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Effects of Organic and Origin Labels on Consumer Willingness to Pay for Kale: A Case Study in Southeastern United States

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Abstract

As consumers become increasingly conscious of the health and environmental impacts of their dietary decisions, the demand for "superfoods" has surged. Using data from an online survey in the seven states in the southeastern United States and a choice experiment approach, this study investigated the effects of organic and product origin attributes on respondents' willingness to pay (WTP) for kale. A mixed logit in WTP space was utilized for the analysis. Results showed that respondents are willing to pay approximately a 35% premium for organic kale and a 27% premium for kale produced from the southeastern United States. Policy recommendations are also discussed.

Keywords: kale, choice experiment, WTP space, mixed logit, superfoods

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Introduction

During the last two decades, as consumers have become more interested in the health impact of their diets, several trends regarding food preferences have emerged. Among the most recent ones is the increased interest and marketing share of "superfoods" (Liu et al., 2021; Magrach and Sanz 2020; Cobos and Díaz, 2023). Generally, superfoods are considered and marketed as food products that are nutritionally dense and beneficial to a variety of health goals. Nevertheless, despite their popularity, there is currently no widely accepted legal definition of "superfoods" (Driessche, Plat, and Mensink, 2018; Liu et al., 2021; Franco Lucas et al., 2022).

Although a relatively rich literature regarding the factors affecting the consumption of functional foods exists (e.g., Pappalardo and Lusk, 2016; Plasek and Temesi, 2019; Szakály et al., 2019), to the best of our knowledge, the research regarding consumers' willingness to pay for superfoods such as kale in the United States is rather limited. This study is an effort to add to this research area by examining factors influencing consumer preferences for kale, a superfood product with a substantial increase in demand, as noted by several news outlets.[1] Moreover, Cobos and Díaz (2023) found that kale stands out as the most frequently mentioned superfood on websites due to its health-promoting properties.

The surge in demand for kale can be attributed to consumers' favorable perception of its numerous health advantages. As a low-calorie food with high levels of phytochemicals, vitamins, and minerals (Šamec, Urlić, and Salopek-Sondi, 2019), kale improves gut and metabolic health (Raychaudhuri et al., 2021; Thavarajah et al., 2016) and could be beneficial for preventing obesity (Reda et al., 2021). Traditionally, kale has been a natural remedy for treating stomach ulcers, diabetes mellitus, rheumatism, bone weakness, ophthalmologic problems, hepatic diseases, anemia, and obesity (Šamec, Urlić, and Salopek-Sondi, 2019). Recent studies found that kale supplementation could reduce risks of coronary artery disease (Kim et al., 2008), intestinal inflammation (Lima de Albuquerque et al., 2010), stomach ulcer (Lemos et al., 2011), cognitive decline and age-related oxidative damage (Kushimoto et al., 2018), and other diseases (Satheesh and Workneh Fanta, 2020). Alfawaz et al. (2022) found that more than 60% of their participants self-reported improvements in their health after adding kale to their diet.

In the United States, kale's domestic availability tripled in the last two decades and grew by 47% between 2020 and 2022 (USDA-ERS, 2023). California, South Carolina, New Jersey, Texas, and Georgia are the biggest kale producers, respectively (USDA-NASS, 2023). In terms of production practices, more than half of the kale sold in the United States is labeled as organic (Reda et al., 2021).

As a superfood that has gained popularity in western markets, several studies have examined kale and its attributes. Research conducted in the United States has centered predominantly on the sensory characteristics of kale (e.g., Swegarden et al., 2019). However, little is known about how labeling strategies (e.g., organic, place of origin) impact U.S. consumer preferences for kale. The extensive meta-analysis by Kilduff and Tregeagle (2022) also identified a limited number of

[1] *The New York Times* (Eddy, 2019) and Winsight (Sidrane 2015).

studies estimating consumers' willingnes s to pay (WTP) for organic and origin labels of leafy greens. To the best of our knowledge, studies of a similar nature were mostly conducted in Kenya (e.g., Ngigi et al., 2011; Lagerkvist et al., 2013). This study aims to bridge the knowledge gap by assessing the consumers' WTP for kale with value-added attributes. Following the literature on the estimation of WTP for fresh produce (Yue and Tong, 2009; Onozaka and McFadden, 2011), we estimate the WTP for kale with organic and origin attributes for consumers in seven states in the southeastern region[2] of the United States using a choice experiment approach.

Several studies have found that consumers are willing to pay a premium for organic produce (Bond, Thilmany, and Keeling Bond, 2008; Yue and Tong, 2009; Costanigro et al., 2014). Another strand of the literature found that consumers are also willing to pay for locally or regionally grown produce (Onozaka and McFadden, 2011; Gumirakiza and Choate, 2018). However, divergences exist. Kilduff and Tregeagle (2022) found that organic labels had no significant impact on WTP for fresh produce, whereas the local attribute increases WTP. Moreover, while the intersection of organic and local attributes was fairly well-studied in literature, consumers' WTP for fresh produce with organic and origin labels (i.e., country, region, or state) was much less explored.

As one of the superfoods, kale was selected because of its surging popularity in the United States (Thavarajah et al., 2016; Cobos and Díaz, 2023). We included organic and product origin attributes because they often indicate food preferences (Pappalardo and Lusk, 2016). The data for the study were obtained from an online survey of 199 consumers, and the mean WTP was estimated using mixed logit in WTP space. As a robustness check, the mean WTP was also obtained using a conditional logit and mixed logit in preference space. The secondary objective is to discuss in-depth the characteristics of kale consumers, such as purchase behavior and beliefs about organic and regional products.

We find that WTP estimates do not change substantially among the methods used. For the estimates using WTP space, results suggest that on the average, consumers are willing to pay a 35% premium for organic kale ($0.470 per bunch) and a 27% premium for regionally sourced kale ($0.359 per bunch). These estimates show that consumers are willing to pay a premium price for organic and regionally grown produce. Moreover, these estimates are similar to what has been found in the literature for other food products (Printezis, Grebitus, and Hirsch 2019; Li and Kallas, 2021).

Method

Data

The data for the study were obtained from an online survey distributed through Qualtrics to the southeastern region of the United States[3] in October 2022. The questionnaire was divided into six sections—screening questions, consumer grocery shopping habits, preferences for local options,

[2]States included are North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, and Tennessee.
[3]States included are North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, and Tennessee. As per interviews with kale producers, these states share homogeneous production practices for kale.

awareness and perception of kale, discrete choice experiment (DCE), and demographics. To reduce potential bias and ensure relatability of the choice experiment scenario, participation was restricted to individuals who met a set of criteria—being 18 years or older, serving as the primary grocery shopper for their household, purchasing vegetables monthly, and consuming kale at least once every quarter. Following Onozaka and McFadden (2011), our survey was restricted to kale buyers and consumers due to its online nature, precluding physical product inspection. Through this approach, we can ensure that respondents derive utility from consuming kale, with their additional WTP directly tied to organic and region of origin[4] labels. Prior to actual data collection, the survey was pretested with agricultural professionals and students, and 20 pilot responses were also gathered by Qualtrics to test for survey functionality. The final sample size included 199 participants.

An online platform was utilized considering that 83.69% of the households in the study site have broadband internet subscriptions (U.S. Census Bureau, 2023). Moreover, utilization of online surveys enabled us to randomize the sequence of choice cards presented to each respondent, thus avoiding an order effect (Carson et al., 1994). Lastly, we utilized the page break feature of Qualtrics to deter the respondents from reading ahead and comparing choice sets that should be evaluated independently (Champ, Boyle, and Brown, 2017).

In the DCE section, a description of USDA organic products was presented to the respondents (see Appendix 1). Given the potential for hypothetical bias in stated preferences studies, a cheap talk script was included to reduce this risk. This script reminded respondents of the tendency for consumers to overestimate their WTP when presented with hypothetical product descriptions (Champ, Boyle, and Brown, 2017). Each respondent was then asked to select among kale products with varying prices (i.e., \$0.99, \$1.33, or \$1.67) [5] and different combinations of organic and region-of-origin attributes or indicate that they would not purchase the product (see Figure 1). For this study, "regional"[6] refers to kale that was produced in the southeastern United States. To help survey participants visualize this area, instead of a regional label, a map was included in the choice tasks. The use of real-world kale pricing and two uncorrelated attributes (organic, regional)[7] provided a choice experiment with reliably maximized marginal utility responses (Gao and Schroeder, 2009).

[4]A regional origin label was chosen over a local label, given that kale produced in the Southeast is generally marketed within the region and nationwide.
[5]Based on the USDA commodity reports, the lowest kale price in the Southeast during the development of the survey was \$0.99, and the highest was \$1.67 (February 2022), resulting in a mean of \$1.33 per bunch (USDA Agricultural Marketing Service, 2022).
[6]Given that kale produced in the Southeast is typically marketed in the region and across the country, a place-of-origin label was chosen over a local label.
[7]The correlation analysis revealed that organic and local attributes have a weak correlation of 0.25.

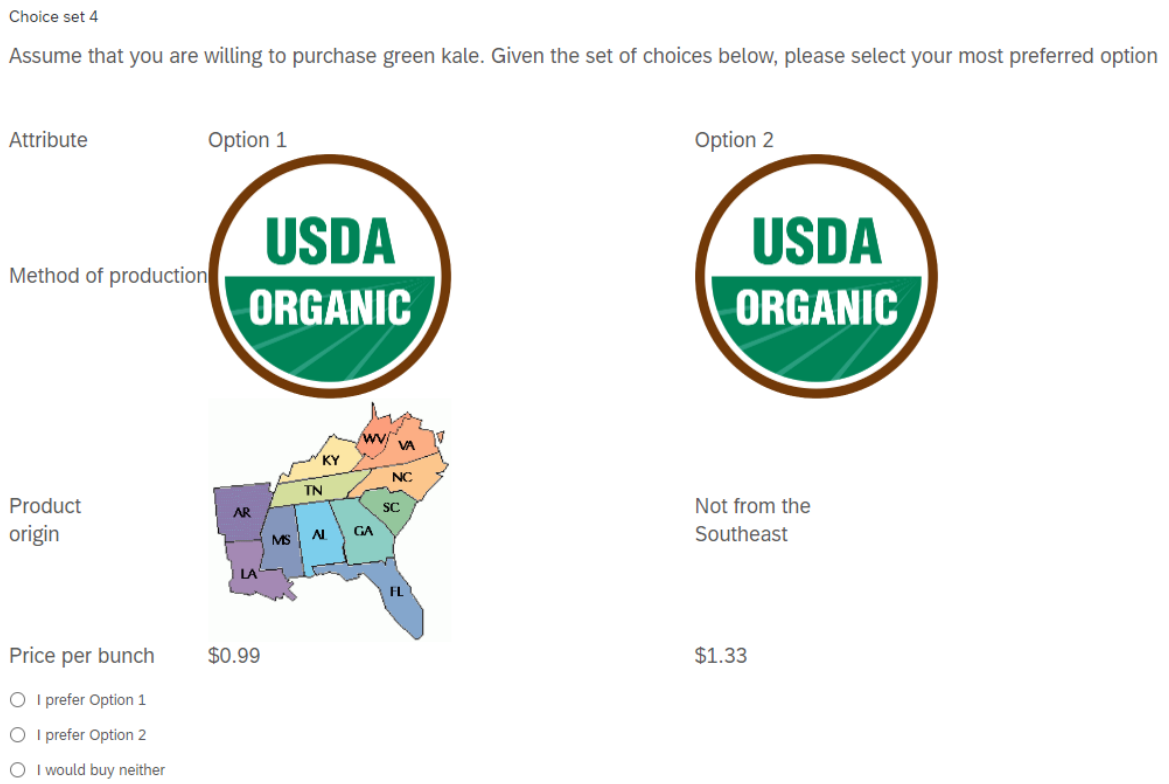

Figure 1. A sample question from the discrete choice section of the survey, in which respondents indicate their purchase decision based on label information and price.

The choice sets were generated using Ngene.[8] In generating the choice sets, a condition was set to guarantee that the price of alternatives labeled as organic is consistently equal to or higher than the price of non-organic alternatives.[9] Given this condition, Ngene generated 12 choice sets with two alternatives resulting in a D-efficiency score of 89.16%. A no-purchase option was added as the third alternative to avoid conditional situation and to estimate the "true" demand (Louviere, Hensher and Swait 2000). To avoid survey fatigue, the samples were split into two groups, and each group was presented with only six choice tasks.

Empirical Strategy

McFadden's (1974) random utility model was utilized to evaluate the consumers' responses to organic and regional value-added attributes of kale. As shown in equation 1, the indirect utility (U) experienced by each individual ($I = 1, 2, \ldots, 199$) when choosing a product with $j = 1,2,3$ alternative in choice set ($n = 1,2,\ldots,6$)[10] is determined by a linear function of attributes (X_{ijn}):

[8]Ngene 1.3.0 was utilized for generating the choice sets.
[9]Although organic product prices may exhibit seasonal fluctuations, they consistently command a premium when compared to their conventional counterparts (USDA Economic Research Service, 2023).
[10]The model includes 3,582 observations (199 respondents x 6 choice tasks x 3 alternatives).

$$U_{ijn} = \boldsymbol{\beta}' X_{ijn} + e_{ijn} \quad (1)$$

where $\boldsymbol{\beta}$ represents the vector with unknown parameters of marginal utilities associated with the attributes of product $\boldsymbol{X}$ with alternate *j* in choice set *n*. The last term, e_{ijn}, denotes the random error of the computed utilities. The rational, utility-maximizing consumer has a choice probability of selecting alternative *j* in the *n*th choice set.

This study uses a fixed effects conditional logit[11] approach as a baseline model, similar to the approach used by Soley, Hu, and Vassalos (2019), Güney and Giraldo (2019), and Hu, Woods, and Bastin (2009). Conditional logit (CL) is especially well-suited for use in discrete choice experiments (DCE), accepting that the independent and identical distribution (IID) of error terms and independence of irrelevant alternatives (IIA) assumptions hold. CL assesses a binary dependent variable, such as a purchase or no-purchase choice option, modeled through a logistic regression (McFadden, 1974). The IIA assumption restricts the participant's substitution within the model, suggesting that the choice probabilities of one product relative to another must hold, regardless of the introduction of new alternatives. Under these conditions, the probability of alternative *j* being selected by individual *i*, in choice set *n* can be modeled using equation 2:

$$P_{ijt} = \frac{\exp(X_{ijn}\,\beta')}{\sum_{j=1}^{J} \exp\,(X_{ijn}\;\beta')} \quad (2)$$

where the coefficients $\boldsymbol{\beta}$ are weights that represent indefinite marginal utilities derived from different attributes of kale (i.e., organic, regional). Given the inherent limitations of the conditional logit, alternative regression models are employed to analyze DCE data (Train, 2009). Mixed logit (MXL) relaxes IIA assumption and accounts for preference heterogeneity by modeling the choice probability as follows:

$$P_{ijt} = \frac{\exp(X_{ijn}\,\beta')}{\sum_{j=1}^{J} \exp\left(X_{ijn}\;\beta'\right)} f(\beta|\theta)d\beta \quad (3)$$

where the density function of $\boldsymbol{\beta}$ is represented as $f(\beta|\theta)$ in which θ pertains to a parameter vector that characterizes the distribution of preferences in the population.

Two types of mixed logit models were utilized in this study—preference space (PS) and WTP space. In order to differentiate between these two models, equation 1 was expanded to emphasize that the utility derived by respondent *i* from selecting alternative *j* in a choice set *n* is a function of both the monetary ($Price_{ijn}$) and non-monetary (X_{ijn}) attributes of kale, resulting in the following expression:

$$U_{ijn} = \boldsymbol{\alpha} Price_{ijn} + \boldsymbol{\beta}' X_{ijn} + e_{ijn} \quad (4)$$

[11]Stata 15.1 was used to estimate the models using Clogit and mixlogit followed by WTP by Hole (2007), and mixlogitwtp by (Hole, 2016) for the mixed logit on willingness to pay space.

In the PS model, the utility coefficients are presumed to conform to a normal distribution, enabling the estimation of mean and standard deviation for each coefficient. Hence, the marginal WTPs for organic and origin attributes are then calculated using equation 5 (Louviere, Hensher, and Swait, 2000):

$$WTP_x = -\frac{\beta_x}{\alpha} \tag{5}$$

where α and $\boldsymbol{\beta}$ represent monetary and non-monetary coefficients, respectively.

Unlike the PS model, WTP is directly estimated in the WTP space model (Lim and Hu, 2023).[12] As such, the utility is further specified as:

$$U_{ijn} = \lambda(\boldsymbol{WTP}'X_{ijn} - Price_{ijn}) + e_{ijn} \tag{6}$$

where WTP is a vector of non-monetary parameters (e.g., organic, regional) with dollar units, and λ is a scale parameter. In equation 3, the θ in the density function of PS model contain α and $\boldsymbol{\beta}$, whereas *WTP* and λ for the WTP space model (Bazzani, Palma, and Nayga, 2018; Helveston, 2022) noted that the WTP coefficients generated by a PS model are prone to inaccurate interpretation due to the fixed specification of price and scale parameters. While a PS model specifies the price as a fixed parameter, suggesting that the standard deviation of unobserved utility remains constant across observations, the price/scale coefficient in a WTP space model can be considered random (Bazzani, Palma, and Nayga, 2018). Previous studies found that WTP space models outperform PS models in generating more stable and reasonable WTP estimates (Train and Weeks, 2005; Balcombe, Chalak, and Fraser, 2009; Thiene and Scarpa, 2009; Bazzani, Palma, and Nayga, 2018).

Results and Discussion

The demographic characteristics of our sample and a comparison with the 2021 American Community Survey are reported in Table 1. The distribution of the sample closely resembles that of the household population in the study site. Most of the respondents were from Florida, North Carolina, and Georgia. The difference in the average age of the sample and the population is attributed to the survey design, which excluded residents under the age of 18 from participating. The sample also included a higher proportion of females, likely due to the filtering of primary household grocery shoppers. This distribution is consistent with previous studies. For example, Fonner and Sylvia (2015) found that females represented 60% of shoppers, whereas Soley, Hu, and Vassalos (2019) found that females comprised 69% of their sample. Moreover, previous studies found that women are more likely to respond to web surveys than men (Keusch, 2015; Becker, 2022).

[12]Also see Train and Weeks (2005) and Scarpa, Thiene, and Train (2008) for discussion and initial applications of this method.

The demographic characteristics of the respondents are also comparable with the profile of "superfoodies," as determined by Franco Lucas et al. (2022) in their consumer segmentation study. For instance, compared to other clusters of consumers, superfoodies are mostly female, employed, and have a relatively higher household income.

Table 1. Sociodemographic Characteristics of the Respondents (n = 199)

Characteristics	Sample	Population*
Distribution of household population (%)		
Alabama	7.00	7.96
Florida	33.70	34.41
Georgia	15.10	17.06
Mississippi	4.50	4.66
North Carolina	17.60	16.67
South Carolina	13.10	8.20
Tennessee	9.00	11.02
Age (year)	47.64	39.64
Male (%)	28.14	48.79
Employed fulltime or part-time (%)	55.78	55.89**
Low income (<$25k/yr) (%)	22.11	20.90
Middle income ($25k -$50k/ yr) (%)	31.66	22.03
Homeowners (%)	67.34	68.47
Has a four-year degree or higher (%)	33.67	28.62
County resident for 5+ years (%)	78.39	Unknown
White (%)	66.83	69.03

Notes: Determined using state-level data from 2021 American Community Survey 1-year estimates.
**The percentage of individuals aged 16 years and above who are employed.

Awareness and Perception of Organic and Regional Produce

The majority of the respondents spend between $25 to $100 per month on purchasing fresh vegetables (see Table 2). Kale emerges as a favored choice as it is typically included in the weekly diet of 58% of the respondents. Among the varieties of kale available in the market, green kale is the most sought after variety as reported by 91% of the respondents. Moreover, more than half of the respondents prefer to buy organic kale grown in the Southeast, and a significant percentage indicated that they would be willing to pay a premium for these products (see Table 2).

Table 2. Respondents' Awareness and Perception of Organic Products (N = 199)

Consumer Behavior	Sample (%)
Spending habits on fresh vegetables	
Spends less than $25 per month on fresh vegetables	14.57
Spends between $25 and $100 per month on fresh vegetables	76.88
Spends more than $100 per month on fresh vegetables	8.54
Preferences of kale	
Eats kale at least once a week	58.29
Typically eats red kale	32.66
Typically eats green kale	91.46
Typically eats kale lacinato/Tuscan	15.58
Prefers organic kale	64.82
Prefers kale grown in southeastern United States	64.82
Willing to pay a premium for organic and local kale	61.31
Awareness and engagement with organic products	
Heard the term "organic food products"	98.49
Able to find organic produce at their regular stores	87.44
Shops at different location because of their organic food selection	58.79
Buys organic products at least once a month	80.90
USDA organic label seeking behavior	
Seek USDA organic label all the time	28.64
Seek USDA organic label most of the time	27.14
Seek USDA organic label sometimes	36.68
Never sought USDA label before	7.54
Perception of organic products	
Organic products are healthier or more nutritious.	73.87
Organic products taste better.	58.29
Organic products are more fresh.	59.30
Organic products are better for the environment.	69.85
Organic products contain no artificial ingredients and additives.	72.36
Organic products have less chemical or pesticide residue.	74.87
Organic products promote animal welfare.	63.32
Organic products are better for the health of farmers/farm workers.	67.84
Organic products support local farmers.	67.34

Almost all participants indicated that they were familiar with organic products, and organic produce is typically available at their regular grocery venue. When organic products are unavailable in their usual stores, 58.79% opt to shop elsewhere, primarily due to their wider selection of organic food. This amount is much higher than the 20% that was reported in the study of Govindasamy, DeCongelio, and Bhuyan (2006) in the northeastern United States.

In line with the prevailing perception of "superfoodies" (Franco Lucas, Costa, and Brunner, 2021; Franco Lucas et al., 2022), the majority of survey participants believed that organic products are

healthier, have less chemical or pesticide residue, contain no artificial ingredients, and are more environmentally friendly than non-organic products. These findings align with the systematic review conducted by Katt and Meixner (2020), highlighting that consumers' environmental and health concerns drive their consumption of organic products. Also, more than half of the respondents believed that organic production is beneficial for local farmers and for the health of agricultural workers. This finding is consistent with the findings of Bond, Thilmany, and Keeling Bond (2008), which demonstrated that consumers' support for local farmers positively impacts their purchases of fresh produce.

Given the respondents' positive perceptions of organic products and their availability at their regular stores, 80.9% reported that they buy organic products at least once a month, with 34.67% buying them even on a weekly basis. When asked if they look for a USDA organic label when purchasing these products, 29% reported that they always seek this label, and very few reported that they never looked for this label before (7.54%). In total, 92.46% of the respondents indicated that they seek out the USDA label at least occasionally. This percentage is higher than the findings of McFadden and Huffman (2017) in the midwestern United States, where only 66% of respondents reported noticing the USDA organic seal prior to their study.

When it comes to product origin, 62.81% indicated that they prefer to buy fruits and vegetables grown from the Southeast over those from other regions. This finding is similar to the response by Hasselbach and Roosen (2015) regarding the local attribute, who found that 65% of consumers were conscious of the origin of the products they bought. It is noteworthy that only 61.31% of respondents were willing to pay a premium for both organic and regional (grown in the southeastern United States) attributes of kale.

Estimation Results

Table 3 presents the estimation results of the four models—conditional logit (Model 1), mixed logit in preference space (Model 2), and mixed logit in WTP space (Models 3 and 4). Although the CL model was presented, it should be noted that the Hausman test revealed that the IIA property is violated. This suggests that MXL estimation is a more suitable approach for the analysis. Based on the AIC and BIC values, WTP space model exhibited superior model fit when contrasted with conditional logit and mixed logit in preference space models. It should be noted that Models 1 and 2 present utility coefficients, whereas the utility in Models 3 and 4 is expressed in dollar units.

Table 3. Estimation Results

Attributes	Model 1 (Coef. / S.E.)	Model 2 (Mean/S.E.)	Model 3 (Mean/S.E.)	Model 4 (Mean/S.E.)
Price	-1.753***	-2.517***	1.128***	1.323***
	(0.186)	(0.244)	(0.152)	(0.158)
Organic	0.799***	1.161***	0.470***	0.375***
	(0.101)	(0.183)	(0.064)	(0.062)
Regional	0.644***	0.907***	0.359***	0.237***
	(0.070)	(0.119)	(0.043)	(0.046)
Organic*Regional				0.204*
				(0.081)
No purchase	-3.208***	-5.833***	-2.747***	-2.210***
	(0.246)	(0.526)	(0.311)	(0.185)
Standard deviation				
Price			0.975***	-0.819***
			(0.257)	(0.211)
Organic		1.693***	0.612***	0.530***
		(0.211)	(0.066)	(0.076)
Regional		1.041***	0.375***	0.272***
		(0.136)	(0.039)	(0.045)
Organic*Regional				-0.586***
				(0.095)
No purchase		2.795***	1.401***	0.914***
		(0.426)	(0.227)	(0.133)
AIC	2,104.841	1,912.118	1,902.239	1,887.591
BIC	2,129.576	1,955.404	1,951.708	1,949.428
Log likelihood	-1,048.4207	-949.05918	-943.11939	-933.79575
N	199	199	199	199
Observations	3,582	3,582	3,582	3,582

Notes: Model 1: Conditional logit; Model 2: Mixed logit in Preference space; Model 3 & 4: Mixed logit in WTP space.
Level of significance: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Across the models, price, organic, and product origin variables are statistically significant, confirming their influence on consumers' decisions regarding kale selection. A "No Purchase" variable was also added to the analysis, wherein 1 represents the third alternative (I would not buy), whereas 0 corresponds to alternatives A and B with different attribute levels. It is an alternative specific constant that holds across all choice sets, providing participants with the option of not purchasing any of the presented kale options. The significant negative coefficient associated with "No Purchase" indicates that the lack of a purchase by consumers significantly reduces their utility.

Table 4 presents the mean WTP for the organic and regional attributes of kale. Based on the point estimates computed through the three models (Models 1–3), respondents' mean WTP for organic

kale ranges from $0.456 to $0.470. On average, this amount represents a 35% premium price over the average price of kale at $1.33 per bunch. The estimated WTP for regionally grown kale ranges from $0.359 to $0.368, which represents a 27% to 28% premium. The calculated premium for the origin attribute closely aligns with findings from Kilduff and Tregeagle (2022), who estimated a 28.39% premium for locally sourced sustainable food. However, it was lower than the results of Printezis, Grebitus, and Hirsch (2019), who identified a premium ranging from 41.4% to 52.5% for food products labeled as local, which could originate from nearby local, state, or regional sources. It is important to highlight that these studies employed meta-regression analysis and encompassed a diverse range of products, whereas our estimates were specifically derived for kale. Furthermore, our estimates were specifically focused on regionally sourced kale, whereas previous studies often link the local label with products grown or produced either within a defined distance, state, or region (Printezis, Grebitus, and Hirsch, 2019).

Table 4. Willingness to Pay Point Estimates for Organic and Origin Attributes of Kale

Attributes	**Mean WTP (95% confidence intervals) ($)**			
	Model 1	**Model 2**	**Model 3**	**Model 4**
Organic	0.456 (0.353–0.558)	0.461 (0.328–0.595)	0.470 (0.344–0.595)	0.375 (0.253–0.497)
Regional	0.368 (0.282–0.453)	0.360 (0.269–0.452)	0.359 (0.275–0.443)	0.237 (0.147–0.327)
Organic*Regional				0.204 (0.04–0.362)

Notes: Model 1: Conditional logit; Model 2: Mixed logit in preference space; Model 3 and 4: Mixed logit in WTP space.

In Model 4, we interacted the organic with the regional variable to estimate the respondents' mean WTP on kale that possesses both attributes. Following the approach of Meas et al. (2014) in computing for combined WTP,[13] our results showed that respondents are willing to pay $0.816 per bunch of organic and regionally grown kale, which represents a 61.35% premium. This WTP estimate exceeds the one calculated by Meas et al. (2014), which determined a $0.4 premium for an organic and regionally produced jar of blackberry jam. Additionally, Meas et al. (2014) found that the total premium for combined regional (produced in Ohio Valley) and organic attributes was lower than the sum WTP of individual attributes. On the contrary, we found that combining these two attributes generates a higher premium for kale, which suggests complementary effects between these two kinds of label.

At the conclusion of the discrete choice experiment, participants were asked to report the highest priority attribute of the choices they made. They reported that price (38.7%) and organic attribute (38.2%) were their main priorities, followed by the regional attribute with 23.1%. These findings show that organic labels draw a higher premium than regional labels. This result is consistent with the study of Kilduff and Tregeagle (2022), which reported that organic labels command higher WTP for sustainable food products than a local label. Previous literature has shown that these

[13]The aggregate WTP is derived from the sum of individual WTP values and the WTP associated with interaction variables (Meas et al., 2014).

attributes are not consistently prioritized, and, for any given study, the items and samples may cause one to have higher priority than another (Bond, Thilmany, and Keeling Bond; 2008; Gao and Schroeder, 2009; Hu, Woods, and Bastin, 2009; Yue and Tong, 2009; Li and Kallas, 2021).

Conclusions

Over the past two decades, alongside the rising demand for local and organic products, there has been a notable trend where consumers are increasingly eager to explore and purchase larger quantities of food items commonly referred to as "superfoods." Although there is not an official definition, superfoods are often considered as food products with high concentrations of nutrients or bioactive chemicals beneficial to human health (Liu et al., 2021; Franco Lucas et al., 2022). Consumers' growing desire for a healthier diet is a key driving force behind the increased popularity of superfoods. Although there is a rich literature regarding the chemical characteristics of superfoods (Franco Lucas, Costa, and Brunner, 2021), and substantial research efforts exist regarding consumers' WTP for functional foods, to the best of our knowledge, there is limited literature related to WTP for superfoods in the United States. This study is an effort to add to this literature.

Specifically, we estimated the WTP of consumers across seven states in the southeastern United States for value-added kale products that are produced using organic practices or come from farms within the region. Kale was selected because of a noticeable surge in demand within the United States and its growing popularity as a superfood (Cobos and Díaz, 2023). Using a discrete choice experiment, the results indicate that consumers have a significant positive response to both organic and origin attributes. Despite price being one of the major concerns of shoppers, both organic and origin attributes are able to draw premiums individually. Organic and origin attributes in kale draw premiums of 35% and 27%, respectively. Moreover, when these labels were shown together, they generated a combined premium of 61.35%. This result implies that as the demand for kale continues to grow, producers may consider shifting from conventional to organic farming practices and exploring regional distribution options, especially if they can do so at costs lower than the price premiums outlined in this analysis.

The estimates obtained in this study can help beginning farmers consider venturing into organic kale farming and distributing the produce regionally. Additionally, they provide essential guidance for Extension professionals who are pivotal in assisting producers with their decision-making processes. Premium-priced products, such as organic and regionally grown kale, can give producers more realized revenue (USDA-ERS, 2023). While our study contributes to the growing body of literature affirming the positive effects of the organic and origin labels on food prices, it is important to acknowledge the presence of conflicting results in the literature. Moreover, producers may not realize the price premiums stated by consumers in research studies, especially those derived from the stated preference approach (Davidson, Khanal, and Messer, 2023).

It should be noted that the findings of this study are limited to understanding the consumer preferences for organic and regionally grown kale in the southeastern United States. Consequently, these findings may not necessarily align with broader national perspectives on kale. Future studies

should aim to capture an equitable representation of respondents from various southeastern states, given that our paper does not capture state-level differences. Since kale produced in the Southeast is marketed nationwide, future studies could also include a more diverse audience from various regions across the country. Moreover, as the top 5 kale producers span various U.S. regions (i.e., West, Southeast, Northeast, Southwest), exploring whether product origin impacts superfood preferences is valuable to inform targeted marketing strategies. It will also be interesting to explore additional superfood commodities and to conduct comparative analyses based on the findings of this study. Lastly, although we tried to control for hypothetical bias using cheap talk scripts, future studies could supplement the survey using field experiments with real products or online surveys coupled with improved visualization of alternatives. Yue and Tong (2009) and Lizin et al. (2022) found that using real products instead of pictures reduces any hypothetical bias in CE studies.

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Appendix

Appendix 1. A redacted version of the questionnaire.

1. Which state do you currently reside in?

2. What is your five-digit zip code?

3. What is your year of birth?

4. Are you the primary grocery shopper of your household (at least 50% of the time)?

☐ Yes ☐ No

5. Do you buy vegetables every month? ☐ Yes ☐ No

6. On average, how much do you usually spend on fresh vegetables per month?

☐ Less than $25 ☐ $76- $100

☐ $25- $50 ☐ More than $100

☐ $51- $75

7. How often do you eat kale?

☐ Daily ☐ Once a month

☐ 4-6 times a week ☐ Once a quarter

☐ 2-3 times a week ☐ Rarely or Never

☐ Once a week

8. Have you heard the term 'organic food products'?

☐ Yes ☐ No

9. Is organic produce available at the stores where you typically buy your groceries?

☐ Yes ☐ No ☐ Sometimes ☐ I do not know

10. Please indicate how often you purchase organic food products.

☐ Weekly ☐ Once every quarter

☐ Twice a month ☐ Rarely

☐ Once a month ☐ Never

11. Do you shop at different location if you are specifically seeking out organic food products?

☐ Yes ☐ No

12. Do you look for this label when purchasing products?

☐ Never ☐ Sometimes ☐ Most of the time ☐ Always

13. What are your reasons for purchasing organic products? Please select your level of agreement to each statement.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Organic products are healthier or more nutritious.					
Organic products taste better.					
Organic products are more fresh.					
Organic products are better for the environment.					

Organic products contain no artificial ingredients and additives.	○	○	○	○	○
Organic products have less chemical or pesticide residue.	○	○	○	○	○
Organic products promote animal welfare.	○	○	○	○	○
Organic products are better for the health of farmers/ farm workers.	○	○	○	○	○
Organic products support local farmers.	○	○	○	○	○

14. Do you prefer to buy fruits and vegetables that were grown from Southeastern US?

☐ Yes ☐ Sometimes ☐ No ☐ Product origin does not matter to me

15. What are the varieties of kale that you typically eat? (please check all that apply)

☐ Red kale ☐ Green kale ☐ Kale Lacinato/ Tuscan

16. Do you prefer eating organic kale?

☐ Yes ☐ No ☐ Method of production does not matter to me

17. Do you prefer to eat kale grown from Southeastern US?

☐ Yes ☐ No ☐ Source of kale does not matter to me

In this section, we would like to know your willingness to pay for locally-sourced and organic kale. Please read the following information on how USDA defines organic products and local food.

Organic Products

According to USDA, organic products have to meet the following requirements to be certified as "USDA organic":

Must be produced using agricultural production practices that foster resource recycling, promote ecological balance, maintain and improve soil and water quality, minimize the use of synthetic materials, and conserve biodiversity.

Products must be:

Overseen by a USDA NOP (National Organic Program)-authorized certifying agent, following all USDA organic regulations

Produced without excluded or prohibited methods, (e.g., genetic engineering, ionizing radiation, or sewage sludge)

Produced using allowed substances

The experience from previous similar surveys is that people often state a higher willingness to pay than what one is actually willing to pay for the good. For instance, a recent study asked people whether they would purchase a new food product similar to the one you are about to be asked about. This purchase was hypothetical (as it will be for you) in that no one actually had to pay money when they indicated a willingness to purchase. In the study, 80% of people said they would buy the new product, but when a grocery store actually stocked the product, only 43% of people actually bought the new product when they had to pay for it. This difference (43% vs. 80%) is what we refer to as hypothetical bias. Accordingly, it is important that you make each of your upcoming selections like you would if you were actually facing these exact choices in a store, i.e., noting that buying a product means that you would have less money available for other purchases.

18. Would you be willing to pay a premium for **organic kale grown in the Southeastern US**?

☐ Yes ☐ No

19. Assume that you are willing to purchase green kale. Given the set of choices below, please select your most preferred option:

Attribute	Option 1	Option 2
Method of production		
Product origin		Not from the Southeast
Price per bunch	$0.99	$1.33

☐ I prefer Option 1 ☐ I prefer Option 2 ☐ I would buy neither

(Note: Six choice sets were shown to each respondent)

20. When you were deciding which option to choose, what was the most important attribute that you considered?

☐ Organic ☐ Product origin ☐ Price

21. What is your gender?

☐ Male ☐ Female ☐ non-binary ☐ Prefer not to say

22. What ethnicity do you most identify with?

☐ White ☐ Native Hawaiian or Pacific Islander

☐ Black or African American ☐ Hispanic or Latino or Spanish Origin of any race

☐ American Indian or Alaska Native ☐ Other

☐ Asian

23. What is the highest level of education you have completed?

☐ Some high school or less

☐ High school diploma or GED

☐ Some college, but no degree

☐ Associates or technical degree

☐ Bachelor's degree

☐ Graduate or professional degree (MA, MS, MBA, PhD, JD, MD, DDS etc.)

☐ Prefer not to say

24. Do you have any agricultural background?
☐ Yes, we are managing a farm.

☐ Yes, I earned a degree related to agriculture.

☐ Yes, I worked in an agricultural-related company.

☐ Yes (please specify) _____

☐ No

25. How many people are currently living in your household?

26. Which of the following categories best describes your employment status?

☐ Employed full time ☐ Student

☐ Employed part time ☐ Disabled

☐ Self-employed ☐ Unemployed

☐ Retired

27. What was your total household income before taxes during the past 12 months?

☐ Less than $25,000 ☐ $100,000-$149,999

☐ $25,000-$49,999 ☐ $150,000 or more

☐ $50,000-$74,999 ☐ Prefer not to say

☐ $75,000-$99,999