

Pro-environmental behavior in Costa Rica: A case study on price premiums for coffee certification

Comportamento pro-ambiental en Costa Rica: un estudo de caso das primas no prezo para a certificación de café

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Abstract

This study examines the willingness to pay (WTP) of Costa Rican consumers for certified coffee. Two marketed coffee ecolabels (Fairtrade and Carbon Neutral) are considered, as well as non-marketed environmental certification (ISO 14001) to allow for comparison. A discrete choice experiment reveals that consumers are willing to pay a significant price premium for any of these three certifications. In a context where ensure equitable and sustainable conditions in the production of agricultural goods and taking action to combat climate change by reducing greenhouse gases is imperative, our results show that certified coffee, particularly fair trade and carbon neutral coffee, receive price premiums from Costa Rican consumers. Thus, eco-labels can serve as a means of promoting more sustainable practices within the coffee value chain.

Keywords: Carbon neutral; Fairtrade; ISO 14001; Discrete choice experiment; Willingness to pay (WTP).

Resumo

Este estudo examina a disposición para pagar (DAP) dos consumidores costarrriqueños polo café certificado. Considéranse dúas ecoetiquetas de café comercializadas (*Fairtrade* e *Carbon Neutral*), así como unha certificación medioambiental non comercializada (ISO 14001) para permitir a comparación. Un experimento de elección discreta revela que os consumidores están dispostos a pagar un sobreprezo significativo por calquera destas tres certificacións. Nun contexto no que é imperativo garantir condicións equitativas e sostibles na produción de bens agrícolas e tomar medidas para combater o cambio climático mediante a redución dos gases de efecto invernadoiro, os nosos resultados mostran que o café certificado, en particular o de comercio xusto e o neutro en carbono, recibe primas de prezo por parte dos consumidores costarrriqueños. Así pois, as etiquetas ecolóxicas poden servir para promover prácticas máis sostibles dentro da cadea de valor do café.

Palabras chave: Neutralidade de carbono; Comercio xusto; ISO 14001; Experimento de elección discreta; Vontade de pago (VDP).

JEL classification: O13; Q21; Q53.

1. Introduction

Coffee is one of the most traded commodities worldwide. Out of all the coffee traded internationally in the world in 2023, European Union imports represented around 62% ([International Coffee Organization, 2025](#)). Importantly, new European mandatory regulations on imported agricultural products, such as coffee, aim to create standards that ensure compliance with several environmental requirements during the production of agricultural goods. These requirements, which are aligned with key policy objectives such as the reduction of greenhouse gases and avoiding deforestation (see [Gilbert, 2024](#); [Cosimo et al., 2024](#), among others), impose some obligations on producing countries, such as Costa Rica, which is the focus of our study.

To comply with these requirements and obligations, coffee producers often face increased costs or must redesign production processes ([Lee & Olivares, 2024](#)). However, firms that voluntarily adopt some social and environmental certifications tend to be more prepared to comply with the new mandatory regulations ([Ormazabal & Sarriegi, 2014](#); [Valenciano-Salazar et al., 2022](#)).

As has often been reported in the literature, firms that implement voluntary sustainable practices can get comparative market advantages by certifying their products, or the firm itself. Environmental certifications are expected to act as signaling devices for society and, especially, for those consumers who are concerned about making more ecological purchase decisions ([Fuller et al. 2022](#); [Valenciano-Salazar et al, 2021a](#); [Van Loo et al., 2015](#)).

Costa Rica is an upper middle-income country recognized for the implementation of public environmental policies aimed at the protection of forests and biodiversity ([Flagg, 2024](#); [Sánchez-Azofeifa et al., 2007](#); [Valenciano-Salazar, 2025](#)), as well as reducing the greenhouse gas footprint ([Flagg, 2018](#); [Flagg, 2024](#)). Costa Rica has achieved some milestones, such as 98% of electric energy production from renewable sources, and 53% of land covered by forests ([United Nations Environment Programme, 2019](#)). The Costa Rican government is currently devising a plan to decarbonize the economy by 2050, and the active participation of companies and consumers is essential to achieve this objective ([Flagg, 2024](#)). As an example of this involvement, a Costa Rican cooperative has been the first organization worldwide that adopted a certification for carbon neutrality in coffee production, using a renowned international standard ([Birkenberg & Birner, 2018](#)).

In emerging countries, such as Costa Rica, more and more consumers are becoming environmentally conscious and searching for more sustainable options ([Aguirre, 2016](#); [Valenciano-Salazar et al., 2021a](#) and [2021b](#)). Determining how much these consumers are willing to pay for environmentally certified products, such as coffee, is crucial for companies that want to ensure the profitability of the environmental investments they make. The adoption of green certifications and programs have improved the environmental performance of many Costa Rican coffee producers, as these certifications drive actions related to reducing the usage of agrochemicals ([Blackman & Naranjo, 2012](#); [Lyngbæk et al., 2001](#)), as well as the coffee carbon footprint ([Birkenberg & Birner, 2018](#)) and increasing biodiversity in farms ([Caudill et al., 2017](#)). Arguably, studying whether (and how much) consumers are willing to pay for a Fairtrade Coffee (FTC), Carbon Neutral Coffee (CNC) and other related certifications will contribute to spreading the environmentally positive side effects of certified coffee and provide useful information for the sake of firms' decisions and policy design.

An additional argument to focus on the coffee sector in Costa Rica is the fact this country, apart from an important producer, also has one of the higher levels in per capita coffee consumption worldwide ([Aguirre, 2016](#)). Our main research question is how much Costa Rican

consumers are willing to pay for a certified coffee versus a regular one. We consider three environmental certifications, including two ecolabels (Fairtrade and Carbon Neutral) that refer to a specific product (coffee in our case) and an international standard, namely ISO 14001, that provides a framework for the environmental management system of a firm and, therefore, certifies the producer itself rather than a product. Each of these certifications entail environmental compliance standards for companies that aspire to be certified themselves or their products.

As far as we know, the only study that has measured the willingness to pay (WTP) for environmentally certified coffee in Costa Rica is [Valenciano-Salazar et al. \(2021b\)](#), which presents an open-ended contingent valuation model to elicit the WTP for ISO 14001, Fairtrade, and Carbon Neutral coffee. The present study complements and goes beyond the results in [Valenciano-Salazar et al. \(2021b\)](#) by simultaneously estimating the price premiums for all three environmental certifications using a discrete choice experiment (DCE). It is well-known that a DCE can simulate a market more realistically than the contingent valuation open-ended format ([Hanley et al., 2008](#)) because respondents are faced with purchase decisions that resemble more closely their daily consumption practices. Therefore, this study provides additional and more credible estimates of Costa Ricans' WTP for environmentally certified coffee in Costa Rica. We are not aware of any published research that addresses the Costa Ricans' WTP for any coffee certification using this stated preferences method.

The paper is organized as follows: Section 2 presents a literature review of previous studies about consumers' WTP for certified coffee; Section 3 presents the material and methods, including data collection and econometric specification; Section 4 presents the main findings and discussion. Section 5 identifies some limitations of the study and finally, Section 6 presents the main conclusions.

2. Literature Review

Voluntary environmental and social certifications can be defined as commitments adopted by firms in improving their environmental or social performance, not formally required by a regulatory agency or government ([Khanna, 2001](#); [OECD, 2000](#); [Valenciano-Salazar et al., 2022](#)).

Companies taking part in the coffee value chain may have different motivations to adopt environmental and social certifications. [Raynolds et al., \(2007\)](#) argued that “*coffee linked to environmental and social issues, typically called sustainable coffee, represents a key segment of the differentiated market*”. Such differentiated coffee can attract conscious consumers that look at standards and labels as symbols of ethical practices in global business ([Fuller et al., 2022](#); [Raynolds et al., 2007](#)). As a consequence, certified coffee producers may expect to receive price premiums in the market with respect to their non-certified competitors ([Valenciano-Salazar et al., 2022](#)).

An increasing number of studies have shown, in empirical terms, that consumers are willing to pay price premiums for sustainable coffee. [Table 1](#) presents a review of the literature focused on the economic valuation of coffee certifications. For each reference, we report the country where the study was conducted, the valuation method, the sample size, the specific certifications considered and the estimated price premiums.

As for the geographical scope, the references in the table reveal that most of the published studies have been conducted in high-income countries, such as Italy ([Gallenti et al., 2016](#); [Maietta, 2003](#); [Rotaris & Danielis, 2011](#)), Belgium ([De Pelsmacker et al., 2005](#); [Maaya et al., 2018](#)), The United States of America ([Fuller & Grebitus, 2023](#); [Fuller et al., 2022](#); [Klimas & Webb, 2018](#); [Loureiro & Lotade, 2005](#); [Van Loo et al., 2015](#)), Sweden ([Schollenberg, 2012](#)),

Germany (Birkenberg et al., 2021; Grebitus et al., 2009), United Kingdom (Galarraga & Markandya, 2004), Spain (Merbah & Benito-Hernández, 2023 and 2024) and Taiwan (Liu et al., 2019). Studies of consumer's WTP for environmental and social coffee certifications in developing countries are much scarcer and include Yang et al. (2012) for China, Ut-tha et al. (2021) for Thailand, and Valenciano-Salazar et al. (2021b) for Costa Rica.

Although some papers consider more than one certification, as we do in the present paper, some of them focus on valuing one single certification, being organic and Fairtrade the most commonly addressed. There are also some studies about other labels and programs, such as Carbon Neutral, Rainforest Alliance, Shade coffee and others. The most applied valuation methods are discrete choice experiments (DCE), contingent valuation methods (CVM), hedonic prices (HP), and auctions (A).

Regarding the quantitative results, there is a wide discrepancy across studies about the reported price premiums. Consider, for example, carbon-related certifications: while, Van Loo et al. (2015) did not find any significant price premium for coffee with the Carbon Footprint label in United States, Valenciano-Salazar et al. (2021b) estimated that consumers are willing to pay a price premium of \$0.65 for a 250 g package of carbon-neutral certified coffee in Costa Rica and Birkenberg et al. (2021) found that respondents in Germany were willing to pay €4.38/250 g package of Carbon Neutral coffee. Remarkably, some of the differences in the estimates persist even between studies that have used the same methodology or are conducted in the same country. Additional factors that may explain the dissimilarity in the consumers' WTP across studies, other than the valuation method and the geographical area, include the sampling method, sample characteristics, the number and type of considered coffee attributes, and the type of certifying institution considered.

Table 1. Literature summary of consumers' WTP for environmental and social certified coffee.

Authors	Country	Method	Sample	Certification	WTP	
Maietta et al. (2003)	Italy	HP	3678	Fairtrade	€ 2.36/ kg.	
Galarraga and Markandya (2004)	The U.K.	HP	228	Fair Trade and Organic	€ 0.003/ gram	
De Pelsmacker et al. (2005)	Belgium	DCE	808	Fairtrade	€ 0.19/ package	
Loureiro and Lotad (2005)	Colorado, The U.S.A.	CVM	284	Organic	\$16.2559 cents/lb.	
				Fairtrade	\$21.64 cents/lb.	
				Shade Coffee	\$20.021 cents/lb.	
Grebitus et al. (2009)	Germany	DCE	481	Organic	€0.79 /500g package	
				Fairtrade	€1.32 /500g package	
				Cause-related marketing (Menschen für Menschen)	€0.13/500g package	
		A	47	Organic	€0.42/500g package	
				55	Fairtrade	€0.80/500g package
				57	Cause-related marketing (Menschen für Menschen)	€0.58/500g package

Authors	Country	Method	Sample	Certification	WTP
Rotaris and Danielis (2011)	Italy	DCE	135	Fairtrade	€2.2/250g package
Schollenberg (2012)	Sweden	HP	21,606	Fairtrade	1.381 SEK/kg.
Yang et al. (2012)	Wuhan in Hubei province of China	CVM	564	Fairtrade	¥ 4.5 /cup
Van Loo et al. (2015)	Northwest Arkansas, USA	DCE	81	USDA Organic	\$1.16/ 12 oz package
				Rainforest Alliance	\$0.84 / 12 oz package
				Fairtrade	\$0.68 / 12 oz package
				Carbon Footprint	Non-significant
Gallenti et al. (2016)	Friuli Venezia, Italy	DCE	420	Fairtrade	€-4.3/250g package.
				Organic	€2.8/250g package
Klimas and Webb (2018)	DePaul University (Chicago, U.S.)	CVM: Stated preference	988	Shade coffee	Mean \$128 cents/ cup, Truncated mean \$178 cents/ cup.
		CVM: Realized preference	120		Mean \$39 cents/ cup, Truncated mean \$149 cents/ cup
Maaya et al. (2018)	Flanders, Belgium	DCE	262	Fairtrade	€2.1/ 250 g package
				Organic	€2.2/ 250 g package
				Fairtrade and Organic	€1.7/ 250 g package
Liu et al. (2019)	Taiwan	DCE	568	Organic	5.32%
				Eco-friendly	3.68%
				Grade	4,09%
				Traceability	6.48%
Valenciano-Salazar et al. (2021b)	Costa Rica	CVM (open-ended format)	387	Carbon Neutral	\$0.65/250 g package
			383	Fair Trade	\$0.68/250 g package
			421	ISO 14001	\$0.64/250 g package
Birkenberg et al., 2021	Germany	DCE	80	Carbon Neutral Label	€4.38/250 g package
				Direct Trade Claims	€5.83/250 g package
				Fair Trade	€6.91/250 g package
				Carbon Neutral and Direct Trade	€8.54/250 g package
				Carbon Neutral and Fair Trade	€8.68/250 g package
Ut-tha et al. (2021)	Thailand	CVM	500	Sustainable coffees	Mean THB 272.95/250 g package

Authors	Country	Method	Sample	Certification	WTP
Merbah and Benito-Hernández (2023)	Spain	HP	645	Fairtrade	€ - 1.11/ kg.
				Organic	€ 1.17/ kg.
				Rainforest Alliance	Non-significant
				UTZ	€ 1.18/ kg.
Fuller et al. (2022)	Arizona, U.S.	A	114	Fair Trade and USDA Organic	\$2.57 /12oz bag
				Fair Trade	\$1.79 /12oz bag
				USDA Organic	\$2.04 /12oz bag
				Rainforest Alliance	\$1.79 /12oz bag
				Direct Trade	\$1.71 /12oz bag
Fuller and Grebitus (2023)	United States	DCE	829	Fair Trade	Mean \$ 5.45/12 oz bag
				Direct Trade	Mean \$ 3.91/12 oz bag
				Rainforest Alliance	Mean \$ 1.69/12 oz bag
				Organic labels	Mean \$ 2.20/12 oz bag
				Fair Trade and Organic	Mean \$ 6.67/12 oz bag
				Direct Trade and Organic	Mean \$ 6.22/12 oz bag
Merbah and Benito-Hernández (2024)	Spain	DCE	547	Fairtrade	€ 1.481/250 g package
				UTZ Certification	€ 1.379/250 g package

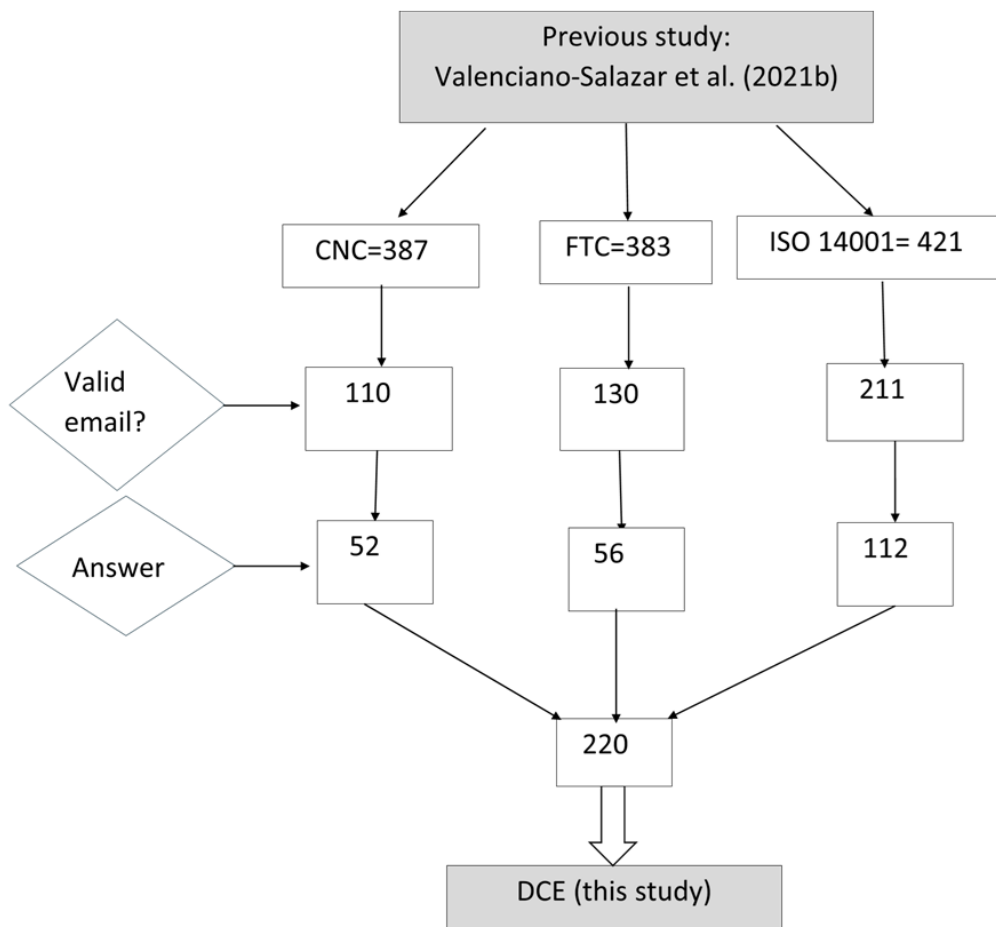
Key: DCE=discrete choice experiment, CVM=contingent valuation method, HP=hedonic prices, A=auctions, WTP: Willingness to pay.

3. Material and Methods

3.1. Data Collection

This paper is a follow-up of the study by [Valenciano-Salazar et al. \(2021b\)](#) and aims to provide further evidence and refining the results in that study. [Valenciano-Salazar et al. \(2021b\)](#) used a contingent valuation with open-ended format is based on a sample of the adult Costa Rican population stratified by province and gender. The sample included 1,191 respondents. Among them, 387 individuals were asked about their WTP for a CNC, 383 were asked about their WTP by FTC and 421 had faced the question regarding coffee produced by ISO 14001 certified companies.

Figure 1. Sample selection



The individuals who provided a valid email in the previous study (451 in total) were invited to take part in a DCE, which is the stated preferences method used in the current study. 211 of these individuals had previously faced questions regarding coffee produced by ISO 14001 certified companies, 130 about FTC, and 110 about CNC (see Figure 1). For our DCE, we got 112 valid answers from the first group, 56 from the second and 52 from the third.

Table 2 shows a summary of the main demographic characteristics of the respondents to the DCE. They are located mainly in the central provinces of Costa Rica, their household income tends to be medium and high, and show a higher level of education in regard to the reference study and the Costa Rica population. All of the DCE participants were coffee consumers or, at least, coffee buyers, as they had reported in Valenciano-Salazar et al. (2021b). The questionnaire was conducted using the TickStat® online platform for discrete choice surveys.

Table 2. Demographics characteristics of the respondents.

	National Costa Rica statistics	Valenciano-Salazar et al. (2021b) n = 1191		This study DCE n=220	
		Mean	St. Dev.	Mean	St. Dev.
Age (years)	31	35.03	13.5	31.41	10.31
Gender (1=man; 0=woman)	0.5	0.53	0.5	0.54	0.5
University degree	0.30	0.36	0.48	0.78	0.41

	National Costa Rica statistics	Valenciano-Salazar et al. (2021b) n = 1191		This study DCE n=220	
		Mean	St. Dev.	Mean	St. Dev.
Province of residence (1=central; 0= coastal)	0.75	0.76	0.43	0.91	0.28
<i>Monthly household income quartile (in colones)</i>					
Less than ₡300,000 (around \$528)	Annual GDP per capita (current \$US for 2023): \$16,942	0.16	0.37	0.04	0.20
Between ₡300,001 and ₡600,000 (around \$529 and \$1056)		0.27	0.44	0.11	0.32
Between ₡600,001 and ₡2,000,000 (around \$1057 and \$3521)		0.46	0.5	0.54	0.50
More than ₡2,000,001 (\$3,522)		0.11	0.32	0.31	0.46

Note: For Costa Rica Statics see INEC (2011), Tribunal Supremo de Elecciones de Costa Rica (2017), World Bank database (2025), and Programa Estado de la Nación (2023).

A description of each certification was presented in the online questionnaire to remind the respondents about the main characteristics of the three certifications, including the one they have faced in the first part of the study and the two new ones. See [Table 3](#) for an English version of this information (the one used in the survey was in Spanish). After providing them with this information, the DCE properly started.

Table 3. Characteristics of certifications shown to respondents.

Certification	Characteristics
Carbon Neutral	The companies that achieve the CARBON NEUTRAL certification for the coffee they produce must reduce or compensate their carbon footprint. Carbon gas emissions that cannot be reduced must be captured in the company's private sinks or offset through the purchase of carbon credits, the revenue from which will be used to pay landowners who maintain and recover forests (André & Valenciano-Salazar, 2022).
Fairtrade	Companies producing FAIRTRADE certified coffee must pay a fair price to the coffee producers, ensure good working conditions, gender equality and the absence of child labor. Also, Fairtrade coffee growers must use techniques that respect the environment and not use agrochemicals categorized as very toxic (Fairtrade International, 2024).
ISO 14001	ISO 14001 certified companies must improve their environmental behavior in the following terms: Creating and putting into operation an environmental management system, with objectives, policies and assignment of those responsible to comply with them, generating some corrective and preventive actions in order to reduce the contamination generated by the company and complying with national environmental laws (ISO, 2015).

The experiment included 6 hypothetical choice cards containing different combinations of environmental coffee certifications and prices. The choice cards were designed following a D-efficient criteria and using the Ngene® 1.2 software (Choice Metrics, 2012).

Each card required the respondent to choose between three hypothetical 250-gram coffee packages, including two certified coffees, each one with a certain price premium, and a regular non-certified coffee, the latter being an opt-out option without any price increment. Each of the 220 respondents faced discrete choice questions about the three certifications (not only the one he/she was asked about in the precedent study), as well as the opt-out option. The price of a 250-gram package of regular ground coffee was set as ₡1,250¹ (around U.S. \$2.2), which was the average sale price of the best-known coffee brands in Costa Rican supermarkets (Automercado, 2019; Maxi Pali, 2019) in July 2017. So, implicitly, respondents were consulted about their WTP over this reference price for a certified coffee. An example of a choice card is presented in Figure 2.

Figure 2. Example of choice card.

Characteristics	Regular Coffee	Certified Coffee A	Certified Coffee B
Type of coffee	Non-certified coffee	Carbon Neutral Coffee	Fairtrade Coffee
Price premium (in colones)	0	400	250
Choose an option	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In addition, we included a follow-up question to detect protest responses. Specifically, there was a “why” question aimed at those respondents who always chose the non-certified coffee alternative in all the decision scenarios. There was only one person in this situation, and he/she stated that the price of the certified coffee was too high. This individual was included in the analysis.

3.2. Econometric Approach

In the last decades of the 20th Century, DCE emerged as an extension of the contingent valuation method. DCE incorporates multidimensionality in the sense that consumers are allowed to simultaneously choose between alternative products with different characteristics and prices like in a real market (Hanley et al., 2008). In accordance with the Random Utility Theory (McFadden, 1974), DCEs are based on the assumption that consumers choose the options that maximize their utility. The utility that consumer i ($i = 1, \dots, I$) gets from taking alternative j ($j = 1, \dots, J$) in choice set t ($t = 1, 2, \dots, T$) is given by:

$$U_{ijt} = V_{ijt} + \varepsilon_{ijt} \tag{1}$$

where $V_{ijt} = \beta_i X_{ijt}$ is the deterministic component of utility, X_{ijt} is a vector of observed variables related to alternative j in choice set t for individual i ; β_i is a vector of structural taste parameters which characterize choices; and ε_{ijt} is the corresponding type-I extreme value

¹ U.S. \$ 1 = 568 colones; based on the 2017 exchange rate of the Central Bank of Costa Rica (2024); colones=₡.

distributed random component, which is assumed to be independent of β and X . In our case, the X 's include four variables: the price and three dummy (1/0) variables associated to each of the three certifications under consideration (z_1 for CNC, z_2 for FTC and z_3 for ISO 14001).

The probability that individual i chooses alternative j in choice set t coincides with the probability that the utility derived from the chosen alternative exceeds the utility that would be gained from the other alternatives k , as follows:

$$p_{ijt} = \text{Prob} (V_{ijt} + \varepsilon_{ijt} \geq V_{ikt} + \varepsilon_{ikt}, \forall k \in A_i \text{ \& } k \neq j) \quad (2)$$

where p_{ijt} is the probability of choosing alternative j , and A_i is the choice set faced by respondent i . If ε_{ijt} and ε_{ikt} are *i.i.d.* type I extreme values of the random component of utility, the probability of choosing alternative j in the observed sequence of choices $[y_1, y_2, \dots, y_T]$ is calculated by the following integral:

$$P_i[y_1, y_2, \dots, y_n] = \int \dots \int \prod_{t=1}^T \left[\frac{e^{X_{ijt}\beta_i}}{\sum_{k=1}^J e^{X_{ikt}\beta_i}} \right] f(\beta|\Omega) d\beta \quad (3)$$

The vector of parameters, in our case $\beta \{\beta_{z_1}, \beta_{z_2}, \beta_{z_3}, \beta_{Price}\}$, varies in the population with density $f(\beta|\Omega)$, where Ω denotes the parameters of the density function. We used a Random Parameter Logit (RPL) model, which allows to introduce unobserved preference heterogeneity (Train, 2009). We assume that the random parameters follow a restricted triangular distribution (Alba-Patiño et al., 2024) and estimations were performed using the NLOGIT® 6.0 software. The sample mean WTP for each certification (z_1, z_2, z_3) as well as the individual WTP is calculated using the formula:

$$\overline{WTP}_{z_j} = \frac{-\beta_{z_j}}{\beta_{Price}} \quad \text{where } j = 1 \text{ is CN, } 2 \text{ is FT, } 3 \text{ is ISO 14001} \quad (4)$$

4. Results and Discussion

In the choice experiment we assume that the consumers' choices follow a panel data structure, i.e. the decision heuristics are the same for the 6 choices of the individual. Then, we estimated a RPL model and calculated the sample mean for the WTP. The results show that, on average, the respondents are willing to pay price premiums of ₡1,787.55 (\$3.15) for a package of Fairtrade certified coffee, ₡ 1,718.58 (\$3.03) in the case of Carbon Neutral coffee and ₡1,549.57 (\$2.73) for a package of coffee produced by an ISO14001 certified company (see Table 4). These premiums represent roughly 143%, 137.5 %, and 124% respectively, with respect to the baseline price. On the other hand, it is interesting to note that the price premiums estimated with the DCE are substantially higher than the ones reported in the previous study by Valenciano-Salazar et. al (2021b), which were around \$0.65.

Previous studies, mainly in high-income countries, have shown that, to some extent, consumers attach to environmentally certified coffee higher values than to regular coffee, or in other words, they are willing to pay a price premium for certified coffee (see Table 1). Our study also shows that the respondents in our sample are willing to pay very significant price premiums for coffee with any of the three considered certifications. All the average price

premiums are above 100% of the original price, ranging between 124% for a coffee produced by an ISO 14001 company and 143% for a FTC coffee. Our study is on the upper range of the premiums estimated in the literature, but not very far from other studies using DCE, such as [Gallenti et al. \(2016\)](#), that estimated a price gap of 93% for organic coffee in Italy. [Maaya \(2018\)](#) found that Flanders inhabitants were willing to pay a price gap of 88% for an FTC and 92% for organic coffee. [Rotaris and Danielis \(2011\)](#) estimated that Italian consumers were willing to pay a 110% price premium for FTC compared to a regular coffee. Moreover, in a large survey (n=1199) of coffee consumers in Costa Rica, [Aguirre \(2016\)](#) showed that 50% of respondents are willing to pay approximately double for high-quality (not necessarily certified) coffee.

Table 4. Random Model and the estimated price premium for coffee certifications.

Variables	Mean Coeff.	Std. Dev. of RP	WTP	95% Confidence Interval
CNC	4.094*** (0.2978)	3.731*** (0.5641)	1,718.58*** (237.6938)	[1,252.71; 2,184.45]
FTC	4.256*** (0.3237)	6.129*** (0.6969)	1,787.55*** (293.1575)	[1,212.97; 2,362.13]
ISO 14001	3.692*** (0.4277)	6.935*** (0.8309)	1,549.57*** (186.6998)	[1,183.65; 1,915.50]
Price	-0.002*** (0.0004)	0.002*** (0.0004)		
McFadden Pseudo R ²	0.4136			
Log likelihood function	-850.3565			
Restricted log likelihood	-1450.1682			
Numbers of observations [individuals]	1320 [220]			

*p<0.05; **p<0.01; ***p<0.001.
Standard errors in parenthesis. RP= Random Parameters

In addition, [Birkenberg et al. \(2021\)](#) found that consumers are willing to pay €4.38/250 g package of CNC and €6.91/250 g package of FTC in Germany, similar to the results from [Fuller and Grebitus \(2023\)](#), who found a mean willingness to pay for certified coffee in the United States of \$5.45/12 oz bag of Fair Trade, \$3.91/12 oz bag of Direct Trade, \$1.69/12 oz bag of Rainforest Alliance, and \$2.20/12 oz bag of organic coffee. These price premiums are similar to those estimated in our study.

Regarding the type of certification valued, although the average price premiums estimated by our DCE for all three certifications are very significant, and not very different from each other, our study shows that the highest of the three is the one associated to FTC, which is in line with previous studies such as [Loureiro and Lotad \(2005\)](#), [Grebitus et al. \(2009\)](#), [Birkenberg et al. \(2021\)](#), [Merbah and Benito-Hernández \(2024\)](#), and [Fuller and Grebitus \(2023\)](#). This result may be due to the fact that the FTC establishes not only environmental standards (such as the responsible use of agrochemicals), but also social standards, such as the payment of fair wages,

the participation of women in the coffee value chain, and the guarantee of premium prices for coffee growers (see, for example, [Fairtrade International, 2024](#)).

Moreover, our study also shows that respondents are more willing to pay for ecolabels (FTC and CNC) than for coffee produced by an ISO 14001 certified company. This is an expected result since ecolabels are more visible as they are displayed on product packaging, while ISO 14001 is a company certification that is not usually displayed on packages. Furthermore, FTC and CNC can be perceived by consumers as more closely related to improvements of the environmental practices of companies and cooperatives ([Valenciano-Salazar et al., 2022](#)).

5. Limitations

The main limitations of this study have to do with the sample size and the way in which the sample was generated. The high cost of acquiring a consumer database and the limited availability of such a database is a typical difficulty in studies conducted in developing countries. In our case, since a consumer database was not available at the time of conducting the DCE, we decided to use the contact information already available from the original survey that was used in [Valenciano-Salazar et al. \(2021b\)](#). An advantage of this decision is that the results of this study are more directly comparable with the ones of the previous exercise. Moreover, by addressing people that had already taken place in the previous study, we could ensure that all of them were coffee buyers and, thus, we did not need to deal with respondents who were not taking part in the coffee market.

Nevertheless, this approach also has some inevitable drawbacks. First, we could only interview the respondents providing a valid e-mail address, which involved a reduction in the sample size. Second, as shown in [Table 2](#), although the respondents participating in the discrete choice experiment maintain a similar distribution to that of the original sample in terms of gender and age, they are different in terms of residence, income, and especially higher education. There may even be other non-observed biases, for example linked to the respondent's familiarity with email and other electronic technologies. Currently, it is a usual challenge faced by other DCE studies that use panel of consumers, since they do not completely represent the whole society because of higher levels of education, access to technology, etc. ([Nielsen, 2011](#); [Soliño, 2023](#)). Summing up, the sampling strategy does not guarantee that the demographic characteristics of the sample reflect the structure of the Costa Rican population. Therefore, we cannot claim that our sample represents the entire Costa Rican population and, as a consequence, the results should be interpreted cautiously when deriving nationwide implications. Nevertheless, we feel that the results still have some value even if they refer to a subset of the population. It is interesting to know that some Costa Rican consumers are willing to pay very significant price premiums for certified coffee.

6. Conclusions

We have resorted to a DCE, which allows consumers to choose between several types of certified coffees versus a not-certified one, a setting that mimics a real coffee market better than a contingent valuation application as it is well-known in literature. Our results confirm that Costa Rican consumers are willing to pay significant price premiums for all the certifications evaluated, namely ISO 14001, Fairtrade and Carbon Neutral, with higher magnitude for the two ecolabels.

Our conclusion is consistent with the fact that, as previously noted, many Costa Ricans have knowledge about environmental certifications and the companies that carry out sustainable

production practices (Valenciano-Salazar et al., 2021). This knowledge and concern about environmental sustainability is due to several factors, including that, for decades, domestic and international communication media has informed about the damage caused by greenhouse gases, as well as the irreversible consequences of climate change (Boykoff, 2009; Valenciano-Salazar et al., 2023; Zamith et al, 2012), the belligerent policy of the Costa Rican government to combat climate change (Flagg, 2018; Flagg, 2024; Vignola et al., 2013), the study of the environmental issues in the public education system (Blum, 2008), and the active actions of companies in order to reduce their carbon footprint (Valenciano-Salazar et al., 2022 and 2023), among others. All these factors explain a high WTP of the respondents, probably higher than one may expect in an emerging country.

Since coffee producers must comply with a series of environmental and social standards in order to get environmental certifications, we can argue that certified products and companies tend to have better environmental performance than their regular counterparts. The fact that Costa Rican consumers are willing to pay a price premium for certified coffee points to the existence of a market channel for eco-labeled coffee that should be strengthened in order to guarantee the environmental improvements derived from these certifications. Plausible paths to strengthen this channel include communication campaigns that help consumers deepen their knowledge of each certification as well as its social and environmental implications.

Finally, we could assume that companies and cooperatives supplying certified products have an advantage in assuming the new environmental regulations that the European Union will impose in the short term, linked to zero deforestation in agricultural production as well as carbon neutrality processes.

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Author contributions

Conceptualization, J.A.V-S., F.J.A and M.S.; Methodology, J.A.V-S. and M.S.; Software, J.A.V-S. and M.S.; Data acquisition, J.A.V-S., F.J.A and M.S; Analysis and interpretation, J.A.V-S., F.J.A and M.S; Supervision: F.J.A. and M.S.; Writing- Preparation of the draft, J.A.V-S, F.J.A and M.S; Writing-Revision & Editing, J.A.V-S, F.J.A and M.S. All authors read and agree with the published version of the manuscript.

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