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Are Fair Trade, Carbon Footprint and Organic Attributes competing? Some Evidences from Scotland, Netherland and France

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Abstract:

A choice experiment was conducted in Scotland, the Netherlands and France to assess consumers' preferences and willingness to pay (WTP) for ethical attributes (i.e. fairtrade, organic, lower carbon footprint) of bananas and to find out whether this ethical food attributes are competing in real markets. The results showed that in the three countries consumers are willing to pay a price premium for the three ethical food attributes. The results showed that in the current market situation these ethical foods are not generally competing against each other. Nonetheless, they are likely to become competing for consumer's money at least when: (1) the price of organic foods is decreased significantly, (2) the price for fairtrade food products is set higher than consumers' WTP, and (3) bananas labelled has having lower carbon footprint are made available in retail stores and sold at a price lower than consumers' WTP.

Key words: Fairtrade, organic, carbon footprint, willingness to pay, competition, choice experiment.

JL Classification: D12, Q13

1. Background

Many developing countries produce vast quantities of agricultural products (e.g. cocoa, coffee, tea, rice and bananas) which are too large to be consumed by their own populations. As a result, large part of the production of these products is exported allowing the earning of foreign currency with which developing countries can buy foreign food products that they are not able to grow at home and they are essential for the nutrition of their population. Therefore, improving exports of food products is fundamental for developing countries to insure their food security and boost the growth of their economy. Nonetheless, exporting food products, especially, to developed countries is becoming challenging not only as a result of the economic crisis and the increasing competence but most importantly because consumers in these countries are increasingly requiring safe foods of high ethical value (e.g. fairtrade, organic, lower carbon footprint etc.).

While this seems to be challenging, some producers and traders of food products such as coffee, tea and bananas took advantage of the increasing interest in fairtrade food products and managed to increase their sales of these products in developed countries after introducing required changes in the production and manufacturing of their products to be eligible for the fairtrade certificate. According to Fairtrade Foundation (i.e. the owner of the commercial brand), fairtrade certification does not guarantee only fair prices but also principles of ethical purchasing such as banning child and slave labour, guaranteeing a safe workplace and a fair price that covers the cost of production and facilitates social development, and protection and conservation of the environment (Nicholls and Opal, 2005).

According to the data collected by Fairtrade International, the total fairtrade sales revenues and fairtrade premium receipts for small producer organizations grew significantly in the last two decades. In comparison with 2010–2011, the data for 2011–2012 show a 41% increase (from 61.1€ million to 86.1€ million) in fairtrade premium returns to producer organizations, and a 36% increase (from 673€ million to 913€ million) in overall fairtrade sales revenues (Fairtrade International, 2013). Furthermore, Fairtrade International calculates the total estimated retail sales value of coffee based on both out of home sales and retail sales at 4.8€ billion in 2012 with an increase of 21% with respect to 2011. With respect to 2011, the estimated Fairtrade retail sales by product volume in 2012 increased by 69% for bananas, 89% for cocoa, 56% for coffee, 63% for rice, 93% for sugar and 86% for tea (Fairtrade International, 2012).

This increasing interest in the consumption of fairtrade products, mainly boosted by the growing importance of positive ethical purchase behaviour, has been accompanied by an increasing interest of scholars in the social and behavioural sciences in assessing consumers' preferences, attitudes and willingness to pay for fairtrade foods. More than 50 research papers have been published on this topic so far. We refer the reader to four review papers (Tallontire et al. 2001; Connolly and Shaw 2006; Newholm and Shaw 2007; and Andorfer and Liebe, 2012) that critically reviewed the methodologies and results reported in those research papers. In general, socially responsible attitudes, support of human right, need for self uniqueness, ethical obligation, and sense of universalism with mankind and nature are example of factors that have been found to positively influence the consumption of fairtrade foods. High prices, lack of availability and lack of information were reported to be the major barrier to the purchase of fairtrade food products. Furthermore, several paper (Arnot et al. 2006; Carlsson et al. 2010; Cranfield et al. 2010; Basu and Hicks 2008; De Pelsmacker, Driesen et al. 2005a; Galarraga and Markandya 2004; Loureiro and Lotade 2005; Trudel and Cotte 2009; Didier and Lucie 2008; Rousu and Corrigan 2008) have found that consumers are willing to pay a price premium for food products labelled as fairtrade. For instance, interviewed consumers in those studies were found to be willing to pay an average premium for fairtrade coffee that ranges between US$ 0.22/lb and US$ 1.79/lb.

In large part, research to date has focused on consumers' preferences and willingness to pay for fairtrade food products. However, little interest (with some exceptions such as Hanely et al, 1998; Loureiro and Lotade 2005; Onozaka and McFadden, 2011) was devoted to assessing the tradeoffs that consumers are likely to make when they have to choose among food products with different ethical food attributes (e.g. fairtrade, organic, carbon footprint, origin etc.). In fact, in non-local markets, fairtrade products are likely to be displayed and sold in retail stores along with other food products of the same category that are organic or have a lower carbon footprint etc. For example, in the same store, consumer is likely to be presented with a choice between a conventional banana, a fairtrade banana, and an organic banana. Therefore, it is not enough to assess whether consumers are willing pay a price premium for fairtrade products but also whether this price premium is high enough to allow fairtrade attribute to compete with other ethical attributes. As aforementioned, consumers revealed to be willing to pay a price premium for fairtrade products. However, this result does not guarantee that consumers are going to buy fairtrade foods even if its price is lower than their WTP. In fact, if consumers prefer organic over fairtrade, they will buy organic even they are willing to pay a premium for fairtrade.

To contribute to filling this gap in the literature, we conducted a choice experiment in Scotland, France and Netherlands with the main objective to identify possible tradeoffs that consumers may make when they are provided with controversial ethical attributes (e.g. fairtrade bananas with high carbon footprint versus non-fairtrade bananas with low carbon footprint). Four food attributes were considered: three ethical attributes (i.e. fairtrade, organic and carbon footprint) and the price. Three random parameter logit models (one for each country) were estimated in preference and WTP space. Then the results on consumers' preferences and WTP for each attribute and each country were compared.

The reminder of this paper is organized as follows. The next section describes the experimental design. This is followed by an explanation of how the data were analysed. Next, the main findings are reported and discussed, whilst the final section presents the conclusions.

2. Experimental Design

The choice experiment was conducted in three locations: Edinburgh (Scotland), Clermont-Ferrand (France) and Amsterdam (the Netherlands). In total, 247 real consumers participated in the study (100, 95 and 52 respondents from Scotland, France and the Netherlands, respectively)[1]. Participants were randomly recruited in public places and in front of retail stores. Only subjects who were found to be the main responsible for the purchase of food products in their household were allowed to take part in the study. Banana was the product considered in the study. All participants were at least occasional buyers or consumers of bananas. Table 1 summarises the socio-demographic characteristics of participants.

Table 1 goes here

Respondents were asked to participate in a choice task, then, they were required to complete a questionnaire about their attitudes toward ethical food attributes and their socio-demographic characteristics. In the choice task, respondent were successively provided with 16 different choice sets and were repeatedly asked to choose between two different alternatives of bananas and a "no choice" option. Each alternative is a combination of four different attributes' levels: fairtrade (fairtrade/not fairtrade), organic (organic/not organic), emitted carbon dioxide during the transport

[1] We must mention that the size of our sample is far from being a representative sample of the whole population of the three countries in terms of number. The main objective of this study is to gain some insight on consumers' preferences and willingness to pay for different ethical food attributes in the three countries and not to produce estimates to be used for inference.

per kg of bananas (697 g of CO_2 (from Canary Islands - Spain)[2], 1.143 kg of CO_2 (from Ghana), 1.880 kg of CO_2 (from Ecuador), 2.619 kg of CO_2 (from Indonesia)) and the price (£0.13, £0.18, £0.23, and £0.28 per banana in Scotland and 0.13€, 0.18€, 0.23€, and 0.28€ per banana in France and the Netherlands). Participants were told that apart from these attributes the bananas would be identical in appearance. A cheap talk script, similar to the one implemented by Cummings and Taylor (1999), was used to incentivise participants to reveal their real preferences.

Given all the attributes' levels a full factorial design of 64 (2*2*4*4) profiles was created. Since presenting participants with 64 combinations would be time and cognitive costly, an orthogonal factorial design of 16 combinations was generated. To generate the second option from the 16 profiles obtained in the orthogonal design, we followed the optimal design approach proposed by Street and Burgess (2007). We used the generator (1,1,1) to obtain the second option. Since it is not realistic to force participants to choose one of the provided options of bananas, we included a "no choice" option (i.e.: third option) in each choice set. An illustration of a choice set is presented in figure 1

Figure 1 goes here

3. Choice model: random parameter logit (RPL)

Utility-maximizing individual i who is confronted with a set of j alternatives at a given choice occasion *t*, should choose the alternative that yields the highest utility. The utility function takes the form:

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

[2] The origin of the product was not revealed to participants.

where V_{ijt} is the deterministic component and ε_{ijt} is the random component. ε_{ijt} is assumed to have an *iid* extreme value distribution. Assuming that the deterministic component of utility is linear-in-parameter, equation (1) can be written as:

$$U_{ijt} = \beta_i' X_{ijt} + \varepsilon_{ijt} \qquad (2)$$

where X_{ijt} is a vector of explanatory variables that are observed by the analyst and include attribute of the alternatives (i.e. Fairtrade, Organic, Carbon footprint and Price) as well as socio-economic characteristics of the respondent (e.g. Gender, education, income and age). β_i denotes the K×1 vector of utility parameters corresponding to K choice characteristics. The subscript i on β_i indicates that β_i are individual-specific parameters. In the RPL, β_i are considered as draws from the population distribution $f(\beta|\Omega)$ where Ω are the fixed parameters of the distribution such as the mean and the variance. For a given value of β_i, the conditional probability that individual i makes a choice j is:

$$P(j|X_{it}, \beta) = \prod_{t=1}^{T} \left[\frac{\exp(\beta_i' X_{ijt})}{\sum_{k=1}^{J} \exp(\beta_i' X_{ikt})} \right] \qquad (3)$$

The unconditional choice probability is the expected value of the logit probability over all possible values of β, that is, integrated over these values, weighted by the density of β: so the unconditional probability is:

$$P(j|X_{it},\Omega) = \int_{\beta} P(j|X_{it},\beta)\, f(\beta|\Omega) d\beta \tag{4}$$

This expression does not have a closed form solution and is therefore approximated through simulation methods. In particular, draws of β_{ir} are taken from the distribution $f(\beta|\Omega)$ for $r = 1, \dots, R$, and the resulting probabilities are then averaged. The simulated log-likelihood (SLL) for all respondents, which is estimated via maximum likelihood procedures, is calculated as:

$$SLL = \sum_{i=1}^{I} \sum_{t=1}^{T} ln\left(\frac{1}{R}\sum_{r=1}^{R} \frac{\exp\,(\beta_{ir}X_{ijt})}{\sum_{k=1}^{J} \exp\,(\beta_{ir}X_{ikt})}\right) \tag{5}$$

For this estimation, the parameters for fairtrade, organic and carbon footprint are assumed to be distributed normally. The price should enter the utility negatively, which can be imposed by specifying the parameter on negative price as log-normally distributed. In this way, the price coefficient can therefore be interpreted as the marginal utility of money.

In choice experiment, the standard approach to calculate WTP data consists in computing the ratio of the attribute coefficient to the price coefficient. Therefore, the WTP from an RPL is given by the ratio of two randomly distributed terms.

$$WTP_{non-price\ attribute} = -\frac{\beta_{non-price\ attribute}}{\beta_{price}} \tag{6}$$

Depending on the choice of distributions for the coefficients this can lead to WTP distributions which are heavily skewed (e.g. very large WTP values) and that may not even have defined moments. A common approach to dealing with this potential problem is to specify the price coefficient to be fixed. Nonetheless, it is often unreasonable to assume that all individuals have the same preferences for price (Meijer and Rouwendal, 2006). Train and Weeks (2005) suggest another way to get around this problem that consists in estimating the RPL in WTP space rather than in preference space. This involves estimating the distribution of willingness to pay directly by re-formulating the model in such a way that the coefficients represent the WTP measures. In the reformulated models, the a priori assumptions about the distributions of the parameters are made on the WTP rather than the attribute coefficients.

The model in preference space is:

$$U = \beta_{price} Price + \beta_{Fairtrade} Fairtrade + \beta_{Organic} Organic + \beta_{CO2} CO2 + \varepsilon \quad (7)$$

The model in WTP space consists in rewriting equation (7) as:

$$U = \beta_{price}\left[Price + \frac{\beta_{Fairtrade}}{\beta_{price}} Fairtrade + \frac{\beta_{Organic}}{\beta_{price}} Organic + \frac{\beta_{CO2}}{\beta_{price}} CO2\right] + \varepsilon \quad (8)$$

Equation (8) can be rewritten as:

$$U = \beta_{price}[Price + \theta_1 Fairtrade + \theta_2 Organic + \theta_3 CO2] + \varepsilon \quad (9)$$

$\theta_1, \theta_2, \theta_3$ are the WTP estimates. All the explicative variables considered in the estimation are described in table 2.

Table 2 goes here

5. Results and discussion

In this section, we will first presents results from the analysis of respondents' consumption habits and attitudes toward ethical attributes. Then, the results of the estimation of RPL will be described and respondents' preferences for the attributes fairtrade, organic, carbon footprint and price will be discussed. Finally, respondents' WTP for the ethical attributes as well as possible tradeoffs they may make in real market will be described and discussed.

The analysis of participants' responses reported in the questionnaire showed that Scottish and French respondents consume more frequently fairtrade bananas than Dutch respondents. In fact, 45%, 41% and 25% of Scottish, French and Dutch participants, respectively, revealed to regularly consume fairtrade bananas. While only 11% and 4% of Scottish and French respondents, respectively, reported to never consume fairtrade bananas, 44% of Dutch participants said they never consumed fair trade bananas. The rest of respondents in the three samples revealed to occasionally consume fairtrade bananas. Compared with the consumption of fairtrade bananas, the frequency of consumption of organic bananas seems to be lower in the three countries. For instance, 28% (16%), 37% (15%) and 50% (15%) of, Scottish, French and Dutch participants, respectively, revealed to never (always) consume organic bananas.

The majority of respondents in the three countries revealed to be reasonably or well informed about fairtrade and organic labels, although Scots seems to be less informed than French and Dutch respondents. In fact, 36% (30%) of Scottish participants stated to be not well informed about fairtrade (organic) labels compared with 13% (15%) and 24% (7%) of French and Dutch participants, respectively. The results also showed that 85% (83%), 88% (71%) and 72% (81%) of Scottish, French and Dutch respondents revealed to trust fairtrade (organic) label. This positive interest and trust in fairtrade and organic labels was also found true for other issues such environment and farm-worker conditions. In fact, Scottish, French and Dutch respondents scored high their concerns about the environment at 7.7, 8.2 and 7.7 out of 10, respectively. Similar scores were found in the three samples for respondents' concern about other issues related with fairtrade and organic farming such as working conditions in banana farms, global poverty, carbon dioxide emissions and the use of fertilizers and pesticides.

To sum up, the descriptive analysis of respondents' habits and attitudes showed that the majority of participants in the three countries consume fairtrade and organic bananas and they trust its labels. Furthermore, large majority of Scottish, French and Dutch respondents showed high concern about the environment and the how workers are treated and recompensed for their works in the farms where bananas are produced. If respondents were consistent in their answers, their high interest in fairtrade and environment will be translated into positive preferences and WTP for the ethical attributes considered in the choice task. This is what we are going to figure out in the rest of the results' section.

The results of the estimation of RPL models are displayed in table 3. All the estimations were conducted using NLOGIT 5.0, with 1000 Halton draws to simulate random parameters. The RPL models show significant improvement in fit when tasted against conditional logit models: *Chi square* = 1827.28, *p-value* <.01 for Scotland model, *Chi square* = 1021.18, *p-value* <.01 for the Netherlands model, *Chi square* = 1324.26, *p-value* <.01 for France model, and 4029.92, *p-value* <.01 for "all respondents" model (i.e. in this model the data from the collected in the three countries were pooled and an RPL was estimated for all respondents). All the main effect parameters are modelled as random parameters, except no-choice option parameter (NONE) that is modelled as fixed parameter. In all the models, the means of the coefficients are statistically significant with the expected sign. The positive and significant sign for fairtrade and organic attributes show that average respondent in the three countries prefer fairtrade bananas than non-fairtrade bananas and organic bananas than non-organic bananas. In other words, average respondent is more likely to choose bananas labelled as fairtrade or/and organic than conventional bananas. The negative and significant sign of carbon footprint attribute indicates that average respondent in the three countries prefer bananas with lower carbon dioxide emissions during the transport (e.g. bananas transported for lower distances). As expected, the results show that Scottish, French and Dutch respondents prefer the attribute price to take lower levels (i.e. cheaper bananas are preferred). Finally the negative and significant sign of the "NONE" coefficient shows that respondents preferred to choose to buy bananas than to opt out and choose the no-choice option.

Table 3 goes here

All the standard deviation parameters are significant, indicating that preferences' heterogeneity is detected in all the random parameter. We used some socio-demographic variables (i.e. age, income and education) to explain the detected heterogeneity. The results are displayed under the section "*heterogeneity in mean*" in Table 3. The results show that Scottish respondents with higher education are more willing to choose bananas with higher prices than respondents with lower education level. Dutch and French respondents with high income were found to prefer fairtrade bananas than non-fairtrade bananas. The estimated model for all respondents in the three countries shows that elder respondents with higher income prefer to buy bananas labelled as fairtrade. It also shows that respondents with higher education level prefer organic bananas, bananas with lower carbon dioxide emissions and are willing to choose more expensive bananas. Note that in many cases the parameter was fixed because the heterogeneity around the mean was found to be not significant and not fixing the corresponding parameter was found to decrease the general model fit.

The heterogeneity around the mean that was found to be significant for all the random parameters can be partially due to the correlation between the different attributes and not only the interaction between attributes and socio-demographic variables. Assuming that attributes are uncorrelated was found to be inappropriate and can bias the results for the heterogeneity in mean (Hensher et al (2005). To get around this problem, we allowed that the error components in different choice situations from a given individual to be correlated. The results under the sections "*Diagonal values in Cholesky matrix,* L" and "*Below diagonal values in L matrix. V = L*Lt*" show that the attributes are indeed correlated and allowing for the error components to be correlated were necessary for a clean estimation of the heterogeneity around the mean. The results also show that part of the heterogeneity around the mean of the random parameters is explained by correlations between attributes such the negative correlations between fairtrade and carbon footprint.

Since the attributes have different units of measurement, comparing respondents' preferences for these attribute is inappropriate and leads to biased interpretation. The appropriate way to compare attributes, and determine the tradeoffs that respondents might make when choosing between different ethical attributes, is to calculate the marginal rate of substitution (MRS). When the price is included as the denominator in the tradeoff calculation, the MRS is interpreted as marginal WTP. As aforementioned, we estimated individual WTP space for each attribute and each country as well as for all respondents. The results are displayed in table 4, 5 and 6[3][4][5]. Results in table 4 show that Scottish, Dutch and French respondents are willing to pay a premium of 0.14€,

[3] The estimated individual WTPs in the Scottish data were obtained in pound sterling. For a clean comparison across countries, the individual WTP were multiplied by 1.28 to convert them from pound sterling to Euro.
[4] We tested the normality of the distribution of respondents' WTP for each ethical attribute in each one of the three countries. All the distributions were found to be non-normal. As a result a non-parametric test (Wilcoxon rank-sum test) was used to test whether respondents' WTP for the different ethical attributes are statistically different from each other.
[5] Any difference between the mean WTP for two different attributes is considered statistically significant only if the p-value is equal or lower than 0.05.

0.13€ and 0.09€, respectively, for each banana labelled as fairtrade and a premium of 0.08€, 0.09€ and 0.13€, respectively, for each banana labelled as organic. Scottish, Dutch and French respondents were also found to be willing to pay a premium of 0.09€, 0.12€ and 0.12€, respectively, for a reduction of 1kg of carbon dioxide emissions. To sum up, respondents in the three countries are willing to pay a price premium for fairtrade/organic bananas as well as for bananas with lower carbon dioxide emissions. Nonetheless, to determine whether consumers make tradeoffs when they have to choose between bananas with different ethical attributes, the comparison of the estimated WTP for fairtrade, organic and carbon dioxide emissions is needed.

Table 4 goes here

The results of comparing respondents' WTPs for the three ethical attributes are presented in table 5. For the ease of interpretation and discussion, let's assume a hypothetical market where fairtrade bananas, organic bananas and bananas with lower carbon dioxide emissions (1kg CO2 emissions less than conventional bananas) are being sold. Results in table 5 show that Scottish respondents are willing to pay a significantly higher price premium for fairtrade bananas than for organic bananas and bananas with lower carbon dioxide emissions. Therefore, if these three types of bananas are sold at the same price (being equal or lower than consumers' WTP); average Scottish consumer is likely to buy fairtrade bananas. Average Scottish consumer is, however, likely to opt to buy organic bananas if the retail price of fairtrade bananas is significantly higher than (1) the price of the other two ethical bananas and/or (2) consumers' WTP for bananas labelled as fairtrade. In Scottish retail stores, the actual price of organic bananas is significantly much higher than the price of fairtrade bananas and consumers' WTP for organic bananas[6]. Therefore, average Scottish consumer is more likely to buy fairtrade bananas in first instance and, hence, these two products are not competing as long as the current retail prices are maintained. Furthermore, if the retail price

[6] Bananas certified as having lower carbon footprint is not currently sold in any of the three countries retail stores.

premiums for fairtrade and organic bananas with respect to conventional bananas are higher than 0.14€ and 0.08€, respectively, average Scottish consumer is more likely to purchase conventional bananas instead of ethical bananas. Therefore, to incentivize average Scottish consumer to buy fairtrade bananas, the retail price premium of fairtrade bananas with respect to conventional bananas should be kept lower than 0.14€ per banana.

Table 5 goes here

The results also show that Dutch respondents' WTPs for the three types of ethical bananas are not statistically different. Thus, these three types of ethical bananas are competing and average Dutch respondent is likely to buy the cheapest ethical bananas as long as its price is lower than her/his WTP. Similar to Scotland, the current retail price of organic bananas in the Netherlands is significantly higher than the price of fairtrade bananas. Therefore, fairtrade bananas are more likely to be chosen in first place by the average Dutch respondent. Nonetheless, the retail price premium for fairtrade bananas with respect to conventional bananas should not exceed 0.13€ per bananas, otherwise average Dutch consumer is likely to opt for conventional bananas as a first choice.

In the case of French data, the results show that respondents' WTPs for fairtrade bananas and for bananas with lower carbon dioxide emissions are not statistically different. Therefore, these two types of ethical bananas are competing and average French respondent is likely to buy the cheapest one of these two types of bananas as long as its retail price is lower than her/his WTP. Nonetheless, the results show that French respondents are willing to pay a significantly higher price premium for organic bananas than for fairtrade bananas. Therefore, if fairtrade and organic bananas are sold at similar price, average French respondent is likely to buy organic bananas as long as the price is lower than his or her WTP. Nonetheless, if the retail price premium for organic bananas with respect to fairtrade bananas is higher than 0.04€ per banana (i.e. 0.04 = 0.13 - 0.09), average French consumer may opt to purchase fairtrade bananas. Therefore, a way to incentivise French consumer to purchase fairtrade bananas consists in maintaining the retail price for fairtrade bananas lower than the price for organic bananas by more than 0.04€ per banana. The results also show that average French consumer may opt to buy conventional bananas if the retail price premium for fairtrade banana is higher than 0.09€ per banana.

Finally, it is noteworthy that as regard carbon footprint attribute we reported and interpreted respondents' WTP for a reduction of 1kg of carbon dioxide emissions during the transport of bananas. Nonetheless, the results also show that a higher reduction in carbon dioxide emissions will be rewarded by a higher consumers' WTP and, hence, a higher competitive power of this type of ethical bananas. This is important at least for two reasons: (1) European producers of bananas (i.e. Spain) can benefit from the price premium consumers are willing to pay for environmentally-friendly bananas if they label their bananas as having lower carbon footprint and make them available to European consumers, and (2) people engaged with the production and commercialization of fairtrade bananas need to be prepared to adjust their marketing strategies to be able to compete with bananas with lower carbon footprint once they become available in retail stores beside the other ethical bananas.

Results displayed in table 6 show that Scottish, Dutch and French respondents' WTPs for fairtrade bananas are not statistically different. French respondents revealed to be willing to pay a significantly higher price premium for organic bananas than Scottish and Dutch respondents. Nonetheless, Scottish and Dutch respondents' WTP for organic bananas were found to be statistically similar. Finally, results also show that for carbon dioxide emissions, Scottish respondents are willing to pay a lower price premium than Dutch and French respondents. However, French and Dutch respondents' WTP for bananas with lower carbon dioxide emissions were found to be statistically similar. As mentioned in the experimental design section, the difference of sample size between countries urges the readers to interpret the results displayed in table 6 with caution.

Table 6 goes here

To sum up, consumers preferences and WTP in Scotland, the Netherlands and France for ethical bananas showed that: (1) respondents in the three countries revealed positive preferences for ethical attributes with respect to conventional bananas, (2) Scottish, French and Dutch consumers of bananas are willing to pay a price premium for ethical bananas, (3) the significantly higher retail price of organic bananas makes fairtrade bananas more likely to be the bananas of first choice for an average consumer, (4) consumers are likely to opt to purchase conventional bananas or one of the other ethical bananas if the retail price premium for fairtrade bananas with respect to the other types of bananas is higher than consumers' price premium, (5) to boost the demand for fairtrade food products, the price for these products should be set not only based on product's costs but also based on consumers' WTP and the retail prices for the other ethical food products, and (6) the significant respondents' price premium for bananas with lower carbon footprint is an evidence that producers and retailers of bananas transported for a shorter distance (e.g. bananas produced in Spain compared with the bananas produced in South America) can increase the sales of their bananas if they label them as having lower carbon dioxide emissions during the transport.

6. Conclusion

Several studies on ethical and social food attributes showed that consumers especially in developed countries are willing to pay a price premium for fairtrade foods products. This can lead to the increase of demand for fairtrade food products; which in turn can increase the supply of fairtrade foods, improve the working conditions in fairtrade farms and the benefits from selling these foods are more fairly distributed. The important question that we tried to answer in this study is whether the positive preferences and WTP for fairtrade foods can be negatively influenced by the growing competition from food products with other ethical attributes such as organic and lower food miles or carbon dioxide emissions. In general, our results showed that there is a potential market for fairtrade food products in Europe. Nonetheless, consumers' WTP and the retail prices of other ethical foods have to be taken into consideration to develop a pricing strategy for fairtrade foods that makes them more competitive than conventional and the other ethical food products

We think that our study is a first attempt to assess consumers' preferences and WTP for different ethical food products in different European countries using the same choice experiment. Nonetheless, we must admit that our study is far from being perfect due to several limitations. For instance, the size of the samples is relatively small. Therefore, a complete and more accurate picture of the topic can be obtained only when large and representative samples of shoppers in the targeted populations are used. Furthermore, purchasing food products for the first time does not guarantee repetitive future purchases of the same product. In fact, after tasting the product, consumer may decide to stop buying this product because of its unwanted taste. In our study, we did not control for the taste and, therefore, we were unable to check the robustness of our results after tasting the bananas. Finally, in our study we used a cheap talk script to reduce the effect of hypothetical bias. Results from previous studies on the effectiveness of cheap talk in reducing hypothetical bias are, however, mixed. Therefore, we are unable to confirm that out results are not suffering from hypothetical bias. Unfortunately due to the lack of funding and the prohibitive cost of conducting non-hypothetical choice experiments in the three countries, we opted for conducting the choice experiments in hypothetical setting (face to face interviews without any monetary incentive) using a cheap talk script. Therefore, we warmly encourage future research studies on the same topic to avoid as much as possible the aforementioned limitations to obtain more robust results.

References:

Andorfer, V. A., and Liebe, U., (2012). Research on fair trade consumption—A review. *Journal of business ethics*. 106(4), 415-435.

Arnot, C., Boxall, P. C., and Cash, S. B., (2006). Do ethical consumers care about price? A revealed preference analysis of fair trade coffee purchases. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie*. 54(4), 555-565.

Basu, A. K., and Hicks, R. L., 2008. Label performance and the willingness to pay for Fair Trade coffee: A cross-national perspective. *International Journal of Consumer Studies*. 32, 470–478.

Carlsson, F., Garcıa, J. H., and Lofgren, A ., (2010). Conformity and the demand for environmental goods. *Environmental Resource Economics*. 47, 407–421.

Connolly, J., and Shaw, D., 2006. Identifying fair trade in consump tion choice. *Journal of Strategic Marketing*. 14, 353–368

Cranfield, J., Henson, S., Northey, J., and Masakure, O., (2010). An assessment of consumer preference for Fair Trade coffee in Toronto and Vancouver. *Agribusiness*. 26(2), 307-325.

Cummings, Ronald G. and Laura O.Taylor. (1999). "Unbiased Value Estimates for Environmental Goods: A Cheap Talk Design for the Contingent Valuation Method." American Economic Review, 89(3): 649-666.

De Pelsmacker, P., Driesen, L., and Rayp, G. (2005). Do consumers care about ethics? Willingness to pay for fair-trade coffee. *Journal of consumer affairs*. 39(2), 363-385.

Didier, T., and Lucie, S., (2008). Measuring consumer's willingness to pay for organic and Fair Trade products. *International Journal of Consumer Studies*. 32, 479–490.

Fairtrade International., 2013a. Ulocking the power. Annual report 2012-2013. Retrieved at: http://www.fairtrade.net/fileadmin/user_upload/content/2009/resources/2012-13_AnnualReport_FairtradeIntl_web.pdf.

Fairtrade International., (2013b). Monitoring the scope and benefits of fairtrade. fifth edition. Retrieved at: http://www.fairtrade.net/fileadmin/user_upload/content/2009/resources/2013-Fairtrade-Monitoring-Scope-Benefits_web.pdf.

Galarraga, I., and Markandya, A., (2004). Economic techniques to estimate the demand for sustainable products: A case study for Fair Trade and organic coffee in the United Kingdom. *Economia Agraria y Recursos Naturales*. 4, 109–134.

Hanley, N., Wright, R. E., and Adamowicz, V., (1998). Using choice experiments to value the environment. *Environmental and Resource Economics*. 11, 413–428.

Hensher, D.A., Rose, J.M., and Greene, W.H. 2005. Applied choice analysis: A primer. Cambridge: Cambridge University Press.

Hanley, N., Wright, R. E., and Adamowicz, V. (1998). Using choice experiments to value the environment. *Environmental and Resource Economics*. 11, 413–428.

Meijer, E., and Rouwendal, J. (2006). Measuring welfare effects in models with random coefficients. *Journal of Applied Econometrics*. 21(2), 227-244.

Newholm, T., and Shaw, D., 2007. Studying the ethical consumer: A review of research. *Journal of Consumer Behavior*. 6, 253–270.

Nicholls, A., and Opal, C., (2005). Fair trade: Market-driven ethical consumption. *Sage*.

Onozaka, Y., and Mcfadden, D. T., (2011). Does local labeling complement or compete with other sustainable labels? A conjoint analysis of direct and joint values for fresh produce claim. *American Journal of Agricultural Economics*. 93(3), 693-706.

Rousu, M. C., and Corrigan, J. R., (2008). Estimating the welfare loss to consumers when food labels do not adequately inform: An application to fair trade certification. *Journal of Agricultural and Food Industrial Organization*. 6(1), article 3.

Street, D. J., and Burgess, L., (2007). The construction of optimal stated choice experiments: Theory and methods (Vol. 647). John Wiley and Sons.

Tallontire, A., Rentsendorj, E. and Blowfield, M., (2001). Ethical consumers and ethical trade: A review of current literature. Series 12. *Chatham: Natural Resource Institute Policy*.

Train, K., and Weeks, M., (2005). Discrete choice models in preference space and willingness-to-pay space (pp. 1-16). Springer Netherlands.

Trudel, R., and Cotte, J., (2009). Does it pay to be good? *MIT Sloane Management Review*. 50, 61–68.

Table 1: Socio-demographic characteristics of respondents

Variable	Categories	Scotland (%)	Netherlands (%)	France (%)
Gender	Female	73	75	65
	Male	27	25	35
Age	18-29	28	25	46
	30-64	54	58	53
	65 and older	18	17	1
Education	Primary studies	9	6	13
	Secondary studies	8	19	4
	University studies	42	31	58
	Postgraduate studies	41	44	25
Annual Household income (£/€)	Less than 10.000	23	23	22
	10.000 - 19.999	16	15	16
	20.000 – 34.999	13	23	24
	35.000 - 54.999	20	9	24
	55.000 – 99.999	12	23	12
	More than 100.000	5	6	2

Table 2: Description of the variables used in the estimations

Variables	Name	Description
FT	Fairtrade	Dummy variable that take the value of 1 if the banana is labelled as fairtrade and 0 otherwise.
ORG	Organic	Dummy variable that take the value of 1 if the banana is labelled as organic and 0 otherwise.
CO2	Carbon footprint	Quantitative variable that takes one of these four carbon footprint levels: 697 g of CO2 (from Canary Islands - Spain), 1143 g of CO2 (from Ghana), 1880 g of CO2 (from Ecuador), 2619 g of CO2 (from Indonesia)
PRICE	Price	Quantitative variable that takes one of these four price levels: £0.13, £0.18, £0.23, and £0.28 per banana in Scotland and 0.13€, 0.18€, 0.23€, and 0.28€ in the Netherlands and France
NONE	No-choice option	Dummy variable that take the value of 1 if no-choice option is chosen and 0 otherwise.
INC	Household income	Dummy variable that take the value of 1 if the household income is greater or equal to (£) 55,000€ and 0 otherwise.
AGE	Age of respondent	Continuous variable expressed in number of years
EDU	Education level	Dummy variable that take the value of 1 if respondent has at least some university studies and 0 otherwise.

Table 3: Results from the estimation of the random parameter models

Variables	Scotland	Netherlands	France	All respondents
Random parameters				
FT	1.787***	1.559***	.881***	.553**
ORG	.874***	1.489***	1.599***	.624***
CO2	-1.087***	-2.034***	-1.355***	-.844***
PRICE	-21.942***	-18.200***	-13.465***	-16.539***
Non-random parameters				
NONE	-8.190***	-9.787***	-4.878***	-6.685***
Standard deviations of parameter distributions				
sdFT	1.955***	2.265***	.891***	1.503***
sdORG	1.252***	1.344***	1.531***	1.378***
sdCO2	1.270***	1.822***	1.291***	1.336***
sdPRICE	13.624***	13.671***	11.942***	13.062***
Heterogeneity in mean				
FT:INC	FP	1.907***	1.103**	.641**
FT:AGE	FP	FP	FP	.016***
ORG:EDU	FP	FP	FP	.823***
CO2:EDU	FP	FP	FP	-.595**
PRICE:EDU	6.223**	FP	FP	1.292
Diagonal values in Cholesky matrix, L.				
NsFT	1.955***	2.265***	.891***	1.503***
NsORG	1.238***	1.338***	1.514***	1.333***
NsCO2	1.156***	1.683***	1.129***	1.139***
NsPRICE	10.341***	10.537***	11.459***	12.149***
Below diagonal values in L matrix. V = L*Lt				
ORG:FT	-0.185	0.132	-0.224	-.347**
CO2:FT	-.350*	-.550**	-0.023	-.230*
CO2:ORG	-.390***	-0.429	-.626***	-.660***
PRICE:FT	4.401**	-2.507	-0.697	1.021
PRICE:ORG	6.193***	5.937**	-0.554	-0.228
PRICE:CO2	-4.576***	-5.858***	-3.243*	-4.683***
Observations	1600	832	1520	3952
LogL	-844.13	-403.45	-1007.75	-2326.75
CHI2	1827.28	1021.18	1324.26	4029.92
P-Value	0.00	0.00	0.00	0.00

*** (**) (*) Statistically significant at 1% (5%) (10%) level
FP: fixed parameter
The number of observations is equal to the number of participants multiplied by the number of choice sets (i.e. 16) completed by each participant.

Table 4: Estimated willingness to pay space in €

Variables	Scotland	Netherland	France	All respondents
Fairtrade	.14***	.13***	.09***	.10***
(St. Error)	*(.016)*	*(.033)*	*(.016)*	*(.012)*
Organic	.08***	.09***	.13***	.09***
(St. Error)	*(.011)*	*(.025)*	*(.018)*	*(.009)*
Carbon footprint	.09***	.12***	.12***	.10***
(St. Error)	*(.009)*	(.020)	*(.0171)*	*(.008)*
Standard deviations of WTP distributions				
Fairtrade	.112***	.124***	.083***	.122***
Organic	.072***	.085***	.127***	.110***
Carbon footprint	.059***	.086***	.104***	.083***

*** (**) (*) Statistically significant at 1% (5%) (10%) level

Table 5: Differences of WTPs between attributes

		Wilcoxon rank-sum test
Variables	**Countries**	p-value
Scotland	Fairtrade * Organic	.00
	Fairtrade * Carbon footprint	.04
	Organic * Carbon footprint	.02
Netherland	Fairtrade * Organic	.39
	Fairtrade * Carbon footprint	.71
	Organic * Carbon footprint	.06
France	Fairtrade * Organic	.02
	Fairtrade * Carbon footprint	.12
	Organic * Carbon footprint	.37

Table 6: Differences of WTPs between countries

		Wilcoxon rank-sum test
Variables	**Countries**	p-value
Fairtrade	Scotland * Netherland	.43
	Scotland * France	.07
	Netherland * France	.48
Organic	Scotland * Netherland	.09
	Scotland * France	.00
	Netherland * France	.03
Carbon footprint	Scotland * Netherland	.04
	Scotland * France	.07
	Netherland * France	.78

Figure 1: example of a choice set included in the choice task carried out in Scotland.

Attributes	Option 1	Option 2	No-choice option
Fair Trade	Not Fairtrade	Fairtrade	None
Organic	Organic	Not Organic	of the
Carbon Footprint (from transport)	1880 g CO_2 (equivalent to 4.4 miles in a medium-sized car)	2619 g CO_2 (equivalent to 6.1 miles in a medium-sized car)	two
Price	£ 0.23	£ 0.28	options
	☐	☐	☐
Please indicate your most preferred option (mark your choice)			