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Market Opportunities for Differentiated Locally Grown Fresh Produce: Understanding Consumer Preferences

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Abstract: The intensification of agricultural practices, such as the extensive use of synthetic fertilizers, the expansion of irrigation systems, and land use conversion, has led to substantial biodiversity loss and the disruption of ecosystem functions. Traditional washing procedures for fresh produce involve substantial water usage and can generate wastewater, which requires proper management to prevent environmental contamination. By skipping the washing stage, these reduced water and energy inputs contribute to more sustainable agricultural practices. Although this approach may benefit sustainability and the environment, the market success of a product with a sustainable attribute ultimately depends on consumer acceptance and their willingness to pay (WTP) for it. This study investigates consumer preferences and WTP for a local potato variety called "Agria", with a specific focus on the sustainability attribute concerning the sale of washed versus unwashed potatoes. We conducted an experimental study with consumers in northeastern Spain, where this potato variety is grown, and simulated market shares under varying price scenarios. The methodology involved a choice experiment that evaluated three characteristics: price, local origin, and presentation (washed versus unwashed). The methodology also incorporated attribute non-attendance (ANA) to capture all aspects of the decision-making process. The findings reveal that consumers preferred the locally grown variety over those from other origins and were willing to pay a premium. Although consumers preferred washed potatoes, they would purchase unwashed potatoes at a discount price of EUR 0.2/kg. The results provide marketing and pricing strategies for local producers and retailers and market share projections aligned with consumer preferences for local food. Empirically, the study contributes to the literature on consumer preferences and sustainable food systems by (i) integrating the "washed versus unwashed" attribute with local origin to inform more effective marketing strategies; and (ii) supporting local potato growers through the identification of viable lunch strategies for a differentiated, unwashed product that extends shelf life, reduces food waste, and promotes sustainability by lowering water and energy use in post-harvest processing. For methodologically, it applies ANA in the context of potato choice experiments—an approach rarely used in this domain—to enhance the understanding of consumer decision-making.

Keywords: attribute importance; choice experiment; fresh potatoes; attribute non-attendance; local products

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1. Introduction

The local food movement, first acknowledged in the 1950s, has recently gained attraction due to the notable "buy local" initiative [1]. This trend is primarily driven by (i) product-quality advantages, such as consumers' beliefs in superior freshness, healthiness, and safeness to imported food [2,3]; (ii) economic advantages, such as enhancing farmers' earnings and adding value for nearby stakeholders [4]; (iii) social advantages, such as stronger community bonds and the retention of residents [5]; and (iv) environmental advantages, which encompass lower transportation emissions, the conservation of landscapes, and the promotion of biodiversity [6]. Despite increasing popularity, local fresh produce growers encounter challenges in competitive markets, primarily due to the small scale of their operations and limited consumer interest from those reluctant to pay higher prices [7]. Although specific consumer segments are prepared to spend more for locally sourced produce, there is a widespread belief that "local" food tends to be pricier than nonlocal alternatives [8–10]. This notion is supported by various studies, which highlight that consumers often avoid buying local foods due to the perception that they are more expensive [11]; producers, on the other hand, face pressure to accept lower prices [8]; and stakeholders frequently interpret these higher prices as a sign of superior quality, which can incentivize them to further inflate prices [12].

To tackle these issues and ensure fair compensation for growers, it is vital to highlight the quality of local food products and target consumers willing to pay a premium because they acknowledge the associated production costs [13]. Consequently, assessing consumers' willingness to pay (WTP) for these attributes is crucial for developing effective pricing strategies. This is particularly relevant as European Union (EU) policymakers promote local food consumption through initiatives and support the development of local food chains by providing funding [1].

Despite the extended literature on local versus nonlocal food, studies suggest that there is still room for further research as there is a gap between consumers' positive attitudes toward local food and their actual behaviors [1,4]. This gap in the literature is particularly noteworthy as only a limited number of studies have examined local food in conjunction with differentiated attributes [1]. Studies in the literature have extensively explored the role of local versus nonlocal food in rural development [14], the distribution dynamics of local foods [15], and various aspects of consumer behavior [6], among others. Within the consumer behavior literature, research often revolves around preferences for local versus nonlocal undifferentiated food [6,16,17], with studies that examined the support for local food in local economic activities [18], and the health benefits associated with the freshness and taste of locally grown produce [9]. Several authors also measured the role of brand love and purchase intentions on local food distribution systems [4] and explored consumer characteristics on locally produced food preferences [12]. Additionally, research has been concentrated on studying the types of motivations (egoistic and altruistic) to purchase local food [19], personality traits, and environmental concerns on local food consumption [20] and the effects of consumer regio-centrism on local food [21]. While these studies compared local and nonlocal foods, only a few have explored the impacts of introducing new differentiated attributes for locally sourced fresh produce. To fill this research void, our study investigates consumer preferences and WTP for a local potato variety called "Agria" and focuses on the sustainability attribute of selling it either washed or unwashed. Besides being a case-specific study on local producers, this study was also motivated by the recent decline in potato consumption, mainly due to competition from countries in the Middle East (Egypt and Israel) and Northern Africa (Morocco and Tunisia) [22]. According to the latest Eurostat data, 48.3 million tons of potatoes were harvested across the EU in 2023, representing a decrease of one-third (−36.7%) compared

to 2000. The top producers were Germany (24%), France (18%), and the Netherlands (13%), with Spain ranking seventh at 4%. One contributing factor to this long-term decline in production within the EU is the significant increase in import volumes, with almost 80% of imported potatoes coming from Egypt and 15% from Israel [23]. Hence, to regain market share, Spanish potato producers should differentiate their products from those supplied by competing non-EU countries. The domestic product's quality and commercial identity must be well established in this context. However, research on fresh potatoes that highlights quality attributes in Spain is scant.

While the concept of local food is widely regarded and positively perceived by consumers, food sustainability increasingly shapes purchasing decisions for local food. Agriculture, by its nature, is a highly resource-intensive sector that imposes considerable environmental pressures. The intensification of agricultural practices, such as the extensive application of synthetic fertilizers, the expansion of irrigation systems, and land use conversion, has resulted in significant degradation of terrestrial and aquatic ecosystems, alongside substantial biodiversity loss and the disruption of ecosystem functions [24]. Moreover, food production for more than a quarter of global greenhouse gas emissions consumes approximately 70% of global freshwater resources and occupies around half of the world's habitable land, highlighting its critical role in driving environmental change [25]. In this context, consumer preferences and WTP for differentiated food products, such as unwashed versus washed potatoes, should be explicitly understood within the broader framework of sustainable consumption, a key element of Goal 12 of the United Nations (UN) Sustainable Development Agenda: "ensuring sustainable consumption and production patterns" [26]. Consumer choices that prioritize environmentally friendly options, such as reduced post-harvest processing, contribute directly to more sustainable agricultural systems [27]. Hence, investigating WTP for unwashed potatoes not only reveals market dynamics but also reflects consumers' potential alignment with sustainability goals, bridging production-side practices and responsible consumption behavior [28]. Post-harvest processes, including transportation, storage, processing, packaging, and refrigeration, further contribute to the environmental burden of the supply food chain [29]. In the context of Aragón, the sustainability benefits of unwashed potatoes are primarily linked to environmental factors, notably reductions in water and energy consumption during port-harvest processing. Traditional washing procedures for fresh produce involve substantial water usage and can lead to wastewater generation that requires proper management to avoid environmental contamination [30]. These water and energy inputs are minimized by foregoing the washing stage, contributing to more sustainable agricultural practices. Furthermore, studies have shown that certain washing methods can impact the phytochemical composition of vegetables, potentially affecting their nutritional quality. For instance, research on shredded iceberg lettuce demonstrated that different washing procedures influence phenolic metabolism during storage, which could have implications for the nutritional profile of the produce [31]. While this study focuses on lettuce, it highlights the potential environmental benefits of adopting sustainable practices in crop cultivation. Besides the distinctive sensory characteristics [32], the local potato variety included in this study is unique compared to nonlocal potatoes as it is sold unwashed (brushed to eliminate excess soil). Unwashed potatoes possess their natural protective coating, which aids in minimizing moisture loss and prolonging shelf life. These potatoes can stay fresher for an extended time and help limit food waste, allowing consumers to keep them longer without the danger of spoilage [33]. The sale of unwashed potatoes has been proposed as a sustainable food loss reduction measure in two previous studies, which analyzed food loss reduction from an environmental, socio-economic, and consumer perspective within the Swiss potato market [33,34].

Given the aforementioned, our research aims to investigate consumer preferences and WTP for a local potato variety called "Agria", specifically focusing on the sustainability attribute concerning the sale of washed versus unwashed potatoes. To reach our aim, we conducted an artefactual experiment with consumers in the central city of the potato-growing region in northeastern Spain. This city was selected for its strategic central position within 100 kilometers of production zones, aligning with the EU classification of local fresh produce [35]. To gauge consumer preferences, we employed a choice experiment (CE) approach focusing on three significant characteristics of potatoes: price, the origin of production (local versus nonlocal), and presentation (washed versus unwashed). The CE method simulates accurate shopping decisions and allows for estimating attribute non-attendance (ANA) (this decision heuristic in the choice modeling literature is detailed in Section 3.3) effects. ANA arises when consumers disregard attributes during the CE owing to personal valuation methods and possible biased preferences [36]. Research indicates that neglecting ANA in CE analysis can influence model outcomes and produce biased estimates [37–40]. This study integrates ANA in our analysis to thoroughly comprehend consumer decision-making. Finally, we simulate market shares under different pricing conditions and provide price strategies for the sector.

Our findings advance the existing literature in several ways. Empirically, this is the first study to estimate consumers' *unrevealed* WTP (i.e., beyond stated preferences) for unwashed potatoes and the first to focus specifically on unwashed potatoes within the Spanish market. Methodologically, it incorporates ANA, a dimension of consumer decision-making heuristics that has received limited attention in previous research. To our knowledge, no prior studies have examined consumer preferences or the willingness to pay for potatoes using ANA.

2. Literature Review

As the demand for local food grows, so do the topics related to research [41]. Within the last ten years, research has preliminarily explored consumer preferences for local versus nonlocal foods [6,17], explored preferred sales distribution systems [17], compared local food with organic and various sustainability claims [42], and analyzed purchasing behaviors and quantities bought [3,43,44]. Other studies have mainly explored consumers' acceptance of local versus nonlocal based on physical versus social distance and the role of social identification [1], and regio-centrism on local food [21], and have measured the effects of egoistic and altruistic motivations to purchase local food [19]. Despite the extended focus, no universally accepted definition of "local" exists in the literature (see [45] for an overview). Definitions vary from one country to another and include aspects like food travel distances, geographical boundaries [16,19], regional specialties [46], distribution methods [47], and even personal or emotional ties to food [9].

The EU's Joint Research Centre has suggested that "local" food be defined as produced, processed, and sold within a specific geographical area, usually within a 20 to 100 km range [35]. Nevertheless, consumer views on local food vary worldwide. For instance, North American consumers prioritize environmental sustainability and social equity [16], whereas European consumers align small-scale farming with national development initiatives [48]. Still, research consistently indicates that consumers are willing to pay a premium for food labeled as "local" [6], often exceeding the premium for organic or sustainability-labeled products [10,42,49]. Demographically, a higher WTP is often exhibited by women, older individuals, wealthier consumers, those with connections to agriculture, and supporters of environmentally friendly practices [49,50]. Additionally, factors such as past experiences with local food purchases, preferred sales venues (e.g., farmers market), and

quantity purchased (e.g., buying seasonal vegetables in bulk for winter storage) affect WTP [10,43,44,49,50].

Regarding product labeling and food types within the last ten years, previous studies have mainly looked at "local versus organic" labels on well-known products such as eggs [51], apples and butter [49], tomatoes [10], honey [50], and staple foods like bread, beer, and milk [52]. Other studies have explored consumer behavior towards "local versus nonlocal" labeling across various food items, including lamb [42], ground beef [43], fruits and vegetables, meat, poultry, eggs, and dairy [53], locally grown produce and animal products [54], collards and eggs [16], however without any differentiated characteristics. The rest of the studies mainly compared local versus nonlocal food to measure consumer behavior without mentioning specific products and labeling characteristics [1,4,19,21].

While all these studies offer significant insights, most concentrate on "local" labeling compared to organic labels or focus on local versus nonlocal food products. Only a few studies have investigated consumer preferences and their WTP on "local versus nonlocal" traits alongside new differentiated attributes that have occurred naturally to the local food (e.g., resilience characteristics from environmental stresses in preventing food waste, storage characteristics, distinct sensory properties, and/or nutritional values that are not artificially added). For instance, Bi et al. (2012) researched the influence of sensory attributes on consumers' WTP for new differentiated tangerine varieties, emphasizing internal fruit qualities more than external attributes [55]. Fan et al. (2019) assessed the effect of local labeling on WTP and quality perceptions for two newly developed broccoli varieties [44]. On potatoes, Willersinn et al. (2017) conducted a comprehensive assessment of the environmental impacts associated with food losses throughout the Swiss potato supply chain. Their study evaluated six hypothetical loss reduction scenarios, including the sale of unwashed potatoes, aimed at minimizing quantitative losses and enhancing the ecological efficiency of the supply chain [34]. A more recent work by Willersinn et al. (2017) used the "SustainOS" methodology on the same six reduction scenarios to examine food loss and waste reduction from an environmental, socioeconomic, and consumer perspective on Swiss potatoes, including washed and unwashed potatoes [33]. It is worth noting that while the purchase of local food and consumers' WTP in the market is affected by a variety of attributes, including organic [10,49–52], protected designation of origin (PDO) [56–61], brand [4,17], and sustainability labels [62,63], among others, we focus only on three attributes (price, local origin versus non-local, and washed versus unwashed) as they were selected as the most valuable attributes by the local potato producers and wholesalers (see Section 3.2).

Building on this previous research, we analyze consumer preferences and WTP for a local potato variety, emphasizing a crucial sustainability-related attribute: whether the potatoes are sold washed or unwashed while also simulating market shares under different price scenarios. No studies have been conducted in the last decade examining consumer preferences for fresh potato quality attributes in Spain, nor have any studies been conducted on consumer acceptance of washed versus unwashed potatoes. The only exceptions are two studies that explore this issue indirectly within the context of food loss reduction scenarios [33,34]. Our study differs fundamentally from these in its primary objective and methodological design. Notably, we do not provide consumers with any information about the potential benefits of selling unwashed potatoes as such information could influence stated preferences and WTP [33,34]. Therefore, our research question is as follows: Will consumers accept this local variety, and will they be willing to pay for it if sold unwashed?

The findings of this research contribute to the existing literature in multiple ways. First, merging the "washed versus unwashed" differentiated attribute with local origin will help develop more effective marketing and pricing strategies. Second, this study offers a

case-specific analysis designed to aid local potato growers as they launch a differentiated product that enhances storage time and prevents food waste, showcasing profitable launch strategies. Third, this research includes ANA, an area that has seldom been investigated in studies about consumer decision-making related to heuristics [64]. To our knowledge, there has been no research on consumer preferences and WTP for potatoes using ANA. Earlier studies have assessed non-attendance through self-reports and inferred methods [65]. In addition, following Balcombe et al. (2014) [66] and Chalak et al. (2016) [67], we have also investigated the introduction of a measure of attribute importance as an alternative to or in combination with ANA (serial ANA).

3. Materials and Methods

The experiment involved three stages. In the first stage, participants visually examined and assessed a variety of labeled potato packages, which differed in attributes and pricing (e.g., washed, unwashed, and local). This stage aimed to replicate an actual shopping experience in a supermarket. Respondents were presented with the new differentiated local potato package and those already in the local market. Because some of the existing packages did not permit visual inspection of the potatoes inside, small bulk displays were arranged nearby to allow participants to compare products visually (see Figure A1 in the Appendix A). During this stage, participants rated their visual preferences for the potatoes using a 9-point hedonic scale, where 1 indicated "dislike extremely" and 9 indicated "like extremely". In the second stage, participants conducted a CE that included three options (A, B, and a non-buy choice). They evaluated the potatoes based on extrinsic features such as price, presentation (washed or unwashed), and origin (locally grown or not). Lastly, in the third stage, participants filled out a questionnaire that collected data on their purchasing and consumption habits and socio-demographic information.

3.1. Participants

Data were gathered in 2018 (Notably, potato pricing in Spain did not significantly differ between 2018 and 2024 (https://es.statista.com/estadisticas/495534/precio-medio-de-la-patata-en-espana-en-por-canal-de-distribucion/, accessed on 18 March 2025)) using an artefactual experiment with consumers who were typical food buyers and had experience purchasing potatoes in northeastern Spain's central potato-producing area. We arranged thirteen sessions, each comprising roughly 12 participants, culminating in a sample of 151 consumers recruited through local consumer associations and public institutions.

Previous studies combining CEs in their data collection have shown that reliable choice models can be developed with samples as small as 50 respondents [68]. Considering the number of attributes in this CE, having at least 100 participants would be sufficient to provide adequate statistical power [68]. Additionally, our sample size is slightly larger than that of several studies that used CEs as the primary method for estimating WTP and analyzing ANA (studies using CEs and examining ANA: [69] (n = 100), [70] (n = 120), and [71] (n = 81)). Table 1 presents the sociodemographic characteristics of our sample alongside the population characteristics for comparison. The sample mainly consists of individuals responsible for grocery shopping and cooking at home as 95.1% of participants indicated that they frequently or always shop for food, and 91.1% reported cooking at home daily or several times a week. Most respondents were female (76%), which is consistent with trends in Spain, where women primarily buy food. The average age of respondents was around 54.4 years, and they had typically lived in the region for about 50 years. Participants were part of households that averaged three members, and 69.1% of these households had no children under 18 years old. Approximately 45% of respondents reported having a net monthly household income of less than EUR 2500, while only 12% earned more than

EUR 3500. Those with secondary education were underrepresented (24%), while those with higher education were overrepresented (56%). This overrepresentation of university graduates is anticipated as people with higher education levels are generally more likely to participate in studies [72].

Table 1. Sample demographic characteristics (%, unless stated).

Characteristics	Sample (n = 151)	Spanish Population [a,b]
Gender		
Male	24.0	49.1
Female	76.0	50.9
Age (average, standard dev)	54.4 (13.6)	42.7
18–34	6.4	21.6
35–44	14.4	20.9
45–54	29.6	19.2
≥55	49.6	38.2
Level of education		
Primary	20.0	17.0
Secondary	24.0	50.0
Higher	56.0	33.0
Household monthly income		
≤EUR 1500/month	22.4	N/A
EUR 1501–2500/month	22.4	N/A
EUR 2501–3500/month	20.0	N/A
>EUR 3500/month	12.0	N/A
Do not know/refuse to answer	23.2	N/A
Household size (average, standard dev)	2.9 (1.0)	2.53
Children younger than 18 years		
0	69.1	N/A
1	17.9	N/A
2	10.6	N/A
>3	2.4	N/A
Vegetarian	2.4	N/A
Years living in the region (average)	50.0	N/A
Frequency of shopping for food		
Always	44.8	N/A
Often	50.3	N/A
Frequency of cooking at home		
Every day	81.5	N/A
Several times a week	9.6	N/A

[a] INE—Padrón continuo [73]. [b] Education at a glance: OCDE indicators [74].

3.2. Choice Experiment

To assess consumers' WTP for potatoes, we used a CE because it effectively values multiple attributes at once, aligns with the random utility theory [75], and simulates actual shopping experiences, thus helping to reduce hypothetical bias in WTP estimates [76]. While hypothetical bias presents a known issue in CEs, evidence shows they remain reliable for capturing real-world preferences [77]. Previous research has examined hypothetical and non-hypothetical (the latter offering tangible incentives), favoring non-hypothetical

designs to reduce further hypothetical bias [78]. To minimize this bias in our study, we used a "cheap talk" script [79]. Additionally, we ensured that the potato packages presented during the first stage of the experiment remained visible in the lab throughout the CE.

The initial phase of our CE design involved choosing a reference product and determining the attributes and levels. This phase was conducted in collaboration with local producers preparing to launch a new product and an in-depth analysis of the potatoes available in the local market at that time. The reference product selected was one kilogram of white potatoes, the most prevalent variety in the area. Local consumers associate lighter-colored potatoes with better taste [80]. Two key attributes were straightforward: price, which is essential for calculating WTP, and "locally grown" origin, which was the primary focus of our research. The third attribute was determined following discussions with the region's leading potato wholesaler, who was responsible for marketing the distinctive local variety. Input was also provided by a vegetable production specialist from the agricultural extension service. It was agreed that the product's appearance was crucial, particularly whether it would be sold washed or unwashed. The wholesaler emphasized that selling it unwashed was essential for retailers to maintain a consistent supply throughout the year. The various levels of each chosen attribute can be found in Table 2.

Table 2. Potato attributes and the levels included in the CE.

Attributes	Levels
Price (Euro/kg)	EUR 0.8 per kilogram (kg), EUR 1.0/kg, EUR 1.2/kg and EUR 1.4/kg
Presentation	"Washed" "Unwashed"
Origin of production	"Locally grown" "Non-locally grown"

We defined four price levels based on supermarket pricing at the time of the study. The lowest price was EUR 0.80 per kg, and the highest was EUR 1.20 per kg. Two intermediate prices—EUR 1.00 per kg and EUR 1.40 per kg—were established by increasing the minimum price by increments of EUR 0.20, resulting in an average price of EUR 1.10 per kg. These price levels were selected to encompass the observed market range for conventional and differentiated potatoes sold in Aragón during the study period. According to data from the Spanish Ministry of Agriculture, Fisheries and Food, the average retail price of potatoes in Spain during 2018 was approximately EUR 1.04 per kg, with weekly prices ranging from EUR 0.99 to EUR 1.08 per kg [81]. This indicates that our chosen price levels effectively capture the typical market variations, including both standard and premium pricing triers, relevant to consumers in Aragón at that time. For the origin attribute, we included two categories: "locally grown" and "non-locally grown". The presentation format also had two options: "washed" and "unwashed". The design of the choice tasks was guided by the optimal efficiency properties for CEs proposed by Street and Burgess (2007) [82]. This framework allows for creating optimal and near-optimal designs with defined efficiency characteristics, assuming no prior assumptions about preference parameters. This approach maximizes differences in attribute levels across alternatives, increasing the information gained by prompting respondents to weigh trade-offs among all attributes. A shifting technique was applied to the initial design for the first alternative, using a numerical set to adjust the attribute levels based on orthogonal arrays (generators) to generate additional options. The optimal design properties enable us to measure efficiency relative to the best possible design. We produced eight choice tasks to estimate the main effects of three attributes, which included four, two, and two levels, achieving a D-efficiency of 96.7%. The design was created using Ngene 1.2 from ChoiceMetrics Ltd. (Sydney, NSW, Australia).

Each choice task comprised two designed alternatives and a "non-buy" option, with each respondent making eight choices (refer to Figure A2 in Appendix A). To minimize potential ordering effects, the choice tasks were randomized.

3.3. Attribute Non-Attendance

Our study explored ANA alongside stated preference choices using two well-established methods from the literature: self-reported non-attendance (stated ANA onwards) and inferred non-attendance [83]. Respondents were asked at the end of all choice tasks to indicate the attributes they considered while selecting (stated serial ANA). This stated serial ANA (Some analysts assess whether incorporating information on choice task non-attendance in choice modeling enhances model fit compared to introducing serial ANA. They found that accounting for the effects of choice task non-attendance improves the model's statistical performance. However, Meyerhoff and Liebe (2009) [84] found no significant differences in WTP estimates, Scarpa et al. (2010) [38] found lower WTP, and Caputo et al. (2018) [62] found higher WTP.) was incorporated into our model specification in several ways. We also employed inferred ANA, even though studies have shown that stated and inferred ANA often do not correlate closely [40,85] (the general consensus is that serial stated and inferred non-attendance are not aligned, with the latter providing a better model fit).

Several studies have indicated that the precision of choice models could be enhanced by considering the presence of ANA and understanding why participants might ignore specific attributes [67]. The literature highlights three primary reasons for disregarding attributes: the complexity of the choice scenario (including the number of attributes, levels, and alternatives), individual cognitive limitations, and the perceived significance and relevance of the attributes. To address these factors, we included follow-up questions in our study to gain insights that would inform the model. These approaches have been utilized either as alternatives or in combination with ANA [66,67]. In our empirical application, there was no expectation that choice task complexity or cognitive limitations would influence ANA. The number of attributes, levels, and alternatives was kept small to simplify the task, and the attributes were straightforward, particularly given that participants were responsible for food shopping and preparation and were familiar with potato characteristics. Consequently, any ANA would likely result from the perceived low importance of specific attributes. Therefore, in addition to the stated serial ANA, we follow the approach by Balcombe et al. (2014) [66] and Chalak et al. (2016) [67] and utilized a measure of attribute importance in the specification of the model using a direct ranking question on attribute preference described in the next section.

3.4. Procedure

Participants in the study received a detailed explanation of the experimental protocol, signed informed consent documents, and were assigned identification numbers to maintain anonymity. In the initial stage of visual inspection and evaluation of information, participants evaluated six white potatoes, including the newly differentiated type. These potatoes were presented in their standard retail packaging of 3 kg, as encountered in local supermarkets, with information regarding their origin, presentation mode (washed/unwashed), and potato size (small bulk displays were positioned on a counter adjacent to the packaged options to facilitate quick visual differentiation among the varieties) specifications (see Figure A1 in Appendix A). Participants were instructed to evaluate their visual preferences for each potato variety and the above-mentioned information using a 9-point hedonic scale, where 1 indicated "dislike extremely", and 9 signified "like extremely".

In the choice experiment subsequent stage, participants were provided with a comprehensive overview of the attributes and levels of 1 kg of product to ensure clarity of the alternative products they would select during the choice tasks. Furthermore, a "cheap talk" script was introduced to encourage them to reveal valid preferences and mitigate hypothetical bias [79]. The script highlighted the concept of hypothetical bias while reminding participants of their budget constraints, prompting them to respond within the context of a realistic purchasing scenario. Participants engaged in a series of eight-choice tasks, deciding between purchasing alternative potato options or opting for a non-buy decision. This study also considers preference non-attendance. Then, a follow-up question was posed to explore this non-attendance and determine whether respondents considered all attributes or only a subset of them when making their choices. Respondents were asked to specify which attributes they considered in their decision-making process. The final stage involved completing a questionnaire that gathered data on their potato purchasing behaviors and collected demographic information. In addition, the importance given to several fresh potato attributes was measured using a direct ranking question by having participants rank five attributes (no visual defects, presentation (washed/unwashed), size, origin (local/nonlocal), and price) from most to least preferred ("1 = most preferred" and "5 = the least preferred") [86].

3.5. Model Specification and Estimation

The data from the experiment were analyzed using the Lancastrian consumer theory of utility maximization framework, as established by Lancaster (1966) [87]. This theory posits that the overall utility associated with a good can be disaggregated into its constituent attribute utilities. While consumers are aware of their utility from these attributes, it remains unobservable to researchers. Thus, researchers can only capture observable characteristics of the alternatives, while some aspects of individual utility are treated as stochastic components, aligning with the random utility theory [75]. Consequently, utility is considered as a random variable, which can be expressed as follows for the nth individual selecting alternative j among J options in each of the t choice tasks:

$$U_{njt} = \alpha + \beta_1 \text{PRICE}_{njt} + \beta_2 \text{UNWASHED}_{njt} + \beta_3 \text{LOCAL}_{njt} + \varepsilon_{njt} \quad (1)$$

In this formulation, α represents the alternative-specific constant, coded as a dummy variable, where a value of one corresponds to alternatives A and B, while a value of zero indicates the non-buy option. It is anticipated that α will have a positive and significant coefficient, reflecting greater utility derived from alternatives A and B than the non-buy option. The PRICE variable is treated as a continuous variable based on the experimental price levels. In contrast, the UNWASHED and LOCAL variables are dummy-coded, taking the value of one if the product is unwashed or locally grown, respectively, and zero otherwise. Lastly, the ε_{njt} denotes the random error term, which is assumed to follow an extreme value type (Gumbel) distribution, independently and identically distributed across options. This error term is assumed to be independent of both β and the attributes, allowing for the derivation of various model specifications based on the underlying assumptions concerning the error term density f (εnjt), and, by extension, consumer preferences.

3.6. Econometric Specification

Many empirical CEs fall short by assuming consumers possess homogeneous preferences. This study addresses that gap by allowing for heterogeneous preferences. We employed an Error Component Random Parameter Logit model with correlated errors (ECRPL-CORR) while considering correlations between utilities and taste parameters.

Traditionally, CEs presume that respondents pay attention to all attributes and levels in choice tasks, making trade-offs accordingly. However, studies [71,88] indicate that respondents frequently disregard specific attributes. Neglecting ANA can compromise model efficacy, biased estimates, and ultimately flawed policy recommendations [88]. Our study thus aimed to ascertain if respondents ignored specific attributes during the CE, adjusting our models accordingly to enhance results reliability.

We constructed seven ECRPL-CORR models to explore these dynamics, assessing both ANA and attribute importance. Model 1 served as the baseline, not accounting for ANA. Models 2, 3, and 4 integrated stated serial ANA, while Model 5 utilized inferred ANA. In Model 6, we substitute stated ANA variables for the measures of attribute importance, and in Model 7, we consider both ANA and attribute importance concurrently.

In Model 2, ignored attribute parameters were set to zero, reflecting the assumption that respondents' WTP for these attributes was null. Model 3 advanced this by defining two coefficients for each ANA, based on whether an attribute was ignored or attended: one corresponding to the attribute-level variables and another for the interaction between these variables and a dummy variable indicating attribute attendance (defined as DAttPrice, DAttUnwashed, and DAttLocal in Table 5). This structure enables testing the appropriateness of setting a zero to the ignored parameters; if the interaction term is not statistically significant, it suggests no differential preference between respondents who attended the attribute and those who did not. Conversely, the total of the two coefficients captures the estimated preference for those who did attend [88]. Model 3 can also have several specifications depending on assumptions about participants' heterogeneity across different attribute levels (The price has traditionally been treated as non-random. In contrast, the remaining attributes and their interactions with attendance dummies have been included randomly and non-randomly.), with the best specification represented by Model 4. Model 5 employed an inferred ANA through an Equality Constraint Latent Class (ECLC) model for panel data [40,89]. Model 6, akin to Model 4, incorporated dummy variables for low-attribute-importance dummies rather than ANA dummies. Specifically, each attribute was assigned a dummy equal to one if its importance rank fell in the fourth or fifth positions (the lowest two ranks) and zero otherwise (defined as DLowPrice, DLowUnwashed, and DLowLocal in Table 6). These "low attribute importance" dummies were included in the model as interaction terms with corresponding attribute-level variables. If the interaction term lacks statistical significance, it suggests no variance in preferences between respondents who rated the attribute as low importance and those who did not. The sum of the two coefficients estimates the preference for respondents who assigned low importance to that attribute. Finally, Model 7 included both ANA dummy variables and low-attribute-importance dummies, leveraging them as interaction terms with the relevant attribute levels.

3.7. Estimation, WTP, and Market Share Calculations

Model specifications were analyzed using NLOGIT 5.0. Apart from price, all coefficients were designated as random, adhering to a normal distribution, with only those exhibiting significant standard deviations retained in the final results as random. For the estimation of the ECRPL-CORR models, we opted for 200 Halton draws instead of pseudo-random draws as Halton draws to provide a more robust simulation for random models [90].

To derive the marginal WTP values, we calculated by dividing the parameters for the non-monetary attributes by the price and multiplying the results by negative one. In models involving two coefficients for the ANA and low-attribute-importance dummy variables, the parameters related to the attribute-level variables were employed to compute WTP for participants who ignored the attributes (or attached low importance). Conversely, the sum

of these parameters and their corresponding interaction terms with the dummy variables was utilized to determine the WTP for participants who attended the attributes (or attached higher importance). Additionally, the estimated parameters also allow the simulation of market shares for the differentiated potatoes following Train (2003) [90]. Probabilities for specified attribute combinations can be approximated for any given value θ by averaging the results of product unconditional probabilities (the unconditional probability is given by $P_n(\theta) = \int S_n(\beta_n) f(\beta_n \mid \theta) d\beta_n$) using multiple draws for each random parameter. The simulations here were based on 10.000 draws. Since the simulated probabilities sum to one across alternatives, they are a reliable tool for forecasting market shares. To forecast market shares accurately, the researcher must assume a specific set of available products (alternatives). The estimated market shares will only align with actual market behavior if the experimental assortment includes all, or nearly all, relevant products within the category. While this assumption may seem unrealistic in some contexts, it serves as a reasonable approximation for our defined baseline market. Therefore, our simulations assume a market consisting only of the product profiles defined by the attribute levels in our experiment, holding other market factors constant.

Our baseline market comprises potatoes produced outside the region, sold washed, mimicking the current offerings in supermarkets. Using this baseline, we conducted market share simulations to evaluate the potential success of introducing the locally differentiated potato (either washed or unwashed) into the market. We considered four alternative market scenarios. The first scenario involved the introduction of local unwashed potatoes at two distinct price levels. The second scenario posited the entry of locally washed potatoes into the market, also at the same two price levels, corresponding with the two higher price levels established in the choice task design. Given that higher prices typically yield lower utility, the outcomes associated with higher price levels may be interpreted as lower bounds for realistic market success [91].

4. Results

4.1. Non-Attendance and Attribute Importance

Table 3 illustrates the number of attributes ignored in the CE. Only 24% of respondents attended all three attributes, while 42.4% attended one. Price emerged as the most frequently ignored attribute, with 56% of participants overlooking it, followed by presentation (washed/unwashed) at 39.2%. These results underscore the critical need to address ANA to enhance the reliability of findings in this context.

Table 3. Number and attributes ignored by the respondents in the experiment.

Number of Attributes Ignored	% Respondents	Attributes Ignored	% Respondents
0	24.0	Price	56.0
1	33.6	Presentation	39.2
2	42.4	Local	23.2
3	0.0		

Table 4 presents the percentages of respondents exhibiting ANA in relation to the assigned importance of the attributes.

The findings reveal that respondents who ignored a specific attribute rated its importance lower (100% for local origin, 81.2% for washed presentation, and 63.6% for price). Conversely, respondents who attended one attribute assigned it significantly higher importance (100% for price, 85% for washed presentation, and 71.4% for local origin). This observation corroborates the findings of Hess and Hensher (2010) [65], which established a

robust correlation between attribute importance and ANA, indicating that the probability of non-attendance escalates as the perceived importance of an attribute decreases.

Table 4. Attendance, non-attendance, and attribute importance (% of respondents).

Attendance	Inferred [a]	Stated	Price High	Price Low	Washed High	Washed Low	Local High	Local Low
Full attendance	22.5	24.0	53.3	33.33	50.0	36.7	20.0	46.7
Ignored only Local	0.0	3.2	75.0	0.0	25.0	25.0	0.0	100.0
Ignored only Washed	12.8	12.8	56.2	25.0	6.2	81.2	68.7	6.2
Ignored only price	0.0	17.6	18.2	63.6	63.5	18.2	45.5	27.3
Attend only price	0.0	4.0	100.0	0.0	60.0	40.0	0.0	60.0
Attend only Washed	15.4	16.0	20.0	40.0	85.0	5.0	25.0	65.0
Attend only local	40.2	22.4	25.0	64.3	21.4	60.7	71.4	17.9
Full non-attendance	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[a] Attendance inferred by the estimation of Model 5.

4.2. Estimation Results

Tables 5 and 6 present the estimation results for the various model specifications. As anticipated, the alternative-specific constant (α) is consistently positive and statistically significant across all models, indicating that the utility derived from each alternative surpasses that of the non-buy option. The price variable (PRICE) coefficient exhibits a negative relationship and remains statistically significant in all specifications, aligning with economic theory. Additionally, the analysis reveals preference heterogeneity concerning the two non-monetary attributes across all models, as evidenced by the standard deviations of the coefficients being statistically different from zero.

Table 5. Results from the ECRPL-CORR for Model 1 to Model 4.

Parameters Estimates	Model 1	Model 2	Model 3 [a]	Model 4 [a]
α	4.84 *** (9.34)	5.83 *** (8.51)	6.37 *** (10.25)	6.37 *** (10.25)
PRICE	–3.01 *** (−13.64)	−4.94 *** (−14.19)	−1.50 *** (−4.87)	−1.43 *** (−4.90)
UNWASHED	−0.55 *** (−3.06)	−0.99 *** (−4.75)	−0.017 (−0.08)	--- (---)
LOCAL	1.84 *** (11.45)	2.22 *** (12.10)	0.66 *** (3.14)	0.66 *** (3.14)
PRICE*DAttPrice			−4.00 *** (−8.93)	−4.01 *** (−9.21)
UNWASHED*DAttUnwashed			−1.08 *** (−3.16)	−1.09 *** (−4.45)
LOCAL*DAttLocal			1.73 *** (5.92)	1.74 *** (5.93)
The standard deviation of parameters				
UNWASHED*DAttUnwashed	1.46 *** (8.6)	1.44 *** (7.14)	1.58 *** (7.43)	1.58 *** (7.43)
LOCAL*DAttLocal	1.16 *** (5.09)	0.98 *** (2.77)	1.02 *** (3.81)	1.02 *** (3.81)
σ	2.35 *** (5.14)	4.29 *** (8.64)	3.58 *** (7.9)	3.58 *** (7.99)
Log L	−659.21	−614.61	−597.15	−597.16
Adj.R2	0.397	0.438	0.453	0.456
AIC/N	1.334	1.245	1.216	1.214
Marginal WTP estimates				
			Considered **Ignored**	**Considered** **Ignored**
UNWASHED	−0.18 *** (−2.96)	−0.20 *** (−4.54)	−0.19 *** (−4.31) −0.01 (−0.08)	−0.19 *** (4.08) ---
LOCAL	0.61 *** (11.02)	0.45 *** (10.50)	0.44 *** (−10.74) 0.44 *** (2.78)	0.44 *** (5.39) 0.44 *** (2.79)

Notes: Number of observations (choices): 1000. The final estimations used one hundred twenty-five participants because those who provided missing information to either non-attendance or attribute importance questions were dropped. *** indicates significance at 1% level, respectively. Z-values are in parentheses. [a] Only standard deviations of the parameters for the interaction terms between the attribute variables and the non-attendance dummies were statistically significant.

Table 6. Results from the ECRPL-CORR for Model 5 to Model 7.

Parameters Estimates	Model 5	Model 6 [a]	Model 7 [b]
α	3.80 *** (4.80)	5.29 *** (9.41)	6.64 *** (8.76)
PRICE	−4.84 *** (−9.77)	−3.79 *** (−14.07)	−1.93 *** (−5.53)
UNWASHED	−1.85 *** (−6.48)	−1.27 *** (−4.68)	−-- (---)
LOCAL	2.01 *** (10.76)	2.34 *** (11.70)	1.05 *** (3.79)
PRICE*DAttPrice			−3.71 *** (−8.44)
UNWASHED*DAttUnwashed			−1.09 *** (−4.25)
LOCAL*DAttLocal			1.44 *** (4.60)
PRICE*DLowPrice		1.59 *** (3.58)	0.80 * (1.82)
UNWASHED*DLowUnwashed		1.33 *** (3.62)	---
LOCAL*DLowLocal		−1.07 *** (−3.37)	−0.52 * (−1.72)
The standard deviation of parameters			
UNWASHED*DAttUnwashed	---	1.55 *** (8.00)	1.70 *** (7.35)
LOCAL*DAttLocal	---	1.07 *** (4.28)	1.01 *** (4.18)
σ	---	2.82 *** (5.71)	4.23 *** (6.68)
Log L	−667.5	−635.92	−596.52
Adj.R2	0.389	0.416	0.454
AIC/N	1.359	1.308	1.217
Marginal WTP estimates			

		High importance	Low importance	Considered High importance	Ignored Low importance
UNWASHED	−0.38 *** (−6.28)	−0.33 *** (−4.52)	0.03 (0.27)	−0.19 *** (−4.13)	---
LOCAL	0.41 *** (7.31)	0.61 *** (9.90)	0.58 *** (3.92)	0.44 *** (8.89)	0.46 *** (3.28)

Notes: Number of observations (choices): 1000. The final estimations used one hundred twenty-five participants because those who provided missing information to either non-attendance or attribute importance questions were dropped. *** and * indicate significance at the 1% and 10% levels, respectively. Z-values are in parentheses. [a] All the standard deviations of the parameters for the attribute levels and the interaction terms were statistically significant, but only the interaction terms are provided in the table. [b] Only standard deviations of the parameters for the interaction terms between the attribute variables and the non-attendance dummies were statistically significant.

The estimates for the UNWASHED attribute are consistently negative, albeit not universally statistically significant, while the LOCAL attribute consistently displays positive and statistically significant estimates. This finding reinforces the notion that consumers prefer washed over unwashed varieties and locally produced varieties over those sourced from outside the region. Although the magnitude of these coefficients varies across models, this overall trend remains stable.

Model selection criteria included log-likelihood, adjusted R2, and AIC/N values. Model 1, which excluded the consideration of ANA, exhibited the highest absolute values for both log-likelihood and AIC/N, alongside the lowest adjusted R2 (except when contrasted with the inferred ANA in Model 5). This indicates a significant need to include stated ANA in the analysis.

When comparing Model 2, where parameters for ignored attributes were constrained to zero, with Model 3—which integrated ANA by introducing dummy variables for ignored and attended attributes—Model 3 revealed a superior statistical fit. The t-ratio values for the interactions between variables and attendance dummy variables were significantly different from zero, suggesting that it is inappropriate to assume respondents completely ignored specific attributes; in reality, they likely gave some consideration to these attributes even if they reported otherwise. Model 4, a refined version of Model 3, omitted the UNWASHED variable due to its lack of statistical significance. In contrast, the inferred ANA model (Model 5) demonstrated the poorest statistical fit across all models assessed. Notably, the behavior of our stated and inferred ANA models contrasted with findings from other empirical applications of ANA, which typically report a better fit for

inferred ANA [40,85]. Model 6, which included low-importance attribute dummy variables and corresponding interaction terms, exhibited a lower fit quality than Model 3, which utilized attendance dummies. Nevertheless, the dummy variables for low-importance attributes were statistically significant, highlighting that low attribute importance plays a relevant role in shaping consumer utility, albeit with less explanatory power than stated ANA. Finally, Model 7 exhibited a fit comparable to Model 4, but two interaction terms (PRICE*DLowPrice and LOCAL*DLowLocal) were statistically significant at the 10% level. The results, alongside findings from Table 5, suggested significant multicollinearity between the sets of interactions—attendance and low attribute importance. Although both measures may convey similar information, the stated ANA explains consumers' utility more effectively. Consequently, Model 4 was identified as the optimal specification and was employed for stakeholder recommendations.

4.3. Economic Results: WTPs and Market Shares

The analysis of WTP across various models revealed consistent trends in the context of ANA in consumer preferences for locally grown potatoes. Notably, models that did not account for ANA (i.e., Model 1) resulted in inflated marginal WTP estimates compared to those that did. For example, the WTP for the UNWASHED attribute was −0.18 in Model 1 and dropped slightly to −0.20 when parameters were set to zero in Model 2. A more pronounced variation was observed for the LOCAL attribute, where WTP decreased from 0.61 (Model 1) to 0.45 (Model 2). In Model 4, which differentiated WTPs for participants who attended versus ignored specific attributes, those who ignored the UNWASHED attribute exhibited a zero WTP, as opposed to −0.19 for respondents who attended the attribute. Conversely, the WTP for the LOCAL attribute remained constant, regardless of the extent of the respondents' attention given. This dichotomy illustrates that sensitivity to PRICE was heightened when the LOCAL attribute was attended, reinforcing the expectation that consumers who disregard price exhibit diminished sensitivity in their purchase decisions.

The WTPs derived from the inferred ANA model (Model 5) were consistently lower than those observed in the stated ANA condition, corroborating findings from the existing literature [40,85]. Model 6, which focused solely on low attribute importance, indicated parallel WTPs for the LOCAL attribute across both consideration groups; however, participants assigning low importance to the UNWASHED attribute reported a zero WTP, while those who gave high importance had a negative WTP, indicated a willingness to purchase unwashed potatoes only at a discounted price. Model 7, which explored WTPs for attributes deemed highly important while also considered ignored attributes, produced WTPs similar to those found in Model 4. Given that Model 4 has a marginally superior fit, its results will primarily be considered for providing stakeholder recommendations. Accordingly, market shares were simulated using the parameter estimates from Model 4, which provided the best statistical fit. Consumers expressed a WTP for an additional EUR 0.44/kg for locally grown potatoes compared to non-locally grown alternatives. Notably, when considering the UNWASHED attribute, participants demonstrated an inclination for unwashed potatoes and were willing to purchase them at a discounted price of EUR −0.19/kg. Consumers ignoring the attribute were indifferent between washed versus unwashed alternatives.

In light of stakeholders' intention to introduce unwashed local potatoes to sustain market presence seasonally, market shares for these products were computed at two price levels (EUR 1.2/kg and EUR 1.4/kg), detailed in Figure 1 (Table A1 in Appendix B outlines all simulated price scenarios).

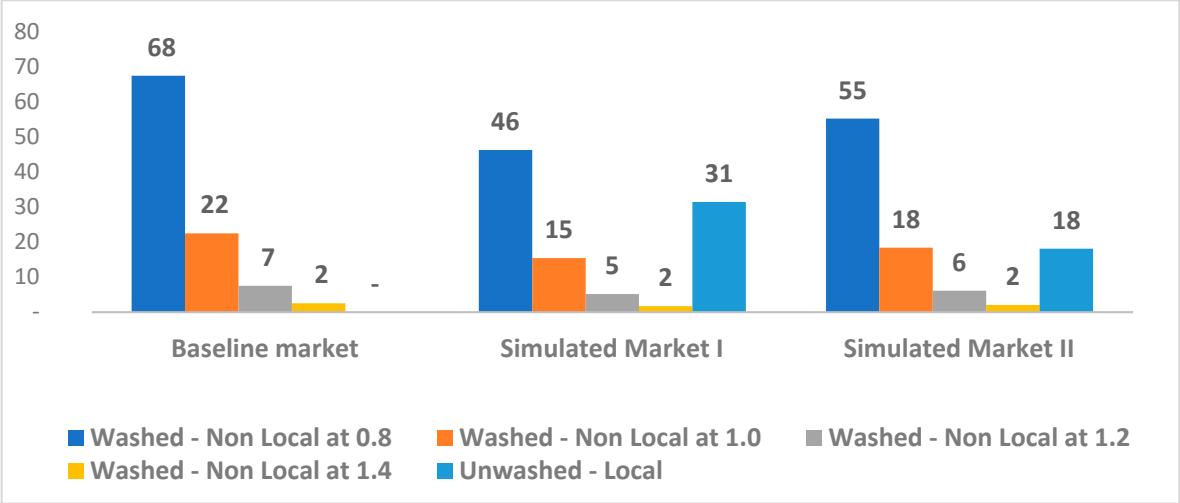

Figure 1. Mean market shares for alternative market scenarios: unwashed local potatoes.

At EUR 1.2/kg, unwashed local potatoes are projected to capture a 31% market share, which diminishes to 18% at EUR 1.4/kg (Figure 1). Alternatively, local producers should adopt new technologies to sustain the availability of washed potatoes year-round as projections indicated that, at EUR 1.2/kg, washed local potatoes could capture 46% of the market (Figure 2). In contrast, the unwashed would capture 31% of the market. Likewise, at a higher price (EUR 1.4/kg), the market share for washed potatoes would be higher (26%) than for unwashed potatoes (18%). These findings provide insights for stakeholders to devise market entry and pricing strategies, considering product costs and technological capabilities.

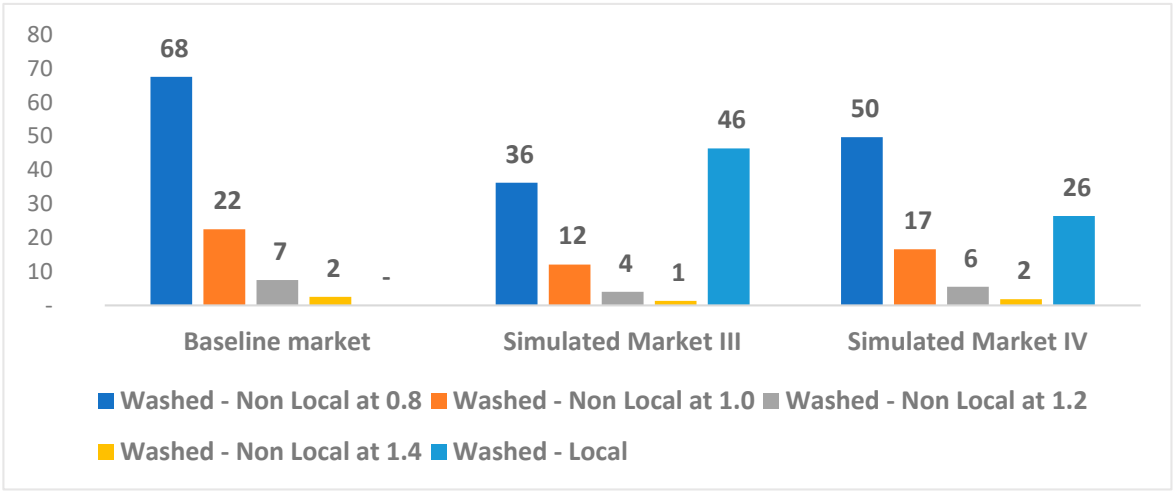

Figure 2. Mean market shares for alternative market scenarios: washed local potatoes.

5. Discussion

This study investigated consumer preferences and WTP for a local potato variety called "Agria", explicitly focusing on the sustainability attribute concerning the sale of washed versus unwashed potatoes.

Empirically, the answer to the research question "Will consumers accept this local variety, and will they be willing to pay for it if sold unwashed?" is nuanced. Consumers prefer locally grown potatoes, with an average WTP of EUR 0.44/kg over nonlocal alternatives, affirming strong market acceptance of the local variety overall. This preference is grounded in perceptions of higher quality, freshness, environmental sustainability, and

socio-cultural values like trust, transparency, and regional identity [9,92–94]. This result aligns with previously established findings on WTP for local food [6,42] and an overall preference for local versus nonlocal food [1,4,19,21]. For instance, Brugarolas et al. (2009) documented significant price premiums for local tomatoes in Spain, approximating 79% and 68%, respectively [95]. Our study estimates a local potato premium of around 40%. The form in which the local variety is sold—washed versus unwashed—significantly affects consumer acceptance and WTP. While the local variety in general has market potential, most consumers express a distinct preference for washed potatoes, aligning with consumer preferences on washed vegetables perceived as cleaner, more hygienic, and convenient [96]. Conversely, unwashed local potatoes are generally accepted only when offered at a price discount of approximately EUR 0.19, approximately 20% lower than the price of washed potatoes, echoing observations from earlier studies on consumer preferences [33,34].

At the market level, unwashed local potatoes can still capture a notable segment of 31% at EUR 1.2/kg (representing a 10% price increase) and 18% at EUR 1.4/kg (a 27% price increase). Evidently, market penetration could be enhanced if these potatoes were offered washed, with estimations of capturing 46% of the market at EUR 1.2/kg and 26% at EUR 1.4/kg. The findings indicate that consumers are willing to pay a premium of EUR 0.44/kg for the differentiated local potatoes compared to their nonlocal counterparts, irrespective of their attention to specific product attributes. Notably, most consumers would only purchase unwashed potatoes if presented with a EUR 0.2/kg discount.

Summing up, while consumers will accept the local variety, they are less willing to pay a premium if it is sold unwashed. The unwashed form has potential but is perceived as less convenient and less appealing, requiring a price discount to remain competitive. For optimal market penetration and price realization, consumers strongly prefer choosing the local variety in a washed form.

Methodologically, incorporating ANA in choice modeling enhances preference accuracy and model performance, as failing to do so can bias estimates [38–40]. However, stated ANA performed better than inferred ANA in terms of model fit. In fact, the inferred ANA model (Model 5) demonstrated the poorest statistical fit across all models assessed.

The behavior of our stated vs. inferred ANA models contradicts findings from other empirical applications of ANA, which typically report a better fit for inferred ANA [40,85]. Stated ANA, where respondents explicitly indicate which attribute they ignored in a choice experiment, can be subject to various biases. These include social desirability bias, recall inaccuracies, or a lack of introspective awareness about their own decision-making processes [89]. As a result, stated ANA may not always reflect actual behavior. In contrast, inferred ANA, which is derived from respondents' choices through statistical modeling, offers a complementary and potentially more objective perspective [97]. By analyzing choice patterns rather than relying on self-reports, inferred ANA helps to uncover which attributes truly influenced decisions, providing a more behavioral-grounded understanding. Although in our study stated ANA outperformed inferred ANA, researchers should consider both approaches in parameter and WTP estimates as, together, both approaches contribute to a richer interpretation of consumer preferences, balancing subjective insights with empirical evidence.

5.1. Policy and Marketing Implications

Policymakers should prioritize developing initiatives to promote and distribute local foods, particularly those with differentiated attributes (i.e., unwashed potatoes). Given that consumers' awareness regarding the advantages of differentiated food products is limited, educational campaigns that elucidate these benefits are essential. Such measures could expand market opportunities for producers while fostering economic development in

their respective regions. The strong WTP for locally grown potatoes suggests that targeted marketing efforts should focus on the merits of local produce, underscoring aspects like freshness and lower environmental impact. Emphasizing price premiums that consumers are inclined to accept could incentivize retailers to feature and market local products prominently. Initiatives that advocate for unwashed varieties should highlight their advantages, including enhanced shelf life, decreased food waste, and superior freshness. Furthermore, government-supported campaigns and incentives for producers who adopt unwashed practices could bolster local agricultural efforts and contribute to sustainability by mitigating food waste.

5.2. Research Implications

Our study revealed a high incidence of ANA despite the straightforward nature of choice tasks and recognized attributes. Consequently, we explored three ANA methodologies and assessed attribute importance rankings. The findings reinforce previous assertions that setting ignored attributes to zero is often misguided as participants likely considered these attributes to a degree. Notably, the inferred ANA model demonstrated poorer statistical performance than in earlier research, although the economic implications remained consistent [40,85]. Contrary to previous studies, our inferred model showed the least fit, and the WTP estimates derived from it were lower than those obtained through stated measures. This discrepancy may stem from our expectation of ANA arising from low attribute importance, leading to poorer performance in the inferred model compared to studies where participants possessed significant familiarity with the product, as highlighted in Van Loo et al. (2018) [62].

In conclusion, practitioners employing CEs for decision-making should acknowledge the implications of ANA within empirical applications. Integrating multiple ANA methodologies and delving into the underlying causes of non-attendance are paramount. Tools like eye-tracking could provide valuable insights into visual ANA in CEs [71,98,99]. Additionally, incorporating questions regarding attribute importance and the rationale behind non-attendance would be beneficial as no singular model consistently outperforms others. Researchers can derive a spectrum of WTP values by analyzing results across different models to enhance decision-making.

5.3. Study Limitations

This research is subject to several limitations. First, while the preference for unwashed potatoes may suggest underlying sustainability motives, inferring such motivations solely from this behavioral tendency is inherently limited. Without direct measures of consumer perceptions regarding environmental impact, such as explicit questionnaire items assessing beliefs about water or energy use, it is difficult to conclusively attribute this preference to sustainability concerns rather than other factors like tradition, cost, or perceived freshness. Second, the environmental benefits of unwashed potatoes may come with trade-offs that were not fully captured in this study. For example, unwashed potatoes may have a longer shelf life and are less susceptible to spoilage and microbial contamination, potentially leading to decreased food waste. The study did not include items in the questionnaire specifically evaluating consumer awareness or valuation of such trade-offs, which represents an important area for future research. Third, despite employing a cheap-talk script, our estimates' potential for hypothetical bias should not be discounted. Fourth, while average potato prices in Spain have remained stable since our study was conducted in 2018 (see footnote 2), our findings may lack the precision needed to inform current market strategies effectively. Fifth, although our sample size might be deemed modest for CEs estimating ANA, it is relatively adequate compared to previous studies investigating WTP and ANA

(see footnote 3). Lastly, the pronounced ANA levels observed across most attributes may be attributed to participants' high familiarity with the product, as Van Loo et al. (2018) [71] indicated. However, other unidentified factors may also contribute to these results. Addressing these limitations could involve utilizing real-choice experiments with economic incentives, larger sample sizes, and a more diverse geographical representation. Previous research has indicated that selling unwashed potatoes can minimize supply chain food waste by as much as 53% [33,34]. Communicating the sustainability benefits of purchasing unwashed potatoes may elicit different consumer responses.

6. Conclusions

This study investigates consumer preferences and WTP for a local potato variety called "Agria", explicitly focusing on the sustainability attribute concerning the sale of washed versus unwashed potatoes. We simulated market shares under varying price scenarios by employing an experimental choice model through a CE, concentrating on three potato attributes: price, local origin, and the presentation of the potatoes (washed versus unwashed). Additionally, we integrated several methodologies to address ANA in our analysis. The findings indicate a significant preference and a higher WTP for locally produced potatoes than those from other regions. Although consumers preferred washed potatoes, they were willing to purchase unwashed potatoes with a price discount of EUR 0.2/kg.

These results highlight the growing consumer interest in locally grown fresh produce and suggest an emerging capacity to discern different potato varieties. With the increasing competitive emphasis on sustainability among food brands, local potato producers could underscore the benefits of unwashed, locally grown potatoes, particularly regarding sustainability and food waste reduction. This narrative can potentially mitigate the traditional price discount associated with unwashed produce. The insights of our research increase the understanding of consumer preferences for local products with unique attributes, offering valuable implications for future research and guiding the formulation of targeted marketing strategies, pricing policies, and market share estimations that align with the consumer demand for local produce.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of Centro de Investigación y Tecnología Agroalimentaria de Aragón (CITA) related to the Project experiment "Mejora de la producción y comercialización de patata de Calidad y proximidad en Aragón mediante diferentes sectores de la cadena agroalimentaria" on the 14 May 2018.

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

Data Availability Statement: The data belong to the institution that has financed the data gathering (Gobierno de Aragon).

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Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

EU	European Union
CE	Choice experiment
WTP	Willingness to pay
ANA	Attribute non-attendance
EC-RPL-CORR	Error component random parameter logit model with correlated errors
ECLC	Equality constraint latent class model

Appendix A

Figure A1. Visual inspection and evaluation of potato packages.

Choice set 1	**Potato A**	**Potato B**
Price	0.8 €/kg	1 €/kg
Presentation	Washed	Unwashed
Origin of production	Locally grown	Non-locally grown

Choice sets	I will choose to buy **potatoes A**	I will choose to buy **potatoes B**	I will buy neither **A nor B**
Choice set 1			

Figure A2. An example of a choice task included in the CE.

Appendix B

Table A1. Alternative settings that were considered for market simulations.

Baseline Market	Four products: Washed nonlocal potatoes sold at EUR 0.8/kg, EUR 1.0/kg, EUR 1.2/kg, and EUR 1.4/kg.
Simulated Market I	Five products: Baseline plus the newly unwashed local potatoes sold at EUR 1.2/kg.
Simulated Market II	Five products: Baseline plus the newly unwashed local potatoes sold at EUR 1.4/kg.
Simulated Market III	Five products: Baseline plus the newly washed local potatoes sold at EUR 1.2/kg.
Simulated Market IV	Five products: Baseline plus the newly washed local potatoes sold at EUR 1.4/kg.

Note: Market shares were evaluated based on participants who attended the attributes.

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