 19–64 (/10)	0.656**	0.334
HH members 19–64 Squared	-0.486	0.470
Max education (/10)	-0.034	0.039
Lives in outskirts	-0.131***	0.046
Lives in countryside	-0.055	0.056
Controls for regions	Yes	
Observations	801 <sup>b</sup>	
Log likelihood ratio	222	
Pseudo R-squared	0.20	

\* Significant at the 10% confidence level.

\*\* Significant at the 5% confidence level.

\*\*\* Significant at the 1% confidence level.

<sup>a</sup> Robust standard errors are calculated.

<sup>b</sup> The sample excludes 38 growers who reported being members of non-FT cooperatives and six growers with missing values.

than a linear approximation given the binary nature of *FTOrganic*. This non-linearity between the covariates and the selection variable aids in identification of the effect of the selection variable (*FTOrganic*) on the outcome of interest (marketing performance,  $p_{ai}$ ). But, without an exclusion restriction – one or more variables that affect selection but that do not affect the outcome of interest – identification comes solely through the non-linearity of the first stage. Thus, a sample selection model is most credible when an appropriate exclusion restriction can be found.

Community level variables, like *Percent T&O*, often serve as exclusion restrictions because they capture the influence of exogenous historical, social, or geographic factors on individual behavior. I use the linear and quadratic term for *Percent T&O* as an exclusion restriction in estimation of the treatment effects model, which, as shown by the results in Table 4, are strongly related to participation in FT-organic cooperatives.

Table 5 presents coefficient estimates and standard errors for estimating Eq. (4) under three specifications. The first model is a base model; the second adds variables for processing infrastructure, and the third model is the results from the outcome equation from the treatment effects model.

According to the base model, organic growers in a FT cooperative receive 12.8 (SE .010) cents per pound more than independent non-certified growers. Including variables for processing equipment decreases the point estimate of the premium by .4 cents while controlling for the possible endogeneity of *FTOrganic* reduces it to 12.0 cents. The premium estimates from all three models are statistically indistinguishable from each other and suggest that endogeneity bias from self-selection into FT-organic cooperatives is of modest concern in this case.

Growers with their own cherry processor receive on average 2.6 cents more than other growers receive. All models suggest that

growers in larger cooperatives receive lower prices, though because the actual cooperative size is not observed, it is not clear what is the effect of adding one more grower to the cooperative. The sign of the estimated coefficient, nonetheless, is intuitive if larger cooperatives increased their membership without expanding their market, resulting in less access to premium markets for each individual member. Alternatively, cooperative size may be related to quality since larger cooperatives have a history of emphasizing volume over quality. While not shown in Table 5, the results for the regional indicator variables suggest significant spatial variation in marketing performance: six of the eight regions have statistically different prices than the excluded region, Region 1.

### The economic importance of premiums

The premiums discussed so far ignore costs associated with achieving them. Because growers incur costs to become certified, multiplying an estimate of the per unit premium with total coffee sales measures the gross income gain associated with the premium. Sample households were asked about membership payments to the cooperative and time contributed to cooperative projects in the previous 12 months. While some of the costs might be for one-time projects, most of them, like membership dues, are reoccurring. Valuing time spent on cooperative projects at the community wage for unskilled labor and adding direct payments, the median and mean cost of cooperative participation for organic growers was US\$ 14 and 25 dollars. Multiplying the 12.8 cent premium by the amount of coffee produced and subtracting the cost of cooperative participation yields a median income gain from participating in FT-organic markets through cooperatives of US\$ 103, which corresponds to about 5% of total household income or about US\$ 26 per household member. This gain is still a gross gain since it

**Table 5**  
Average price received ( $p_{ai}$ ) by independent and FT-organic growers.

Rhs variable <sup>a</sup>	Base regression		Quality infrastructure		Treatment effects model <sup>c</sup>	
	Coefficient	SE <sup>b</sup>	Coefficient	SE	Coefficient	SE
FTOrganic	0.128***	0.010	0.124***	0.011	0.120**	0.049
Land in Procampo (/10)	0.052	0.055	0.051	0.056	0.061	0.076
Labor/land (/10)	0.032	0.046	0.042	0.045	0.028	0.051
Coffee land (/10)	0.041	0.030	0.032	0.030	0.046	0.039
Coffee land squared	-0.009	0.008	-0.007	0.008	-0.010	0.011
Youngest parcel (/10)	-0.004	0.004	-0.004	0.004	-0.004	0.004
HH members < 13 (/10)	-0.021	0.034	-0.014	0.034	-0.021	0.034
HH members 13–18 (/10)	0.031	0.073	0.022	0.073	0.029	0.074
HH members 19–64 (/10)	0.026	0.080	0.022	0.082	0.029	0.081
HH members 19–64 squared	-0.069	0.098	-0.068	0.099	-0.072	0.096
Max education (/10)	0.011	0.011	0.008	0.011	0.011	0.011
Lives in outskirts	-0.017	0.013	-0.016	0.014	-0.018	0.016
Lives in countryside	0.001	0.012	-0.000	0.012	0.001	0.013
Cooperative size	-0.105**	0.051	-0.110**	0.051	-0.104**	0.050
Cooperative size squared	0.047	0.048	0.053	0.048	0.047	0.048
Drying Patio			0.014	0.012		
Cherry processing			0.026*	0.015		
Washing tank			-0.007	0.011		
Intercept	0.613***	0.027	0.595***	0.028	0.613***	0.028
Controls for regions	Yes		Yes		Yes	
Observations	713 <sup>d</sup>		712		713	
Adjusted R squared	0.38		0.39		–	

\* Significant at the 10% confidence level.

\*\* Significant at the 5% confidence level.

\*\*\* Significant at the 1% confidence level.

<sup>a</sup> All continuous variables except *Cooperative Size* are divided by 10.

<sup>b</sup> Robust standard errors are calculated.

<sup>c</sup> The two stages of the treatment effects model are estimated simultaneously via maximum likelihood using the *treatreg* command in Stata. The first stage is equivalent to the Probit model presented in Table 4.

<sup>d</sup> The sample consists of growers who were independent or participating in FT-organic cooperatives and were organic certified. This leaves 758 growers who were either in transition to organic or who were members of non-FT cooperatives. Furthermore, 40 growers reported no sales price and were excluded as were five growers with missing values for other variables.

does not include the farm-level costs of fulfilling certification standards.

The survey collected information on all major sources of household income and permits situating the gross income gain (US\$ 103) in the broader household portfolio. Sample households with a member elsewhere in Mexico received a median remittance of US\$ 165, and those with members in the United States received a median amount of US\$ 2900. The gain from price premiums is also considerably less than the nearly US\$ 1000 in annual payments that these Mexican households received in 2005 on average from government programs, mostly from Oportunidades (a conditional cash transfer program) or agricultural subsidies (e.g., Procampo).

## Conclusion

Identifying farm-level premiums associated with participating in FT-organic markets through cooperatives can be more involved than would appear at first glance. There are many sources of variation in a grower's marketing performance as summarized by the average price received over the season (total revenue from sales/total quantity sold). The empirics presented suggest that cooperative size, product quality, and location all affect marketing performance. Future work on premiums associated with selling to niche markets, especially those related to social or environmental labeling initiatives, should consider the multiple sources of price variation highlighted in this study in addition to factors unique to the product under study.

The competitiveness of the commodity coffee market limits the extent that policy makers or NGOs can increase grower incomes through price oriented policies that ignore differentiation of physical attributes. New entrants to markets that attempt to pay growers substantially higher prices for a non-differentiated coffee will bid down premiums. Not surprisingly, careful treatment of FT-organic certification premiums here suggests that they have modest effects on household income. And while the identification strategy employed here is not without its weaknesses (assumptions about joint normality and the validity of the exclusion restrictions), the data suggests that a more rigorous treatment of the endogeneity of participation in FT-organic cooperatives would lower, not raise, estimates of the premium.

Small or zero net premiums, however, do not necessarily imply that certification programs are unimportant to coffee growing households, communities, or consumers. It is important to note, that the five cent per pound FT social premium that is retained by the cooperative is meant to be invested in social projects according to member preferences and could affect household welfare even though it does not enter the household budget. Furthermore, premiums vary over time and may be higher when conventional prices are low and, therefore, help to stabilize revenue. Standards like organic or Rainforest Alliance Sustainable also address some of the negative externalities of coffee growing, such as discharging waste from coffee processing into waterways. The premium only has to be sufficient to induce growers to fulfill standards to further its goals. By paying prices that translate into a farm level gross premium, though not a net premium, consumers can subsidize grower efforts to improve their living conditions and better manage their natural assets.

It is possible that marketing arrangements outside of the formal FT system could provide persistent and economically meaningful price premiums. One possibility is a local-to-local arrangement where independent coffee roasters with loyal customer bases establish direct relationships with particular grower cooperatives. The unique attributes of cooperatives (their history, geography, demographics, etc.) becomes a source of product differentiation as the roaster shares their story with consumers. Another possibility for higher premiums is through product differentiation based on

sensorial attributes. Variation in soils and microclimates can lead to distinct physical attributes. Combining the coffee of growers whose coffee has similar attributes and marketing it accordingly could allow cooperatives to extract higher rents for members.

Nonetheless, the empirics from growers in southern Mexico in 2004–2005 suggest that selling to FT-organic markets will not transform their economic condition through higher prices alone, especially if not accompanied with product differentiation. Groups looking to increase grower incomes should consider in addition to prices, factors like farm management and productivity that affect returns to household assets allocated to coffee. While the marketing performance of FT-organic coffee growers in southern Mexico may be representative of broader outcomes of producer participation in certification initiatives, future research could explore cases outside of coffee to see whether premium outcomes are similar.

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