




## Article

# Paying for Sustainable Coffee in a Developing Country: Consumers' Profile in Costa Rica

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**Abstract:** This article analyzes the willingness to pay of Costa Rican consumers for three environmental certifications in the coffee market, namely, Carbon Neutral, Fairtrade, and ISO 14001. A face-to-face survey was applied to 1191 Costa Rican inhabitants. The results show that Costa Rican consumers are willing to pay price premiums around 30% for all the considered environmental certifications. In addition, a Cragg's hurdle model shows that household income, the level of education, and environmental or community activism increase the likelihood of consumers paying price premiums for environmental certifications, while men are less likely to pay than women. It was also found that the size of the price premiums that respondents are willing to pay are positively related to income, gender (female), and education, and negatively related to age. Once the effect of socioeconomic variables has been controlled for, we conclude that consumers are more willing to pay for the CN certification than for the other two. The results can be useful for participants in the coffee value chain; coffee producers can use environmental certifications both to enhance their participation in green markets, particularly in developing countries, and to improve their environmental performance.

**Keywords:** sustainable coffee; willingness to pay; Cragg's hurdle model; consumers' profile; Costa Rica



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## 1. Introduction

Coffee is the second most traded commodity in the world, only after crude oil [1,2]. According to the International Coffee Organization [3], around 7.6 billion kilograms of coffee were exported from producing countries between October 2019 and September 2020. Some important environmental threats are linked to the coffee production process, especially in developing countries. The way in which resources such as water and soil are used in coffee agricultural production is crucial to reduce environmental impacts such as wastewater [4], deforestation [5–7], and soil erosion [8–10]. In the industrial process, large amounts of residues are also generated, which also represents a serious environmental problem [2]. Thus, in order to preserve natural resources, it is important to look for more sustainable approaches and practices for coffee production and trading.

Voluntary environmental certifications (VECs) are becoming increasingly used around the world as a flexible approach to decarbonize the economy and achieve the United Nations Sustainable Development Goals [11,12]. In addition, it has been argued that, apart from the environmental benefits, in line with the Porter Hypothesis [13,14], VECs can also help improve the economic performance of companies by different channels. For example, smallholder farmers, cooperatives and growers' associations tend to obtain price premiums

from sustainability standards [15], because environmentally aware consumers are willing to pay for sustainable products, including coffee ecolabeling [16].

Most of the environmentally certified coffee is marketed in high-income countries. However, since the potential supply of certified coffee sometimes exceeds the current world demand [17–23], producers are looking for new markets in large developing countries, such as Brazil, India, China; and also smaller ones such as Costa Rica, which is the focus of this study [24]. Costa Rica is an important coffee producer and exporter, and it is also the second per capita coffee consumer country in Latin America, with 4.1 kg per inhabitant in 2017 [25].

There is a wide array of VECs available for coffee producers and traders, such as ISO 14001, which is linked to the Environmental Management Systems (EMS) of firms (not only those in the coffee sector), or sustainability labels such as Carbon Neutral (CN), Fairtrade (FT), shade coffee, organic coffee, among others. There are several successful experiences of introducing VECs in the coffee value chain of Central American countries [26,27], including Costa Rica [28–30]. The adoption of VECs requires implementing certain improvements in terms of more sustainable practices, both in the agricultural and the industrial links of the coffee value chain. These changes are costly for firms due to the certification process and the technological and organizational changes required [12,18]. In return, those firms that implement such practices can get comparative market advantages, such as improving their green image and enhancing the relationship with stakeholders, among other benefits [12,31]. VECs are expected to act as signaling devices for the society and, especially, for those consumers who are concerned about making more sustainable purchase decisions [32].

The effectiveness of VECs is crucially determined by the consumers' recognition and willingness to pay (WTP) for them [16,33]. Several studies have shown that coffee consumers are willing to pay price premiums for eco-labeled coffee; see, e.g., [33–46]. Most of these studies were applied in developed and high-income coffee importing countries. This research aims to contribute to this academic literature by focusing on the case of Costa Rica, which is a producing and exporting country [3]. This double role of the country makes the case study particularly relevant. On the one hand, being a producing country, Costa Rican consumers are directly affected by the negative environmental externalities linked to coffee production. Several studies show that in the coffee regions of Costa Rica, VECs have improved the environmental performance of producers in terms of reducing or eliminating agrochemicals, reducing, and offsetting the coffee carbon footprint, and increasing biodiversity due to the shade-coffee production system [18,28,30,47,48]. As consumers, Costa Ricans can also have a say in terms of appreciating the environmental improvements driven by VECs in their purchase decisions. The latter has not been sufficiently addressed, since most studies on consumers' attitudes are focused on high-income countries, as explained above.

Two related objectives are proposed in the present study. The first one is to determine to what extent Costa Rican consumers are willing to pay for certified coffee versus regular one. Specifically, the focus is on CN and FT, which are two sustainability labels, and ISO 14001, which is a company certification. Each of these certification requests specific environmental improvements in the agricultural and agro-industrial production stages. In the case of FT, these requirements include the efficient use of raw materials from sustainable sources, reducing the use of non-renewable energy and improving waste management as well as restricting the use of polluting agrochemicals in coffee plantations [49]. To get the CN certification, coffee companies must reduce or compensate the carbon footprint generated during the life cycle of the product [28,34]. Finally, the main objective of ISO 14001 is to help companies create and put into operation an EMS, with objectives, policies, and the assignment of responsibilities within the firm [50].

The second objective is to identify the main socioeconomic characteristics that are related to consumers' decisions on whether and how much to pay for a certified coffee. We are not aware of any article addressing this research questions in Costa Rica. The closest

studies were developed by Aguirre [51], which studied the profile of Costa Rican shoppers at the organic farmers market (not specifically for coffee), and Aguirre [52], which presents a coffee consumer profile in Costa Rica, but not for sustainable coffee. Another distinctive feature of our approach is the use of a hurdle model, which allows us to determine whether the same socioeconomic variables that explain the purchase decision of sustainable coffee also explain the payment amount.

Regarding policy implications, our findings may inform policy makers about consumer perception and attitudes toward sustainable coffee. Such information can be helpful to disseminate the use of eco-labeled coffee and thus enhance its environmentally positive side effects. Our results can also help entrepreneurs that are part of the coffee value chain to identify a domestic market niche for certified coffee. At an academic level, we shift the analysis of the WTP by VECs from high-income countries to Central America, a region that usually produces food with eco-labels, but which has not been studied as a potential market for the consumption of sustainable food products.

Section 2 presents a review of the literature on the links between consumers' characteristics and their WTP for certified coffee as well as the hypothesis of the present study. Section 3 describes the study area, the data collection approach, and the model specification. The results are presented in Section 4 and discussed in Section 5. Finally, Section 6 presents our conclusions.

## 2. Literature Review and Hypothesis

There are several works looking at the WTP for eco-labeled foods. In a recent study, using a meta-analysis approach of 80 worldwide studies, Li and Kallas [53] place the overall WTP premium for sustainable labels (in percentage terms) at 29.5%, on average. Using the same analysis approach from 97 original studies, Meemken [15] suggested that farmers certified under a sustainability standard receive 20–30% higher prices and a 16–22% higher revenue than their non-certified counterparts. In the case of coffee, Abdu and Mutuku [16] also applied a meta-analysis from 22 studies around the world and found that consumers are willing to pay on average a price premium of \$1.36/pound of eco-labeled coffee.

Most studies about the socioeconomic characteristics of the consumers who are willing to pay for coffee ecolabels are conducted in coffee-importing countries. The most commonly used methods are contingent valuation and choice experiments, both of them based on stated preferences in hypothetical markets. There is heterogeneity in the estimated WTP [15], premiums for coffee ecolabels, and certifications ranging between 2.5%, as in the case of organic coffee in Colorado, US (see [41]) and 110% for FT coffee in Italy (see [45]). Table 1 summarizes the explanatory variables used in several studies about consumers' WTP for coffee ecolabels.

**Table 1.** Survey of socioeconomic variables that explain consumers' WTP for coffee ecolabels.

Source	Location	Sample	Label	Variables					
				I	A	G	E	M	S
Loureiro and Lotade [41]	Colorado, US	284	FT	+	-	+	+		+
			SC	+	-	+	+		ns
			Or	+	-	+	ns		ns
Rotaris and Danielis [45]	Italy	135	FT		-	+	+		
Yang et al. [46]	Wuhan, China	564	FT	ns	-	+		+	
Klimas and Webb [39]	Chicago, U.S.	988	SC			+			+
Maaya et al. [42]	Flanders, Belgium	262	FT, Or		ns	ns	+		+
Liu et al. [40]	Taiwan	568	GC, Or	+	+	ns	+	ns	
Birkenberg et al. [34]	Stuttgart, Germany	80	CN		+	-			

Note: (+) positive effect on WTP, (-) negative effect on WTP, I—Income, G—Gender (women), A—Age, E—Education, M—Marital status (married), S—Sensitivity toward the environment, ns—statistically not significant, FT—Fairtrade, Or—Organic, SC—Shade-Grown Coffee, GC—Grade-Certified, CN—Carbon Neutral.

Based on the evidence provided by previous studies, we formulate several hypotheses about the variables that determine the WTP of Costa Rican consumers for certified coffee, in two different levels: first, the decision on whether to pay a price premium (yes/no) and, second, the size of such a premium.

The first considered variable is income. Previous studies have found that this variable has a positive influence on consumers' WTP by coffee ecolabels in different countries, such as the US [41] and Taiwan [40]. Strong enough empirical evidence is provided by Li and Kallas [53] who found a positive relationship between income and WTP for sustainable food products using a meta-analysis. Based on this evidence, our two first hypotheses are the following:

**Hypothesis 1a (H1a).** *Consumers with higher income are more likely to pay a positive price premium for certified coffee or coffee produced by a certified company.*

**Hypothesis 1b (H1b).** *The size of the premium that consumers are willing to pay for certified coffee or coffee produced by a certified company is increasing in income.*

The second variable is consumers' age. There is mixed evidence regarding this variable. While Liu et al. [40] in Taiwan and Birkenberg et al. [34] in Germany found that older consumers are more willing to pay for a certified coffee, while Loureiro and Lotade [41] in US, Rotaris and Danielis [45] in Italy, and Yang et al. [46] in China found that younger people are willing to pay higher price premiums for coffee ecolabels. Li and Kallas [53] also show that younger generations have a higher WTP value for food ecolabels. Accordingly, the second pair of hypotheses is stated as follows:

**Hypothesis 2 (H2).** *Consumers' age is negatively related to (a) the probability to pay a price premium and (b) the size of price premium that consumers are willing to pay for certified coffee or coffee produced by a certified company.*

In the literature, gender is also identified as a relevant variable to explain consumers' WTP for organic or sustainable food. Aguirre [51]. Grubor and Djokic [54] found that females are more willing to buy organic products in the Republic of Serbia. In the case of coffee ecolabels, Klimas and Webb [39], Loureiro and Lotade [41], Rotaris and Danielis [45], and Yang et al. [46] found out that women are more willing to pay for VECs. Only Birkenberg et al. [34] found that, in Germany, men are more willing to pay for Carbon Neutral coffee than women. Based on this evidence, the following hypotheses are introduced:

**Hypothesis 3 (H3).** *Females are (a) more likely to pay and (b) willing to pay a higher price premium for certified coffee or coffee produced by a certified company than men.*

Education has also been found to be a driver of consumers' attitude toward eco-labeled coffee [39,40,42,45] and organic products in Costa Rica [51]. Thus, the following pair of hypotheses is formulated:

**Hypothesis 4 (H4).** *Consumers with a university or a technical degree are (a) more likely to pay and (b) willing to pay a higher price premium for certified coffee or coffee produced by a certified company.*

In the case of marital status, only Grubor and Djokic [54] and Yang et al. [46] found that married people are more willing to make green purchases. A possible interpretation of this result is that married people are more willing to protect the environment for future generations, so we propose the following hypotheses:

**Hypothesis 5 (H5).** *Married people are (a) more likely to pay and (b) willing to pay a higher price premium for certified coffee or coffee produced by a certified company.*

Some previous studies have included different measures of sensitivity toward the environment as a key determinant of the WTP for certified products. Loureiro and Lotade [41] found a positive relationship between environmental concerns and WTP for FT coffee. In the study of Klimas and Webb [39], respondents with higher scores on measures of environmental attitudes and personal norms for pro-environmental behavior were, on average, willing to pay more for shade-grown coffee. Maaya et al. [42] found significant effects of environmental and altruistic attitudes on WTP for both organic and FT labels. In our study, consumers' participation in environmental and community groups has been included as a proxy for environmental sensitivity. Previously, Valenciano-Salazar et al. [32] found that the participation of Costa Rican consumers in environmental groups increases their probability of being aware of environmental certifications and programs. So, our two final hypotheses are the following:

**Hypothesis 6 (H6).** *People who participate in at least one environmental or community group are (a) more likely to be willing to pay, and (b) willing to pay a higher premium for environmental certifications.*

We also control for the effect of the respondents' place of residence, differentiating between central and coastal provinces, in order to account for the geographical structure of Costa Rica. Valenciano-Salazar et al. [32] found that this variable did not have a significant impact on the consumers' awareness of environmental certifications. Thus, we expect, a priori, that this variable will not affect either the respondents' WTP in any of the two considered levels. Our hypothesis related with socioeconomic variables are summarized in Table 2.

**Table 2.** Hypothesis about the expected effect of socioeconomic variables on WTP for certified coffee.

Variables	Expected Sign	
	1st Level: Pay Y/N	2nd Level: How Much
Income	+	+
Age	-	-
Gender (male)	-	-
Education	+	+
Environmental sensitivity	+	+
Marital status (married)	+	+
Place of residence	c.v	c.v
Type of certification	c.v	c.v

Note: (+)positive, (-) negative, c.v. = control variables.

Finally, we introduce dummy variables corresponding to each of the certifications under study (CN, FT, and ISO 14001) in order to determine if there exists a difference in the WTP of consumers across certifications. To avoid collinearity, the FT dummy variable is omitted, and thus the parameters associated to CN and ISO 14001 should be interpreted in relative terms to FT.

### 3. Material and Methods

#### 3.1. The Sample and the Questionnaire

This research uses a sample of the Costa Rican population over 18 years old, which is stratified according to the real distribution by province and gender (see Table 3). A total of 1191 face-to-face surveys were completed between July 2017 and April 2018, using a split-sample approach. The respondents were approached in a personal and casual way in public places.

The survey was used for a broader study and had two related purposes. A first line of research (in a companion paper, see [32]) sought to determine the social awareness of environmental certifications in Costa Rica. The second is to measure the WTP for certified coffee or coffee produced by a company that had adopted a VEC. In accordance with this



double purpose, data collection and the questionnaire structure follows standard survey protocols for contingent valuation studies, as suggested by Mitchell and Carson [55].

**Table 3.** Total population and survey respondent distribution.

	Costa Rica		Subsamples			Total Sample	
	Inhabitants	%	CN	ISO 14001	FT	Number	%
<b>By gender</b>							
Men	1,638,577	49.8	205	204	218	627	52.6
Women	1,651,888	50.2	182	217	165	564	47.4
<b>By province</b>							
San José	1,114,779	33.9	132	130	130	392	32.9
Alajuela	630,990	19.2	76	78	76	230	19.3
Cartago	387,905	11.8	42	42	42	126	10.6
Heredia	332,859	10.1	41	73	40	154	12.9
Guanacaste	240,637	7.3	28	32	28	88	7.4
Puntarenas	310,662	9.4	36	34	35	105	8.9
Limón	272,633	8.3	32	32	32	96	8
<b>TOTAL</b>	<b>3,290,465</b>	<b>100.0</b>	<b>387</b>	<b>421</b>	<b>383</b>	<b>1191</b>	<b>100.0</b>

Source: Own elaboration from self-conducted survey and data from the Supreme Election Tribunal of Costa Rica.

The questionnaire (see Appendix A) has three sections. The first one is about consumer characteristics, including gender, age, marital status, place of residence, income level, education, and participation in environmental committees (see details on Table 4). The second part refers to consumers' awareness.

**Table 4.** Variables and descriptive statistics.

Dependent Variables	Description	Mean	Std. Dev.
PWTP	1 if the respondent is willing to pay for an environmental certification in coffee, 0 otherwise	0.7439	0.4366
WTP	Marginal willingness to pay for a 250-g package of certified ground coffee (in US \$)	0.6533	0.8241
<b>Independent variables</b>			
I	<i>Monthly household income quartile in colones (qi = 1 if the respondent is in quartile i, 0 otherwise)</i>		
q1	Less than 300,000 (around \$528)	0.1671	0.3732
q2	Between 300,001 and 600,000 (around \$529 and \$1056)	0.2569	0.4371
q3	Between 600,001 and 2,000,000 (around \$1057 and \$3521)	0.4593	0.4985
q4	More than 2,000,001 (more than \$3522)	0.1167	0.3212
A	<b>Age range of respondents (ai = 1 if the respondent is in the age range i, 0 otherwise)</b>		
a1	Between 18 and 30 years old	0.5104	0.5001
a2	Between 31 and 59 years old	0.4274	0.4949
a3	More than 60 years old	0.0622	0.2415
G	Gender, 1 if the respondent is a man, 0 if the respondent is a woman	0.5264	0.4995
E	Education, 1 for respondents with a university or technical degree.	0.4030	0.4907
PR	Place of residence, 1 if the respondent lives in one of the central provinces, 0 if he/she lives in a coastal province	0.7573	0.4289
PG	1 if the consumer belongs to, at least, one environmentalist or community group, 0 otherwise	0.1385	0.3456
M	Marital status, 1 if the consumer is married or in a domestic partnership, 0 otherwise	0.3233	0.4679
TC	<i>Type of certification (it is used only to differentiate the certification valued by each respondent)</i>		
CNC	1 for the subgroup of respondents asked about Carbon Neutral certification, 0 otherwise	0.3249	0.4685
FTC	1 for the subgroup asked about Fairtrade certification, 0 otherwise.	0.3216	0.4673
ISO	1 for the subgroup asked about ISO14001 certification, 0 otherwise	0.3535	0.4782

Following a contingent valuation approach, the third part asks each respondent about his/her WTP for one (and only one) of the three certifications under study (CN, FT, ISO 14001). After explaining the characteristics of the corresponding certification, the interviewed was asked a dichotomous (yes/no) question about his/her willingness to pay for certified coffee. The reference point was the observed average price of a 250-g package of regular ground coffee in 2017: (1250 colones, around U.S. \$2.2), which was the average sale price of the best-known coffee brands in Costa Rican supermarkets. The question is “*You are offered the possibility of buying a package of certified coffee at a higher price than a regular one. Coffee only differs because of the certification, without having differences in terms of aroma, flavor, body, or any other characteristic. Would you be willing to pay more than 2.2 U.S. dollars for a package of 250 g of [FT-certified coffee, CN-certified coffee, or a coffee produced by a ISO 14001 certified company]?*”. Positive responses (Yes) were followed by an open-ended (OE) question about the maximum willingness to pay for the certified coffee: “*How much more than US \$2.2 would you be willing to pay?*”.

For other applications of this approach see, e.g., Channa et al. [56], Koto and Yiridoe [57], Picardy et al. [58], or Zorić and Hrovatin [59].

### 3.2. The Model

Consistent with the structure of the valuation questions, the Cragg’s hurdle model [60] was applied to estimate the impact of socioeconomic variables on consumers’ WTP. This model jointly considers both the participation decision and the decision on how much to pay. This approach combines a selection equation that determines the boundary points of the dependent variable with an outcome equation that determines its non-bounded values [57,60]. The model treats these boundary values as observed instead of censored [60].

Formally, in the decision-making process, the first step involves the decision on whether to “pay for a certified coffee” (yes/no). The selection variable,  $S_i$ , takes the value 1 if the dependent variable “willingness to pay for a certified coffee” is not bounded, and 0 otherwise. Therefore, the lower limit that binds the dependent variable is 0, so the selection equation is:

$$S_i = \begin{cases} 1 & \text{if } z_i\beta + \varepsilon_i > 0 \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

where  $z_i$  is a vector of socioeconomic variables (see Table 4 for details),  $\beta$  is a vector of coefficients, and  $\varepsilon_i$  is a standard normal error term. The next step is the consumers’ decision on how much to pay. The continuous latent variable  $WTP_i^*$  is observed only if  $S_i = 1$  in the first step. Given the price premiums declared by the respondents, the most suitable version of the outcome model is the exponential version proposed in Cragg [60]:

$$WTP_i^* = \exp(x_i\beta + v_i) \quad (2)$$

where  $WTP_i^*$  is the price premium that respondents are willing to pay for a certified coffee, and  $v_i$  is an error term with a normal distribution. The model is estimated using Stata (the “churdle” command was used to fit an exponential hurdle model, and the “margins” command was used to compute the marginal effects of the explanatory variables). Robust standard errors were used.

## 4. Results

Around three quarters (74.4%) of the sample affirmed that they were willing to pay some positive premium for a certified coffee. The average WTP of the interviewed consumers (both for positive and zero WTP) was computed, first using the complete sample ( $n = 1191$ ) and then for each of the subsamples corresponding to the three certifications under consideration. The joint mean shows that Costa Rican consumers are willing to pay an average price premium of \$0.65 for a certified coffee (Std.Err. = 0.024). In the split sample, the average reported price premiums are \$0.68 (0.043) for CN, \$0.64 (0.044) for FT, and \$0.65 (0.037) for ISO 14001.

Table 5 shows the result of our estimations. The selection model identifies the socioeconomic variables that affect the probability to pay (yes/no) for a certified coffee. The results show that household income, the level of education, being a female, and being part of an environmental or community committee increase the probability of respondents being willing to pay for VECs in coffee. In addition, there is a higher probability that consumers are willing to pay for CN than for the other two considered certifications. Marital status and the place of residence do not show any significant effect.

**Table 5.** Marginal effects of socioeconomic factors influencing consumers' WTP for a certified coffee.

Variables		Selection Model	Outcome Model
I	q2	0.0485	0.2055 *
	q3	0.0875 *	0.3559 ***
	q4	0.1512 **	0.4933 ***
A	a2	−0.0353	−0.2205 **
	a3	−0.0076	−0.2787 *
G		−0.0646 *	−0.1825 **
E		0.1070 ***	0.2484 ***
PR		0.0109	0.0543
PG		0.1054 **	0.1392
M		−0.012	−0.1209
TC	ISO 14001	0.0084	−0.0363
	CNC	0.1013 **	0.1549 *

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ . Robust standard errors were used. Average Marginal Effects (dy/dx) for the conditional mean of the WTP,  $n = 1191$ . a1, q1, and FTC have been omitted for comparison and to avoid multicollinearity.

Secondly, the outcome model equation shows that the amount of money that the respondents are willing to pay for certified coffee is related to essentially the same variables as in the first step, namely income, education, and gender. Moreover, respondents are willing to pay more for the CN certification. However, participation in environmental or community groups is not a statistically significant variable to explain the amount of money that respondents are willing to pay. Another difference is that respondents in the 18–30 age range are willing to pay higher price premiums, whereas this was a non-significant variable with respect to the probability of being willing to pay.

## 5. Discussion

The reported average price premium with respect to the benchmark price is around 30% for all three certifications (31% for CN coffee and 29% for FT coffee, or a coffee sold by ISO 14001-certified companies). Other studies applied in countries with a higher per capita income have found similar price premiums in relative terms. For example, Maietta et al. [43] estimated a price gap for FT coffee of 30% with respect to regular coffee in Italy using hedonic prices. With the same method, Schollenberg [44] estimated a price gap of 38% for FT coffee in Sweden. Using discrete choice experiments, Birkenberg et al. [34] found that consumers in Germany are willing to pay 68% more for CN-certified coffee than for uncertified one. Van Loo et al. [33] estimated that American consumers were willing to pay a price premium of 27% for organic certified coffee. Grebitus et al. [38] estimated a price gap of 34.5% for organic coffee in Germany. Our study suggests that, even though Costa Rica is a country with a medium per capita income (U.S \$ 12,076.8 in 2020 according to the World Bank), there are some consumers who are willing to pay for environmentally certified coffee. This result can be related to the fact that Costa Rica is known for having a very active position in conservation and the fight against climate change [12,61–67], which can have a reflection in the citizens' attitudes. In a previous research, Aguirre [52] showed that 50% of coffee consumers in Costa Rica were willing to pay approximately double for high-quality (not necessarily certified) coffee than for regular coffee. Our results are in line with some meta-analyses that have recently been applied to calculate the consumers' WTP for environmental certifications in food (see, e.g., [16,53]).



The estimates of the Cragg model (see Table 5) reveal that the probability to be willing to pay a price premium for certified coffee and the size of such a premium is considerably larger in higher household income quintiles, which cannot reject our hypotheses H1a and H1b. This result is in line with previous studies (see, e.g., [40,41,53]). In the case of Costa Rica, Aguirre [51] found a positive and statistically significant relationship between income and consumers' WTP for organic products, and Valenciano-Salazar et al. [32] found a positive relationship between income and the individuals' awareness of environmental certifications and programs. This finding can be interpreted in the light of Maslow's hierarchy of needs theory [68], according to which humans seek to satisfy their vital needs before moving up to higher-level needs. Although respondents in the low-income quintile may have some environmental awareness, they do not have the ability to pay for VECs, particularly in a middle-income country.

Respondents with a university or technical degree are more likely to pay a price premium, and such a premium tends to be larger, not rejecting our hypotheses H4(a) and H4(b). This finding is in line with previous studies (see, e.g., [39,40,42,45]). In the case of Costa Rica, a similar conclusion was found by Aguirre [51] in the case of organic products. The fact that environmental education is integrated into public curricula [66] can reinforce this result.

Hypotheses H3(a) and H3(b) are also not rejected. Females are more likely to purchase certified coffee and at a higher price, which is not surprising either, given the previous results in the literature [39,41,45,46]. The higher WTP of female consumers for environmental certified coffee may be related to the fact that females are often a disadvantaged group in many societies and some certification standards such FT entail equality policies in producing countries [46].

According to our estimates, people participating in environmental or community groups are, on average, 10% more likely to pay for environmental certifications, but this factor is not a statistically significant variable to explain the amount they are willing to pay, which cannot reject our hypothesis H6(a) whereas H6(b) is rejected. Generally speaking, people who take part in these groups tend to be more aware of environmental certifications (see [32]) and more sensitive toward the environment, which naturally leads to a higher WTP for ecolabels [39,41,42], although, according to our results, this is not a crucial element to determine the exact amount of money they are willing pay, if it is not accompanied by the other relevant factors (such as education and income).

Like most of the previous studies [41,45,46,53], we conclude that younger responders are also willing to pay higher price premiums, which cannot reject our hypothesis H2(b). In Costa Rica, Valenciano-Salazar et al. [32] found that younger consumers tend to be more aware of environmental certifications, which is probably linked to the environmental conservation policies promoted by the country [61–63] the importance of ecotourism [64,65], and the inclusion of environmental education in the public system from primary education [66].

Finally, our estimates show that the probability to pay and the size of the price premiums that respondents are willing to pay is higher for the CN certification than for FT and ISO 14001. It may seem natural that consumers are less prone to pay for ISO 14001, which is not a product ecolabel, but a company certification, and thus less visible for consumers. This explanation is not applicable to the difference between FT and CN. In this case, the difference can be due to the fact the FT has been traditionally more promoted in developed and importing countries and not so much in producing countries. The higher propensity to pay for CN can also be linked to the fact that reducing the carbon footprint is being widely promoted by the government of Costa Rica [63,67], which is working out a deep-decarbonization plan in order to achieve net-zero emissions by 2050 [69]. The diffusion of carbon neutrality in Costa Rica may lead consumers to associate the CN label with more significant sustainability actions carried out by companies [12]. In other countries, Lombardi et al. [70] shows that Italians are willing to pay a price premium for "climate-neutral" milk. Mostafa [71] found that consumers in Egypt are willing to pay a

price premium of approximately 75 Egyptian pounds for carbon-labeled products. For the case of Chinese consumers, see Zhao et al. [72].

## 6. Conclusions, Limitations, and Future Research

Environmentally certified coffee is mainly traded in developed countries, where it is well documented that consumers are willing to pay price premiums for such certifications. However, our results confirm that there are also niche markets for sustainable coffee in developing countries. Consumer income, gender (female), education, and environmental activism are relevant factors in determining the propensity to pay for VECs, and basically the same variables also determine the size of the premiums that consumers are willing to pay.

Once all the relevant socioeconomic variables have been controlled for, we conclude that consumers are more prone to pay for CN coffee than for the other considered certification. This result can be understood as a consequence of the extensive information and awareness campaign promoted by the government to reduce the carbon footprint of the Costa Rican economy, in order to achieve zero net carbon emissions by mid-century.

From a business point of view, our study suggests that VECs can be attractive, not only in high-income countries, but also, at least for a segment of consumers, in middle-income countries such as Costa Rica. Regarding the selection of a specific certification, there seems to be a slight preference in the Costa Rican market toward CN versus other competing certifications or eco-labels.

From the point of view of the environmental sustainability policy of the country, public-private alliances could be a promising path to encourage the adoption of VECs. Such alliances could foster education and dissemination mechanisms for both companies and consumers and increase environmental awareness in all the links of the coffee value chain. In line with the Porter hypothesis, such initiatives could contribute to the achievement of firms' economic objectives (higher sales and profit), hand in hand with better environmental quality.

As is usually the case in survey-based valuation studies, a possible limitation is that the consumers who are more interested in VECs might be more willing to participate in the survey and complete the questionnaire. However, we believe that the large size of the sample can minimize potential biases, if any. Future research will focus on applying a choice experiment of coffee ecolabels in Costa Rica and thus comparing the findings generated by different methods. This article is part of a broader research agenda aimed at understanding the effects of VECs on companies and environmental improvements in Costa Rica. Among other related studies, we are planning to assess the willingness to pay for tourism services with low carbon emissions and check the differences between domestic and international consumers.

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**Institutional Review Board Statement:** The study was conducted according to the guidelines of the Declaration of Helsinki. This study did not require ethical approval.

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** Data are available upon request to the authors.

**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A

## Questionnaire structure

First Part: Consumer Identification	
A1	Date
A2	Name
A3	Telephone or e mail (optional)
A4	Activity sector
	( ) Public sector employee ( ) Self-employed ( ) Private sector employee ( ) Student ( ) Retired ( ) Other
A5	Profession
A6	Gender ( ) Male ( ) Female ( ) Other
A7	Age
A8	Marital status ( ) Alone ( ) Married ( ) In a domestic partnership ( ) Divorce ( ) Widow (er)
A9	How many people live in your home?
A10	How many people contribute with income to your home?
A11	Province
A12	Canton
A13	Are you a member of an environmental group or committee? ( ) Yes, how many groups? ____ ( ) No
A14	Are you a member of any community group or committee? ( ) Yes, how many groups? ____ ( ) No
A15	Could you tell me your highest educational level?
	( ) Incomplete primary ( ) Complete primary ( ) Incomplete secondary ( ) Complete secondary ( ) Incomplete technical education ( ) Complete technical education ( ) Incomplete university degree ( ) University Degree
A16	How many years of formal education do you have? Counting from your entry in preschool or school
A17	Do you believe that global warming and climate change are real challenges that the humankind are facing? ( ) Yes ( ) No
A18	Who should pay for the efforts made by companies to produce more environmentally friendly products under the best working conditions? ( ) Consumers ( ) Companies themselves ( ) Both
A19	Individual monthly income
	( ) 50,000–150,000 colones ( ) 150,001–300,000 colones ( ) 300,001–600,000 colones ( ) 600,0001–1,000,0000 colones ( ) 1,000,0001–2,000,000 colones ( ) 2,000,0001–3,000,000 colones ( ) more than 3,000,0001
A20	Household monthly income
	( ) 50,000–150,000 colones ( ) 150,001–300,000 colones ( ) 300,001–600,000 colones ( ) 600,0001–1,000,0000 colones ( ) 1,000,0001–2,000,000 colones ( ) 2,000,0001–3,000,000 colones ( ) more than 3,000,0001

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**Second Part: Knowledge about VECs**


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B1	Do you know what an environmental or social certification is? (      ) Yes (      ) No (Go to question B3)
B2	Could you name some voluntary environmental certifications that companies can adopt in Costa Rica? Name those that you remember now
B3	Do you know the Carbon Neutral * certification? (      ) Yes (      ) No
B4	Could you name some companies or institutions that have Carbon Neutral * certification? Please, name them

\* In others subsamples we ask for Fairtrade and ISO14001.

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**Third Part: Respondents' Willingness to Pay for Coffee Certifications**


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NOTE	After explaining the characteristics of the corresponding certification used in the coffee sector, each respondent was asked the following question about one (and only one) of the certifications
C1	You are offered the possibility of buying a package of certified coffee at a higher price than a regular one. Coffee only differs because of the environmental certification, without having differences in terms of aroma, flavor, body, or any other characteristic. Would you be willing to pay more than 1250 colones for a package of 250 g of [FT, CN-certified coffee or a coffee produced by ISO 14001-certified companies]? (      ) Yes (Go to the next question) (      ) No (End of the survey)
C2	How much more than 1250 colones would you be willing to pay? _____

Note: When the survey was conducted, 1250 colones were around U.S. \$2.2.

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