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Improving the living and working conditions of migrant seasonal workers – Assessing consumer preferences for hypothetical, domestic, fair trade apples

Thiermann, Insa^a, Latacz-Lohmann, Uwe^b

^a Wageningen University and Research, Agricultural Economics and Rural Policy Group, Hollandseweg 1, 6706 KN Wageningen, the Netherlands, insa.thiermann@wur.nl

^b Kiel University, Farm Management and Production Economics, Wilhelm-Seelig Platz 6/7, 24118 Kiel, Germany, ulatacz@agric-econ.uni-kiel.de

Abstract

This article assesses consumer preferences for improved living and working conditions for migrant seasonal workers in Germany. The analysis is based on a discrete choice experiment (DCE) with 227 consumers. Consumers were presented with the choice of buying standard apples or apples produced under improved conditions. A mixed logit model was used for the analysis of the data. The predicted probability of choosing an apple produced under improved conditions is 85 %. For most of the attributes, significantly positive estimates were found. Consumers value higher minimum wages, the obligation to participate in the German social security system, and bonus payments on Sundays and public holidays. Higher prices and longer working hours per week decrease the probability of opting for an apple. The attributes with the least importance relate to accommodation. The significant attributes indicate the aspects for which society perceives the greatest need for action. These could be addressed to improve the living and working conditions of migrant seasonal workers.

Key Words: Discrete Choice, Seasonal Workers, Domestic Fair Trade, Social Rights, COVID-

19

1. Introduction

The COVID-19 pandemic shed light on various challenges facing society, for example, the vulnerability of (food) supply chains. It highlighted, among many other things, the great importance of the workforce from Eastern European countries. Seasonal workers were classified as critical workforce at the start of the pandemic (Szelewa and Polakowski, 2022). They were, therefore, allowed to fly into other EU countries even after the EU decided to close the borders in the Schengen region for 30 days (Augère-Granier, 2021). The reason for this was that the largest share of the workforce for fruit and vegetable production comes from abroad, and the Western governments were worried about food shortages (Szelewa and Polakowski, 2022).

However, large COVID-19 outbreaks in slaughterhouses (Pokora et al., 2021) and on farms (Charlton, 2021) also raised awareness among researchers, consumers, and politicians of the employment conditions of seasonal workers. Living and working conditions at farms and in the agribusiness sector make seasonal workers especially vulnerable to infections. Research from the US shows that seasonal workers in agriculture were 4.5 % more likely to infect themselves with COVID-19 than other employees (Charlton, 2021). These higher infection numbers were attributed to the high mobility of seasonal workers (Charlton, 2021), to difficulties in always comply with the minimum distance of 1.5 m, and to ventilated work environments (Pokora et al., 2021).

Because of their essential role and their vulnerable position, the European Commission now aims to issue new regulations that ensure better protection of migrant seasonal workers. Additionally, stricter controls will be introduced to assure the proper implementation of existing regulations (Augère-Granier, 2021). Research on the living and working conditions of migrant seasonal workers has increased since the pandemic and could provide valuable information for the upcoming legislation.

Some of the recent articles focus on infection processes (Pokora et al., 2021; Charlton, 2021), while others analyse the regulations that were in place during the pandemic (Szelewa and Polakowski, 2022; Neef, 2020). There are also articles that describe the harsh living and working conditions of seasonal workers in great detail (Collins et al., 2022; Fialkowska and Matuszczyk, 2021). However,

none of the articles consider possible changes in legislation that could improve living and working conditions in the future.

This article seeks to analyse the aspects of the current employment conditions for which society perceives the greatest need for action by evaluating consumer preferences for improved living and working conditions. The analysis is based on a discrete choice experiment (DCE). The experiment explicitly includes as attributes current legal aspects (minimum wage rates, number of working hours, insurance in the social security system, accommodation requirements, and payments for work on Sundays and public holidays), and possible improvements. Articles on consumer preferences for articles produced under improved conditions (so-called fair trade products) usually refer to a production abroad (e.g., Basu and Hicks, 2008; Rombach et al., 2021) and do not address specific conditions.¹ To our knowledge, no article examines preferences for domestic fair trade fruits and vegetables produced in Europe. However, the idea is not new. Howard and Allen (2008) and Brown and Getz (2008) analysed the potential of domestic fair trade labels for the US.

This article is structured as follows. In section 2, the legislative background within Germany is briefly reiterated. Section 3 describes the methodology (the DCE and the model) and contains the main hypotheses. Section 4 presents the results, which are critically discussed in section 5. The article closes with conclusions (section 6).

2. Legislative Background

Almost a million migrant seasonal workers come to Northern and Central Europe each year, of which roughly 300,000 work in Germany. They are mainly from Poland and Romania (BMEL, 2020; Augère-Granier, 2021). Generally speaking, these seasonal workers are entitled to fully equal treatment with German nationals or the national of countries they are in (Article 45 TFEU,

¹ They usually just refer to fair trade certification. The fair trade umbrella organisation guarantees fair payments, fair prices (fair trade practices) and good working conditions, and a ban on child labour, and also seeks to protect the climate and environment (World Fair Trade, 2023).

Directive 2014/54/EU). The legal requirements in Germany that are relevant for the experiment are described below. They are based on seminar material by Spiess (2022) and Spiess (2021).²

In 2015 Germany introduced a **minimum wage** of € 8.50 per hour. However, during the first few years, exceptions applied for agriculture. The minimum wage in agriculture was € 7.20 per hour and increased incrementally. In July 2022, the minimum wage was € 10.45 per hour in agriculture, and from October 2022, € 12.00 per hour needed to be paid in all sectors (*Mindestlohngesetz*).

The minimum wage is usually a gross minimum wage, and employees pay a share of their wages into the **social security system**. The social security system includes payments for health, unemployment, long-term care, and pension insurance. In total, a share of 20.5 % of gross wages is paid into the social security system by the worker. Additionally, the same share is paid by the employer.³ On top of the payments into the social security system, a wage tax is levied, which is based on individual characteristics, such as the wage level and marital status. It ranges from 14 to 42 % (*Einkommenssteuergesetz*).⁴

However, for migrant seasonal workers, there can be exceptions. If they are employed on a short-term basis, there is no obligation to pay into the social security system. This is the case if seasonal workers are employed for less than three months or for a maximum of 70 days per calendar year. In addition, the exception can only apply if the seasonal work is not carried out professionally. This means that only migrant seasonal workers that have an alternative profession and work for less than 70 days do not have to pay into the social security system. Consequently, social insurance is compulsory for the unemployed, but not for seasonal workers who are housewives, students or those employed in their home country and working in Germany during their holidays. Since 2022, private health insurance is also necessary for migrant seasonal workers in Germany who are not obligated to pay into the social security system.⁵

² An English summary of the German legislative background is, for instance, provided by the German Employment Agency (2021). References to German laws are presented in italic script.

³ This share is distributed as follows: 8.4 % of the employee's gross wages are paid for health insurance, 9.35 % for pension insurance, 1.5 % for unemployment insurance, and 1.25 % for long-term care insurance.

⁴ In the case of seasonal work the wage tax is calculated as a flat rate of 5% (*Paragraph 40, Einkommenssteuergesetz*). Additionally, a church tax and a solidarity tax for unfavourable regions is levied for everyone.

⁵ There are no reliable figures on how many harvest workers in Germany were not subject to social security contributions. However, a report on Bavarian radio refers to a telephone conversation with the Ministry of Labour and gives a figure of 70 % (BR, 2020).

The maximum number of **working hours** is regulated in the German Working Hours Act (*Arbeitszeitgesetz*). It also applies to agriculture. It states that a weekly average working time of 48 hours per year must not be exceeded. Consequently, workers can usually work six days per week for eight hours per day. However, this amount can be extended to 10 hours and, during the harvesting seasons, even to 12 hours per day. Farmers need to apply for permission to extend working hours to prevent crop failure. If granted, up to 60 hours per week are possible. In the case of fixed employment, additional rest periods need to be granted afterward to ensure that an average of 48 hours per week is not exceeded over the whole year. For short, temporary contracts, a compensation for the extra hours worked does not take place during the term of the contract (*Paragraph 3 Section 2 Arbeitszeitgesetz*).

In general, **working on Sundays** is forbidden in Germany (*Article 139 Grundgesetz*), and therefore the maximum of 48 hours is usually not exceeded. Exceptions also apply for seasonal workers and working on Sundays can be approved by the authorities. In the case of employees working on Sundays, there is no entitlement to higher pay. As seasonal workers are employed for a fixed term, a written employment contract covering the described aspects is mandatory (*Paragraph 14 Abs. 3 Teilzeit- und Befristungsgesetz*).

Farmers usually also provide **accommodation** and seasonal workers often live on the farm in shared rooms. When sharing rooms with up to six people, each person must have at least 6 m² of space. If more than six people share a bedroom, at least 6.75 m² must be offered. During the pandemic, rooms were only allowed to be shared by no more than four people, regardless of the room size. In general, accommodations needed to be large enough to allow social distancing and the reduction of contact. Also during the pandemic, farms had to ensure hygiene, offer disinfectants, masks, and regular testing (*SARS-CoV-2-Arbeitsschutz Verordnung*). For seasonal workers living on the farm, rental contracts that are independent of the employment contract are required. The rent must be oriented to prices in the region for comparable accommodation (German Employment Agency, 2021).

3. Methodology

3.1 Research Hypotheses – Factors Relevant for the Decision to Buy ‘Fairer’ Apples

In this case study, German apple production is presented as an example, and the features of a hypothetical label for German fair trade apples are analysed. Apples were chosen because they are the most popular fruit in Germany; 79 % of consumers buy apples (Janson, 2017). In addition, apples in supermarkets show low price variance and almost no seasonal variance. All year round, a kilogram of apples is usually sold for € 1.99 (Jalovec, 2012). Considering the producers’ side, apples are the most important branch of fruit production. They were grown on 33 thousand hectares in Germany in 2022. This accounts for 67 % of the German tree fruit cultivation (German Federal Statistical Office, 2022).

The attributes for the DCE were chosen based on the current legislative framework. The levels of the attributes in the choice sets represent a tightening of legislation with the aim of improving living and working conditions. However, the production costs at the farm, and thus the prices, are expected to increase when ‘fairer’ apples are grown. For this reason, possible increases of apple prices were considered as well.

In the choice sets, the **prices for apples** in supermarkets produced under improved conditions were raised between zero and 100 %. The upper limit accounts for the fact that fair trade products are sometimes twice as expensive as standard products. We expect consumers to react sensitively toward price increases. Howard and Allen (2008) show that consumers seem to accept slight price increases of 3 %, whereby 87 % would buy ‘fairer’ strawberries. For price increases of 100 %, this share decreases to 35 %.⁶

The second attribute was an **increase in the minimum wage** paid per hour. The minimum wage is € 12 per hour. In the choice sets the wage increased by an additional amount between € 2.00 and € 6.00 per hour. The upper wage chosen for the choice sets represents almost the average German wage level. In 2021, the average wage paid in Germany was € 19 per hour (Statista, 2021). It is

⁶ Their fair trade strawberries covered the following aspects: a pledge from retailers to cover the costs of production, and a pledge from farmers to pay a living wage, to recognize the right to collective bargaining, and to provide health and safety protection.

assumed that consumers are in favour of higher wages. This is, for instance, indicated in Howard and Allen's (2008) article.

As described, exceptions from the requirement to pay a share of wages into the social security system are usually granted to seasonal workers. However, labour unions such as 'Faire Mobilität' argue that seasonal work is often the main source of income for seasonal workers, even though they may have other employment in their home countries. They therefore argue that the contribution requirement should extend to all seasonal workers to ensure that they are better secured in illness and in old age (Faire Mobilität, 2022). For this reason, **participation in the social security system** was included as the third attribute.⁷ During the COVID-19 crisis, interest in the employment conditions of seasonal workers increased. We therefore expect a significantly positive effect from the obligation.

In addition to these attributes, the **maximum number of working hours** was shortened in some choice sets. The levels ranged from 40 hours to the current maximum of 60 hours. Additionally, some choice sets included bonus payments for work on **public holidays and Sundays**. These changes were included to account for the fact that seasonal work is associated with long working hours on almost every day of the week (Augère-Granier, 2021; Collins et al., 2022). A lack of recovery time could increase susceptibility to infection, and appears to be true (Collins et al., 2022). This is because leisure time is necessary from recovering from stress and fatigue. Additionally, it is described as an important factor for human wellbeing in general (Caldwell, 2005).

The experiment seeks improvements in **accommodations** by restricting the maximum amount of people per room (single and double rooms). This attribute refers to possibly crowded living and working environments that could boost infections by making it more difficult to comply with minimum distances. This was identified as one of the drivers of COVID-19 infections (Pokora et al., 2021). For these last three attributes (decrease of maximum working hours, bonus payments, and improvement in accommodation) positive effects on the predicted probability of choosing an apple are expected.

⁷ The experiment features a hypothetical product and it is assumed that it would also be possible to voluntarily contribute. The survey participants were informed that health insurance is already mandatory.

3.2 Experiment Design

The attributes and their levels are presented in Table 1. The design was made using *dcreate* in Stata. The D-efficiency was estimated to be 93 %, and included 18 choice cards. According to the literature, designs with a D-efficiency above 90 % are sufficiently good (Auspurg and Hinz, 2015). The choice sets were distributed over three questionnaires. For each choice set, two hypothetical ‘fairer’ apples and the option out (buying a standard apple) were presented. Therefore, the participants were not forced to choose an apple. The participants were informed that the ‘fairer’ apples would be clearly labelled.

The survey was conducted online by a marketing research company in July 2022.⁸ In addition to the choice sets, consumer characteristics were surveyed. The questions referred to their income, age, education, and purchasing behaviour. These questions were included because research articles, for instance, Howard and Allen (2008) and Mahè (2010), show that these characteristics influence the decisions of consumers to buy sustainable products.

Table 1. Attributes used in the discrete choice experiment (source: own representation)

Attribute Description	Levels
Product price	€ 1.99 / kg; € 2.49 / kg; € 2.99 / kg; € 3.49 / kg; € 3.99 / kg
Minimum wage paid per hour	Minimum wage by law + € 0 / h; + € 2 / h; + € 4/h; + € 6 / h
Obligation to participate in the social insurance system	Obligated; not obligated
Bonus payment for work on Sundays and public holidays	No bonus, € 25 / day; € 50 / day
Maximum number of working hours	40 hours / week; 50 hours / week; 60 hours / week
Accommodation (max. people per room)	Single bedroom; double bedroom; shared bedroom

⁸ When analysing the results it needs to be considered that inflation had started to rise and consumers may have been more hesitant to buy more expensive products.

The survey also included so-called catch questions to screen out participants who just clicked through the questions without actually reading them. Using this procedure, three observations were deleted prior to the estimation. Additionally, participants were asked beforehand whether they buy apples in supermarkets. Only participants stating that they do could continue the survey.

3.3 Economic Estimation

The descriptions of the model are based on Train (2009). It is assumed that the participant (n) chooses the apple that is valued the most from a set of J alternatives. The utility from buying an apple (U_{ni}) can be divided into an observable component (V_{ni}) and an unobservable component (ε_{ni}). The observable component is influenced by the attributes (x_{ni}) of the apple. The estimated coefficients (β) determine their influence (Equation 1):

$$U_{ni} = V_{ni} + \varepsilon_{ni} \quad (1)$$

The original conditional logit model assumes a homogenous distribution of preferences, implying that the estimators are the same for all decision makers. In the conditional logit model the predicted probability (L_{ni}) of choosing a product is determined as follows for the parameters β (Equation 2):

$$L_{ni}(\beta) = \frac{e^{V_{ni}(\beta)}}{\sum_{j=1}^J e^{V_{nj}(\beta)}} \quad (2)$$

The estimated mixed logit model assumes that the estimators (β) are continuously distributed and not homogenous. The mixing distribution is described as $f(\beta)$. The probability of choosing an alternative i becomes an integral over the values of β (Equation 3):

$$P_{ni} = \int \left(\frac{e^{\beta' x_{ni}}}{\sum_j e^{\beta' x_{nj}}} \right) f(\beta) d\beta \quad (3)$$

The characteristics of the participants were included as interaction effects with the alternative-specific constant (ASC). The interaction effects provide information on the characteristics affected the decision to buy an apple (Auspurg and Liebe, 2011).

Even though the mixed logit accounts for preference heterogeneity and allows for the consideration of the characteristics of participants using interactions, it does not provide much information on

which attributes are perceived differently. Additionally, a latent class model was applied to gain deeper insight into preferences. In latent class models, participants with similar preferences are sorted into preference classes with homogenous preferences. This means that β takes only M possible values (labelled $b_1 \dots b_m$). The probability to observe that $\beta = b_m$ is s_m . Class-specific probabilities can be calculated and depend on the class-specific estimates using the conditional logit formular. S_m is also the share of respondents in per class, the probability to belong to a certain class depends on the characteristics of the participants. The probability to observe a choice can be calculated from the class share and the class-specific predicted probabilities:

$$P_{ni} = \sum_{m=1}^M s_m \left(\frac{e^{b'_m x_{ni}}}{\sum_{j=1}^J e^{b'_m x_{nj}}} \right) \quad (4)$$

4. Results

4.1 Descriptive Statistics of the Sample

The descriptive statistics of the consumer sample are presented in Table 2. The average respondent in the sample is 50 years old, slightly older than the German average. The average inhabitant of Germany is 45 years old (Statista, 2020). The largest share of participants have a household income of more than € 3,000 per month. The German average value is € 3,600 (after taxes) (Statista, 2022). However, only 33 % of the participants have a university degree, which is slightly below the German average (BPB, 2019).

Other questions in the survey addressed consumer buying behaviour. They show that most of the participants buy their groceries in supermarkets (73 %) and discounters (56 %). Their buying decisions are mostly based on the perceived quality of the product (36 %), personal taste (30 %), and product price (25 %). Half of the participants (48 %) stated that they know the ‘fairtrade’ label that is used, for instance, for coffee and cacao. However, only 26 % said that they buy fair trade products. This is much lower than Fairtrade Germany assumes; they state that 66 % of the population buys fair trade products (Fairtrade Germany, 2018).

Table 2. Descriptive Statistics of the Consumer Sample (n =227) (source: own calculation)

Variable	Mean (Std. Dev.)	Description
Female	0.45	Share of female participants
Age	50.70 (13.36)	Age of the participants in years
Higher Education	0.33	Share of participants with university degrees
Income category up to € 1,000	0.03	Share of participants in the income category (< € 1,000)
Income category up to € 2,000	0.10	Share of participants in the income category (€ 1,000 - € 1,999)
Income category up to € 3,000	0.17	Share of participants in the income category (€ 2,000 - € 2,999)
Income category > € 3,000	0.22	Share of participants in the income category (> € 3,000)
Buys Fair Trade	0.26	Share of participants who buy fair trade products
Buys at Farmers' Markets	0.23	Share of respondents who chose farmers' markets as one location where they buy their groceries
Buys at Supermarkets	0.73	Share of respondents who chose supermarkets as one location where they buy their groceries
Buys at Organic Supermarkets	0.14	Share of respondents who chose organic supermarkets as one location where they buy their groceries
Buys at Discounters	0.56	Share of respondents who chose discounters as one location where they buy their groceries
Buys based on Price	0.25	Share of respondents who selected price to be one of their top three criteria when shopping for groceries
Buys based on Taste	0.30	Share of respondents who selected taste to be one of their top three criteria when shopping for groceries
Buys based on Season	0.09	Share of respondents who selected seasonality to be one of their top three criteria when shopping for groceries
Buys based on Quality	0.36	Share of respondents who selected quality to be one of their top three criteria when shopping for groceries
Buys based on Appearance	0.17	Share of respondents who selected appearance to be one of their top three criteria when shopping for groceries
Buys based on Regionality	0.20	Share of respondents who selected regionality to be one of their top three criteria when shopping groceries
Buys based on Production (Organic)	0.09	Share of respondents who selected organic production practices to be one of their top three criteria when shopping for groceries
Buys based on Fairer Production Standards	0.04	Share of respondents who selected fairness to be one of their top three criteria when shopping for groceries
Buys based on Nutrition	0.01	Share of respondents who selected nutritional aspects to be one of their top three criteria when shopping for groceries
Buys based on Preparation	0.01	Share of respondents who selected food preparation time to be one of their top three criteria when shopping for groceries
News about Covid-19	0.63	Share of participants who followed the news on COVID-19 outbreaks in slaughterhouses and on farms

4.2 Factors Relevant for Consumers' Decision to Buy a 'Fairer' Apple

Table 3 shows the mixed logit model used to explain the consumers' decision to buy an apple produced under improved living and working conditions. The model was chosen using the likelihood ratio test. Where the likelihood ratio test was undefined a robust Wald test was used. Some of the socio-economic characteristics had no explanatory power and were excluded.⁹ For the attributes product price and minimum wage paid per hour, the linearity assumption was controlled using dummy coding (Mariel et al., 2021).¹⁰

Table 3. Mixed logit model to explain consumers' decision to buy a 'fairer' apple (obs.= 4,086)

(Source: own calculation)

	Coef.	P>z	Std. Dev.	P>z
Attributes of the apples				
Product price (€ per kg)	-1.788***	0.000	2.137***	0.000
Minimum wage paid per hour	0.163***	0.000	0.140**	0.020
Bonus payment (€ 25.00 per day)	1.053***	0.000	-0.222	0.778
Bonus payment (€ 50.00 per day)	0.935***	0.000	0.027	0.967
Maximum number of working hours	-0.025***	0.005	0.054***	0.000
Obligation social insurance system	1.045***	0.000	1.586***	0.000
Accommodation (single room)	0.145	0.432	-0.675***	0.008
Accommodation (double room)	0.277*	0.099	-0.091	0.861
ASC	-1.414	0.279	2.415***	0.000
Interaction effects with consumer characteristics				
ASC x Female	1.624***	0.004		
ASC x Age	0.027	0.198		
ASC x Higher Education	-1.472***	0.007		
ASC x Buys Fairtrade	1.152**	0.048		
ASC x Buys at Supermarkets	1.111*	0.082		
ASC x Buys at Organic Supermarkets	-1.475	0.109		
ASC x Buys based on Regionality	1.900***	0.003		
ASC x Buys based on Production (Organic)	2.357**	0.021		

(Level of Significance: *** 99 %, ** 95 %, * 90 %)

⁹ The attributes determined as uninfluential are: income level, location (city or countryside), household members, shopping frequency, and aspects of buying behaviour (shops at discounters, buys based on: taste, season, quality, appearance, nutrition or preparation).

¹⁰ The linearity assumption could not be tested for the maximum number of working hours because only three levels are included. However, the log-likelihood and the pseudo-R squared values for a model holding the working hours as dummies indicate that a linear model is to be preferred.

The pseudo- R^2 of the chosen model is 0.319. According to Hensher et al. (2018) this represents a sufficiently good fit for the model. All of the estimates show the expected signs. The predicted probability of choosing one of the 'fairer' apples is 85 %. The probability increases for products produced with seasonal workers who are paid higher wages and bonus payments for working on Sundays and public holidays, and with the obligation to participate in the social security system. As expected, the predicted probability of choosing one of the 'fairer' apples decreases for more expensive products. In addition, longer working hours per week are evaluated negatively. They decrease the predicted probabilities of choosing a product. The attributes referring to the accommodation on farms seem to be rather unimportant. A significantly positive effect is found for the obligation to offer 'double bedrooms', but the effect is significant at a low level only.

The consumer characteristics reveal that female consumers are more likely to choose an apple than male consumers. Additionally, higher education levels decrease the probability of opting for a hypothetical 'fairer' apple. Consumers more concerned about production conditions are more likely to choose an apple. This is shown by the significantly positive estimates for the dummies 'Buys based on Regionality', 'Buys based on Production (Organic)', and 'Buys Fairtrade'. These dummies took the value one for consumers who stated that those aspects are important for them when buying groceries. In addition, consumers who already purchase products with the Fairtrade label were more likely to choose one of the apples produced under improved conditions. A slightly positive effect is also found for consumers buying at the supermarket.

Unlike the coefficients, marginal effects and WTP values also provide information on the strength of the described effects (Table 4). They show that the price of the product is the most important attribute. An increase in prices by one euro decreases the predicted probability of choosing an apple by 8 percentage points (pp). An increase of the working hours by one hour decreases the predicted probabilities only by 0.1 pp. Therefore, an increase of the maximum number of working hours from 40 to 50 hours per week decreases the predicted probabilities by only 1 pp. It seems that somewhat longer working hours may be tolerated. The estimates for the other conditions show that the obligation to pay into the social security system is important to consumers. It increases the predicted probabilities by 4 pp. An increase in minimum wages is also of higher importance; an increase of one euro increases the predicted probability of choosing an apple by 1 pp. The values

for the bonus payments show that consumers value a bonus payment of € 25 per day as much as a bonus of € 50 per day. Therefore, € 25 per day may be perceived as sufficient.

Table 4. Estimated marginal effects and willingness to pay values (Source: own calculation)

	Marginal Effects	WTP (€ / kg)^b	WTP confidence intervals	
			5 %	95 %
Product price (€ per kg)	-0.08			
Minimum wage paid per hour	0.01	0.10	0.03	0.20
Bonus payment (€ 25.00 per day)	0.04	0.64	0.03	1.25
Bonus payment (€ 50.00 per day)	0.04	0.57	0.02	1.12
Maximum number of working hours	- 0.001	-0.02	-0.03	-0.002
Obligation social insurance system	0.04	0.64	0.04	1.24
Accommodation (single room) ^a	x	x	x	x
Accommodation (double room)	0.01	0.17	-0.08	0.42

^a Marginal effects and WTP values were not calculated for insignificant attributes.

^b Willingness-to-pay was calculated with nlcom ($WTP_{\text{attribute}} = -1 * \text{coef. attribute} / \text{mean cost}$)

The estimated WTP values show that consumers indicated that they are willing to pay an additional 64 cents per kg for the obligation to pay into the social security system. For bonus payments on Sundays and public holidays, these relatively high WTP values are found as well. In contrast, farmers can only expect a price increase of 10 cents per kg for an increase of one euro in minimum wages paid. Only low WTP values are found for decreases in working hours.

As the significant standard deviations in Table 3 indicate that the attributes are perceived differently (Train, 2009), an additional latent class model was estimated (Table 5). Based on the BIC values, a model with two preference classes was chosen. The pseudo R^2 for the latent class estimation is 0.287. The predicted probability to observe a participant choosing an apple was estimated to be 74 %. The second preference chose a ‘fairer’ apple almost with certainty (97 %), while the first preference class did not (44 %). The first preference class accounted for 25 % of the sample and the second for 75 %.

Table 5. Latent class model to reveal heterogeneity in consumers' decision to buy a 'fairer' apple (obs.= 4,086) (Source: own calculation)

	Class 1		Class 2^b	
Class share^d	25 %		75 %	
Class-specific pred. prob.^e	97 %		44 %	
Attributes of the apples	Coef.	P>z	Coef.	P>z
Product price (€ per kg)	-3.609***	0.000	-0.485***	0.000
Minimum wage paid per hour	0.045	0.667	0.090***	0.000
Bonus payment (€ 25.00 per day)	-0.551	0.220	0.642***	0.000
Bonus payment (€ 50.00 per day)	-0.891*	0.081	0.573***	0.000
Maximum number of working hours	-0.012	0.690	-0.014**	0.011
Obligation social insurance system	-0.051	0.889	0.705***	0.000
Accommodation (single room)	-0.608	0.293	0.142	0.256
Accommodation (double room)	-0.070	0.857	0.170	0.150
ASC	1.505*	0.057	1.965***	0.000
Consumer Characteristics (Covariates)				
Female	-0.003	0.830	0.000	0.000
Age	-0.787**	0.042	0.000	0.000
Higher Education	0.833**	0.034	0.000	0.000
Buys Fairtrade	-1.276***	0.003	0.000	0.000
Buys based on Regionality	-1.226***	0.007	0.000	0.000
Buys based on Production (Organic)	-2.939**	0.011	0.000	0.000
Buys at Supermarkets	-0.621	0.131	0.000	0.000
Buys at Organic Supermarkets	1.655**	0.024	0.000	0.000
Constant	0.510	0.591	0.000	0.000

^e Coefficients of the reference category are restricted to zero in the class membership regression.

(Level of Significance: *** 99 %, ** 95 %, * 90 %)

The estimates for the attributes show that the first preference class is price-orientated. Their choice is mostly determined by price, and they even value high bonus payments (slightly) negatively. In contrast, the second preference class values the attributes that represent improved working conditions. As in the mixed logit model increases in minimum wages, bonus payments and the obligation to participate in the social security system are evaluated positively, and higher prices for

apples and longer working decrease the probability to choose an apple. Overall, consumers in preference class 2 could be considered as more engaged.

Overall, the effects of the class membership variables mostly confirm the findings from the mixed logit model. As in the mixed logit model, participants with higher education levels were less interested in the fairer apples and belonged to the first preference class. Additionally, we find that older participants are also less likely to choose a fairer apple. Furthermore, the results confirm that those who buy products with the Fairtrade label and those who buy regional or organic food are more strongly associated with the second preference class and more likely to choose a fairer apple.

5. Discussion

This article analyses consumer preferences for apples produced under improved living and working conditions. The estimated predicted probability of buying a fairer apple was high in the mixed logit and the latent class model. Accordingly, we find using the latent class model that the largest share of consumers would buy an apple produced under improved conditions. The results presented are in line with the literature. Howard and Allen (2008) also find a high probability of consumers in the US buying domestic, 'fairer' strawberries. Furthermore, various articles find a positive perception of imported fair trade products and positive WTP estimates. Comprehensive review articles are provided by Andorfer and Liebe (2012) and Bürgin and Wilken (2021). Mahè (2010) analyses consumer preferences for fair trade bananas in Switzerland and points out that fair trade is particularly successful in Europe, which may also explain the high predicted probability that was estimated.

In comparison to the existing articles on consumer preferences for fair trade (e.g., Basu and Hicks, 2008; Howard and Allen, 2008; Mahè, 2010; Rousseau, 2015; Rombach et al., 2021; Hadad-Gauthier et al., 2022), this article analyses the living and working conditions in detail by including them as attributes. Other articles only add 'production under fair trade standards' as an attribute. The fair trade label guarantees good working conditions, a ban on child labour, and the protection of the climate and environment (World Fair Trade, 2023). They find positive WTP estimates for the fair trade label, which shows that consumers value improvements in working conditions.

However, these results do not allow for the identification of the aspects of working and living conditions that are considered crucial and need to be improved.

The experiment presented in this article considers working conditions in great detail. By doing so, it was able to identify minimum wages, working hours, access to insurance (social security system), improvements in accommodation, and bonus payments for working on Sundays and public holidays as influential factors. Overall, our results confirm the main hypotheses in Section 3.2. However, some results need to be considered in more detail. Three of the attributes seem to be less influential. With respect to the bonus payments offered on Sundays and public holidays, the WTP values are the same for bonuses of € 25.00 and € 50.00 per day. In the latent class model, the higher bonus payment is even evaluated negatively by the first preference class and may have been perceived as too high. Basu and Hicks (2008) show in their case studies for Germany and the US that consumers value fair trade coffee and calculate positive WTP estimates. However, they also found that WTP values for increases in growers' revenue declines beyond particular thresholds. Therefore, once a certain level is reached, WTP does not seem to increase further. This is also indicated with respect to the bonus payments on Sundays and public holidays; the bonus payment of € 25.00 per day seems to be perceived as sufficiently high. Additionally, the results show that increases in working hours only had small effects and may be tolerated to a certain extent. The participants understand that working hours in agriculture can be longer due to seasonal factors. Furthermore, accommodation seems to be of lesser importance. This may be because participants assume that higher wages would enable seasonal workers to find other accommodation themselves if the one offered by the company is not satisfactory.

Including the characteristics of the participants allows for the identification of potential target groups for fairer products. As in Howard and Allen (2008), the findings presented show that consumers who buy organic food are more likely to opt for domestic fair trade. Rousseau (2015) finds that people who are members of nature protection groups are more interested in fair trade chocolate, and Rombach et al. (2021) find that consumers familiar with fair trade are more likely to value fair trade flowers as well. This is in line with our findings that those who buy organic, regional or standard fair trade are more likely to also buy domestic, fair trade apples. Targeted campaigns could address these specific consumers.

However, the results also show that some consumers might not be easily reachable. Just as in this article, Howard and Allen (2008) also found a lower willingness to buy fairer products among consumers with higher education levels. This goes against the conventional wisdom that higher-educated people are more interested in (social aspects of) sustainability. They assume that the result may be explained by the greater social distance between highly paid and educated consumers and seasonal workers. In addition, Howard and Allen (2008), Hadad-Gauthier et al. (2022), and this article all show that men are less likely to buy fairer products. A possible explanation may be that men show lower levels of empathy, as Mestre et al. (2009) shows. That older consumers are less likely to buy fair trade was also found by Mahè (2010) with respect to fair trade bananas. The latent class model further reveals that this may be because consumers with certain characteristics (older, higher education levels) react more sensitively toward price increases. That those interested in fair trade (class 2 in the latent class estimation) coffee seem to be less price sensitive is also described by Arnot et al. (2006).

Importantly, the product price estimates are significant in both estimations and for both latent classes. This shows that the probability of buying the apples will decrease with price increases for all consumers. Among others, Howard and Allen (2008) (for domestic fair trade) and Rombach et al. (2021) (for German consumers) find price sensitivity to be important. Bürgin and Wilken (2021) summarised articles on consumer WTP with respect to fairtrade coffee and conclude that consumers are, on average, only willing to pay 10 percentage points more. This is not particularly high. Depending on the tightening of regulations on living and working conditions, it remains to be seen if product prices would only increase by 10 percentage points. Concerning this price sensitivity, it may also be necessary to consider more expensive products in future studies. Apples are relatively cheap, and this could positively affect the probability of buying more expensive apples. However, these high probabilities might not be found for more expensive products, for example, asparagus. In 2020-2021, the price for a kilogram of asparagus varied between € 8.00 and € 13.00 per kg (AMI, 2022).

Overall, more research on domestic fair trade for fruits and vegetables appears to be necessary. Various research articles analyse consumer preferences for fair trade but mostly in relation to coffee and with production abroad. This is, for instance, shown in a review by Andorfer and Liebe (2012).

However, research shows that the results of DCEs might not hold in other contexts (Andorfer and Liebe, 2012).

Finally, farmers and seasonal workers should be included in further analyses. Surveying farmers would allow for analyses on what tightening of regulations would be easier or more difficult to implement. Additionally, it would allow for the calculation of their willingness-to-accept (WTA) and thus the amount of money required for improvements in production conditions. Latacz-Lohmann and Schreiner (2019) analysed the preferences of German consumers and farmers with respect to animal welfare meat. By determining both the WTP and WTA, they were able to simulate a market. Following the same procedure for domestic, fair trade apples would allow us to answer the question of whether the estimated WTP values are sufficiently high. Low WTP would be problematic for voluntary approaches that allow farmers to label fairer products, and changes in policy that would legally require improvements. In the latter case, this is because production may simply relocate to other countries where living and working conditions cannot be addressed. Surveying seasonal workers would allow us to find out which improvements are crucial for them.

6. Conclusion

This article analyses consumer preferences for apples produced under improved living and working conditions. The high predicted probabilities indicate that German consumers would be interested. Furthermore, the estimated coefficients show the living and working conditions for which society perceives the greatest need for improvement. Domestic fair trade labels or legislative changes could, for instance, require higher wages and moderate bonus payments. Additionally, we find that consumers highly value the obligation to participate in the German social security system. This is important but more difficult to implement as this might only be possible by amending legislation. However, companies interested in domestic fair trade labels could explore the possibilities of private insurances. Whether it makes sense to also include attributes that are valued less should be critically evaluated. For instance, consumers liked reductions in maximum working hours and the availability of double bedrooms, but to a lesser extent. Introducing these measures may raise prices while only having a negligible effect on the probability to actually buy the apple. This is important because price sensitivity was determined as crucial in the analysis.

Acknowledgements

We thank Henrike Götze for her contribution to the questionnaire and data collection. The research received funding from the EU project AgroBRIDGES (Grant Agreement N° 101000788).

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