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UNPACKING LOCAL FOOD: THREE ESSAYS ON CONSUMER DEFINITION, MOTIVATION, AND GEOGRAPHIC VARIATION

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by

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ABSTRACT

This dissertation is a collection of essays that relate to local food in different forms.

Essay 1 addresses what factors affect consumers' definition of local food and, in turn, how their definition affects their willingness to pay for local food. In this study, we conduct an online survey with 509 respondents from the Mid-Atlantic region in the U.S. and Washington State. We find that consumers who identify local with increasingly larger geographic scales generally have lower willingness to pay for local food. Consumers who prioritize national policies rather than global are more likely to define local food with a broader, more national, definition of local. Moreover, we also find that people who have had experiences of COVID, especially those who have personally been infected, are willing to pay more for the local food compared to others who haven't had such experiences. Finally, we find that the rural-urban spectrum matters, as consumers who live in urban areas are willing to pay the most, followed by those who live in suburban areas.

Using a lab-in-the-field experiment, in Essay 2, we investigate how providing information about food miles and pesticide residues influences willingness to pay (WTP) for potatoes among 407 shoppers in Taiwan, split between a supermarket and a farmers market. Initially, local organic potatoes have the highest average WTP at NTD73, followed by imported organic at NTD67, local non-organic at NTD48, and imported non-organic at NTD42. When we introduce information about food miles, the WTP for imported organic potatoes decreases by NTD10.2, without significantly impacting other varieties. A different information treatment featuring pesticide residue information boosts the WTP for local organic potatoes by NTD8.3 but has no significant effect on the other categories. Providing both types of information diminishes the local premium for non-organic potatoes while enhancing it for local organic varieties. The influence of the information varies by shopping venue: farmers market shoppers give more weight to food miles information, whereas supermarket patrons are more responsive to pesticide residues information.

Essay 3 aims to examine how different definitions of “local” influence the non-hypothetical WTP for local and non-local potato chips among supermarket shoppers across varying rural-urban landscapes, and to investigate whether there are any significant differences in WTP for local and

non-local products between rural and urban settings. We conduct a lab-in-the-field experiment in the parking lots of supermarkets located in rural (Huntingdon) and urban (Altoona) areas in Pennsylvania. The results indicate that consumers' WTP for local potato chips does not vary significantly between two definitions of local: one that defines local as being produced within the state of Pennsylvania, and another that defines local as being predominantly sold within the state. These findings suggest that future research on local food can feasibly use the "predominantly sold within" definition, which is highly compatible with supermarket scanner data. Rural shoppers demonstrate a lower WTP for both local and non-local potato chips compared to their urban counterparts. Both rural and urban shoppers exhibit a premium for local potato chips, with rural shoppers showing a higher premium than urban shoppers. However, this difference in local premium between rural and urban settings is subtle and not statistically significant.

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Chapter 1

Could the Definitions of "Local" Affect the Consumer Willingness to Pay for Local Food? A Survey Conducted during the COVID Pandemic

1.1 Introduction

In the U.S., the word organic has been carefully defined and managed by the U.S. Department of Agriculture; however, the phrase "local food" is not defined or managed by any U.S. government agency or other federal institution. The definition of local is mentioned in the 2008 Farm Bill, i.e., the 2008 Food, Conservation, and Energy Act, which says local food depends on:

> The locality or region in which the final product is marketed, so that the total distance that the product is transported is less than 400 miles from the origin of the product; or the State in which the product is produced.

Several other jurisdictions have attempted to define local to varying degrees. In Canada, local food is "food produced in the province or territory in which it is sold or food sold across provincial borders within 50 km of the originating province or territory" stated by local food claims interim policy (Government of Canada, 2013). In 2020, the governor of Vermont signed ACT129 into law and changed the previous term "local" requiring food to originate within Vermont or 30 miles of the point of sale; however, for raw agricultural products, it should be exclusively grown or tapped in Vermont. In England, the Real Food Calculator stated that "...All production, processing, and distribution facilities must be within a 250-mile radius of the institution. This radius is extended to 500 miles for meat, poultry, and seafood…". These varying definitions suggest that there is no clear definition and legal legislation for the local food. Even so, local foods have been promoted worldwide by governments and civil society organizations. Enthoven et al. (2021) stated that the meanings of "local food" are different based on the authors and context of the research. Local food systems can be generally separated into three domains of proximity: geographical proximity (e.g. locality: the distance between the food consumption and food production), relational proximity (e.g. the close relationship between producers and consumers within the food system), and proximity in values (e.g. the origin of food, traceability, freshness, and quality). The geographical proximity still constitutes the fundamental measure for defining local food, yet the other dimensions of proximity represent additional features.

Despite a great deal of articles discussing local food, very few studies investigate how consumers define local or how this definition might be associated with the value consumers place on local food. Thus, this paper addresses two related research questions: (1) What consumer characteristics or related factors affect consumers' own definition of local food, and (2) Could the different definitions influence consumers' willingness to pay (WTP) for local food?

No doubt, there may be additional factors besides consumers' definitions of local scales that affect their WTP for local food. For example, during the COVID-19 pandemic period, researchers noticed that consumers changed their behavior in purchasing food in favor of "natural products" (Chenarides et al. 2021).

Consumers expressed greater trust in local food products because they view local food as a fresher, safer, and healthier choice than imported products (Feldmann and Hamm, 2015). Therefore, in our study we explore whether consumers who have experiences with COVID, such as personal infection or family infection, are willing to pay more for local food.

Thus, in this study, we attempt to fill in some research gaps stated above by conducting an online survey about the WTP for local foods using 509 valid samples mainly from participants in the Mid-Atlantic region. To be more specific, we first investigate the driving factors behind how people define local and secondly, on whether different definitions of local affect consumer WTP for local food. We use a Two-stage residual inclusion approach to solve the potential endogeneity problem in our model, namely that an unobserved variable exists that might affect both how people define local and how their WTP for local food varies at the same time. In the first stage, we use Multinomial Logistic Regression to determine what factors affect how people define local; in the second stage, we use a two-limit Tobit regression to investigate how the definitions affect WTP for local food.

The results show that consumers who use a larger geographic scale to define local food are generally less willing to pay for local food. In addition, consumers who have had experiences of COVID are willing to pay more for the local food compared to others who were unaffected by COVID. Consumers who live in urban areas have the highest WTP for local food, followed by those who live in suburban areas.

The remainder of this paper is arranged as follows: Section 1.2 describes the data and variables used in the empirical analysis, Section 1.3 explains the estimation strategy, Section 1.4 presents the results, and Section 1.5 provides additional discussion and conclusions.

1.2 Data and Variable Descriptions

This project makes use of data conducted via an online survey previously described by Vecchi et al. (2022). In this paper, we use 509 validated responses from consumers who are 18 or older and mainly from the Mid-Atlantic region. The survey was conducted from November 19 to November 29 in 2020, with the help of the survey provider Dynata. Participants spent around 10 minutes completing the survey and received a participation fee of $4. In this survey, participants were asked both a series of questions to elicit their WTP for local food and about how they would define local food. In addition, participants were also asked about their experiences with COVID and other demographic information. The full survey is shown in Appendix D.1.

1.2.1 Variables Used in Models

In this study, we employ a two-stage model, and this section describes all variables used in both stages. This section also provides background information on how the survey data relates to previous research.

Definitions of local

As noted above, previous research treats the definition of local food very differently. For example, a survey conducted by Grebitus et al. (2013) used a kilometer radius scale to help define local. Those authors found that consumers were willing to pay 0.35 Euro less for a wine traveling 1000 kilometers rather than 20 kilometers; however, they also found that consumers would pay 0.49 Euro less for apples in the same distance condition. In that study, discounts for kilometers traveled varied with the perishability of goods such as apples and wine.

Unlike previous research that focuses on setting different distances to elicit consumer WTPs for food with different food miles, this survey asked consumers to pick the definition of local that best fits their own perception. More specifically, consumers were asked to pick the best fit from the following four choices: (1) local food is grown in local farms; (2) local food is grown in one's own county; (3) local food is grown in one's own state; and (4) local food is grown within the United States. This survey question was administered after consumers were asked about their WTP for local food.

Willingness to pay for local food

For the WTP for local food, this survey includes a series of hypothetical binary choices between local and non-local produce (and meat). The structure of the repeated choices is referred to as a

staircase procedure, or the so-called “unfolding brackets method” introduced by Cornsweet (1962).

In this survey, participants were asked a series of questions about their WTP for local food. For example, the participants would first be asked “If you were buying fruit or vegetables and you could choose at equal prices between local food produce and non-local produce, which one would you choose?” The participants would give the answer of local produce or non-local produce. Those participants picking “local” would next be asked, “If instead the price of locally grown produce was 50% more expensive than non-local produce, which one would you choose?” If participants answered non-local produce, the next question will be “If instead the price of locally grown produce was 37.5% more expensive than non-local produce, which one would you choose?” If participants answered non-local produce, the next question will be “If instead the price of locally grown produce was 32.5% more expensive than non-local produce, which one would you choose?” And if the participant answered local produce, then the exact WTP for local produce of this participant will be 35% more compared to non-local produce (the calculation= (37.5+32.5)/2). Respondents would be asked whether they would buy local or non-local produce (and meat) at different WTP for local food that alters upwards or downwards to narrow into the indifference point (accurate to a 5% interval).

Finally, we take the average of WTP for local produce and local meat to get the average WTP for local food to help analyze data more efficiently. In this way, we have (i) the average percentage WTP for local food; (ii) the percentage WTP for local produce; (iii) the percentage WTP for local meat. All WTPs for local food are on a scale of -100 to +100, which means that participants are willing to pay from 100% less to 100% more for local food compared to non-local food.

Previous literature indicates that consumers are willing to pay more for local food because of its high quality, freshness, and better taste compared to non-local (Campbell et.al.,2014; Willis et al., 2013; Carroll et al., 2013; Hu et al., 2012; Onken et al., 2011). Consumers also have a higher WTP for local as a product attribute compared to other value-added claims, such as fair trade, non-GMO, low fat, or “no added sugar” (Onozaka and Thilmany-McFadden, 2011; James et al., 2009; Loureiro and Hine, 2002). Food mileage is a significant element when consumers make their purchases. An empirical result shows that in Canada, consumers’ WTP for beefsteak labeled local over beefsteak produced from the United States is around $7.00/lb (Lim and Hu, 2016). In addition, consumers tend to minimize travel time to the purchase location, making a grocery store nearby a more appealing alternative. A study shows a negative effect on WTP for local food if the location of the selling place is far from where consumers live, such as farms (Printezis and

Grebitus, 2018). Another study indicates that consumers choose local foods not only for their intrinsic and extrinsic attributes, but also for seeking to engage with the farmers, food producers, and the rural community, and this social influence positively affects WTP for local foods for women and negatively for men (Gracia et. al., 2012). In this study, we wondered how local definitions and experiences of COVID affect WTP for local food.

Nationalism

In the survey, participants were asked the following question about their global or national perspectives: "Should your country's leaders give priority to solving global problems or to solving your country's problems?". Participants responded on a scale from 1 to 10, where 1 was linked to a global focus and 10 was linked to a national focus. We posit that this question relates to a participant's degree of nationalism (as opposed to globalism).

In classic political theory, nationalism is often considered as personal security and social justice. Governments are supposed to provide every citizen with a certain level of protection against the contingencies of life (Miller, 2008). Especially during the COVID pandemic, participants identifying with national problem solving may tend to support locals first and "eat patriotically". In Europe, people are creating a new wave of food nationalism. For example, Agriculture Minister in France declared, "I am calling for food patriotism, for agricultural patriotism," and encouraged citizens to buy French cheese, strawberries, and tomatoes over foreign ones, even though these products might be more expensive (Wang, 2021; Miller, 2008).

Meanwhile, the Rural Economy Secretary in the UK endorsed the Scottish Government's campaign to support local dairy products and claimed that "I would encourage everyone in Scotland to take part to support local farming and food production." It is understandable that national states might resort to a unilateral agenda to mitigate potential shortages in key supplies from other countries and protect their people when they had no clear ideas or plans to cope with the unknown crisis. "Me first" and a nationwide or large-scale local concept are trends of new nationalism to pursue the local interests and to protect their own territories (Wang, 2021). It seems that the more nationalism, the larger the scale in which people define local. In our study, we will examine whether different degrees of supporting nationalist policies lead to different definitions of local food.

Experiences with COVID

In the survey, participants were asked two questions about their experiences during the COVID-19 pandemic: they were asked if they were personally infected and if anyone in their family was infected. Consumers view local food as a fresher, safer, and healthier choice than imported products, and they also expressed greater trust in local food products (Feldmann and Hamm, 2015). During the COVID pandemic period, consumers changed their food purchasing behavior in favor of "natural products" (Chenarides et al. 2021). This change seems likely to continue over the next few years based on health concerns. The lockdown was indeed related to changes in motivations of food choice, 26% of the surveyed participants increased their purchasing of healthy food, 21% increased their ethical concerns, and 19% cared about natural content more than before (Marty et al., 2021). People who have experienced COVID, including personally infected as well as having family member infected, might pay more attention to "healthier food", such as local food, are willing to pay the price premium for it because they might concern more about healthy things after the sickness.

Other variables

The survey instrument also asked participants questions about many other, more general socio-demographic characteristics, such as gender, race, Hispanic origins, age, income, education, living area (rurality), and the number of children. Table 1.1 describes all the variables that we used in our models.

Table 1.1 Variables Used in the Models

Variables	Definition
Average WTP for local food	The average of WTP for local produce and local meat. -100 if price premium for local food is -100, 100 if price premium for local food is 100
WTP for local produce	-100 if price premium is -100, 100 if price premium is 100
WTP for local meat	-100 if price premium is -100, 100 if price premium is 100
The definitions of local scale	1 if local food is what I purchased at a local farm stand or at a locally owned and operated food store, 2 if grown in my county, 3 if grown in my state; and 4 if grown in the United States
Nationalism	1-10. 1 if you think your government should focus on solving problems of the world, 10 if solving the problems of the US only
Experiences with COVID:	
Personal infected	1 if having personal infected experience, 0 otherwise
Family infected	1 if having family infected experience, 0 otherwise
Female	1 if female, 0 if male
Race	1 if white, 2 if black, 3 if Asian, 4 if others
Hispanic origins	1 if yes, 0 otherwise
Age	18 to 85
Annual income	1 if under $24,999, 2 if $25,000-$49,999, 3 if $50,000-$74,999, 4 if $75,000-$99,999, 5 if $100,000-$104,999, 6 if $125,000-$149,999, 7 if $150,000-$174,999, and 8 if 175,000 and over
Rurality	1 if urban area, 2 if suburban, and 3 if rural
Education	1 if High school or less, 2 if Some college, 3 if Technical degree (2-year college), 4 if 4-year college, and 5 if Postgraduate.
Number of children	How many children are in your household?

1.2.2 Descriptive Statistics on Local Definitions and WTP for Local

As shown in Table 1.2, the total valid sample size is 509. The average participation age is 50.37, and female contributes 61% of the participation in total. Table 1.2 also shows how participants' average demographic statistics and responses vary depending on which of the four definitions of local they picked. Approximately 25% of the people described local food as grown by local farms; 24% indicated it is grown in their own county, 34% said it is grown in their state, and 16% said it is grown in the U.S. The average age of respondents varies substantially across local-definition groupings. In the group that thought/said that local food is grown in one's own state, the average age is the oldest, which is 53.55, while the group of grown in the U.S. is the youngest with 46.68 on average. In the group of local food is grown within the US, 44% of the people live in urban areas, whereas over 50%of the people live in suburban areas in the group of local food is grown in one's own state. The proportion of white and black people among different groups of definitions of local scale is significantly different.

Table 1.2 Demographic Statistics by Definitions of Local Scale

	All	Local farms	County scale	State scale	US scale	F-test P-value
Age	50.37	47.81	50.95	53.55	46.68	**0.00**
	(15.09)	(16.57)	(14.35)	(14.27)	(14.20)	
Gender:						
Male	0.38	0.38	0.44	0.33	0.40	0.21
Female	0.61	0.61	0.56	0.67	0.59	0.19
Education:						
High school or less	0.19	0.27	0.15	0.13	0.24	**0.01**
Some college	0.16	0.16	0.12	0.17	0.16	0.67
Technical degree	0.14	0.10	0.16	0.17	0.11	0.26
4-year college	0.30	0.23	0.34	0.35	0.24	**0.08**
Postgraduate	0.22	0.23	0.23	0.18	0.24	0.49
Annual income:						
Under $24,999	0.18	0.20	0.10	0.19	0.22	**0.10**
$25,000 to $49,999	0.18	0.19	0.18	0.18	0.17	0.99
$50,000 to $74,999	0.18	0.16	0.17	0.21	0.18	0.64
$75,000 to $99,999	0.15	0.12	0.19	0.14	0.15	0.37
$100,000 to $124,999	0.08	0.10	0.10	0.09	0.00	**0.03**
$125,000 to $149,999	0.10	0.09	0.12	0.06	0.16	**0.05**
$150,000 to $174,999	0.04	0.03	0.07	0.02	0.05	**0.10**
$175,000 and over	0.09	0.12	0.06	0.11	0.07	0.25
Rurality:						
Urban	0.31	0.29	0.30	0.27	0.44	**0.05**
Suburban	0.49	0.45	0.52	0.55	0.34	**0.01**
Rural	0.20	0.27	0.18	0.17	0.22	0.19
Number of children	0.57	0.68	0.64	0.42	0.63	**0.08**
	(0.99)	(0.96)	(0.96)	(1.02)	(1.01)	
Hispanic	0.09	0.11	0.10	0.06	0.12	0.25
	(0.29)	(0.31)	(0.31)	(0.23)	(0.33)	
Race:						
White	0.76	0.73	0.77	0.84	0.65	**0.01**
Black	0.11	0.13	0.10	0.07	0.17	**0.08**
Asian	0.07	0.09	0.09	0.04	0.10	0.20
Others	0.06	0.05	0.05	0.05	0.09	0.62
N	509	128	124	175	82	509

Note: Standard errors appear in parentheses. F test tests values crossed different groups are equal. Bold if $p<0.1$.

Participants' WTP for local food, measured in percent above the non-local price, also differed across the local-definition groupings.

Figure 1.1 shows the box plot that indicates that the average WTP for local food (i.e., the average of the WTPs for local produce and local meat) is 37.48, with standard deviation of 40.46, median of 30, the lower quartile value of 5, and the upper quartile value of 67.5. The mean WTP for local

produce is 39.17 percent, with standard deviation of 44.76, median of 30, the lower quartile of 5, and the upper quartile of 80. The mean WTP for local meat is 35.78 percent, with standard deviation of 46.06, median of 25, the lower quartile of 5, and the upper quartile of 80. Overall, people are willing to pay more for local produce compared to local meat. Less than 10 people said they want to pay 100% more for the non-local food; while around 80 people said they are willing to pay 100% more for the local food.

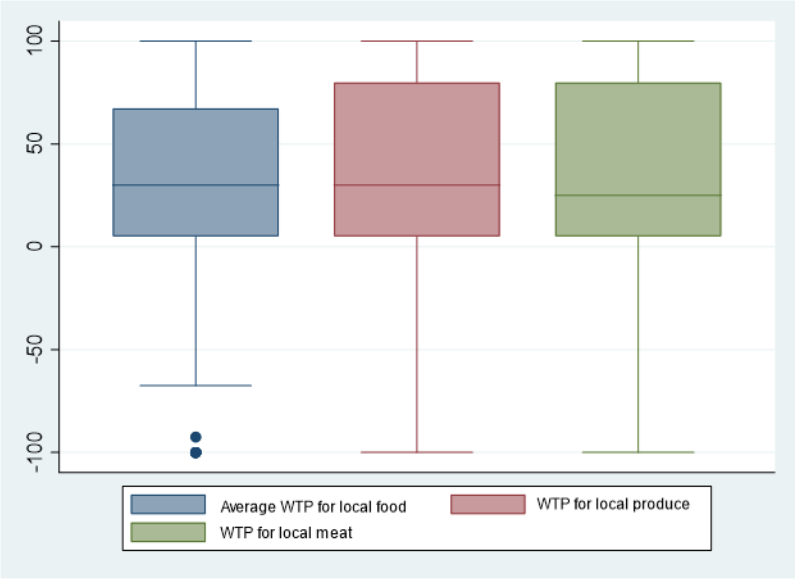

Figure 1.1 WTP for Local Food (% above the Non-local Price)

Figure 1.2 shows that the average WTP for local food is the highest in the group of grown in local farms with 48.3 percent, followed by grown within the U.S., grown in one's own county, and grown in one's own state, with 44.91, 35.24, and 27.65 percent, respectively. The mean of WTP for local produce is higher than for local meat, and the groups of local farms in both product categories have the highest value, with 51.45 percent for local produce and 45.16 percent for local meat. The groups of own's own state in both product categories have the lowest value, with 30.37 percent for local produce and 24.94 percent for local meat.

The data shows that, with one exception, the larger the geographic scale that people use to define local, the less they are willing to pay for the local food. The exception pertains to the subsample that defines local food as grown within the U.S.: that group acts differently from others.

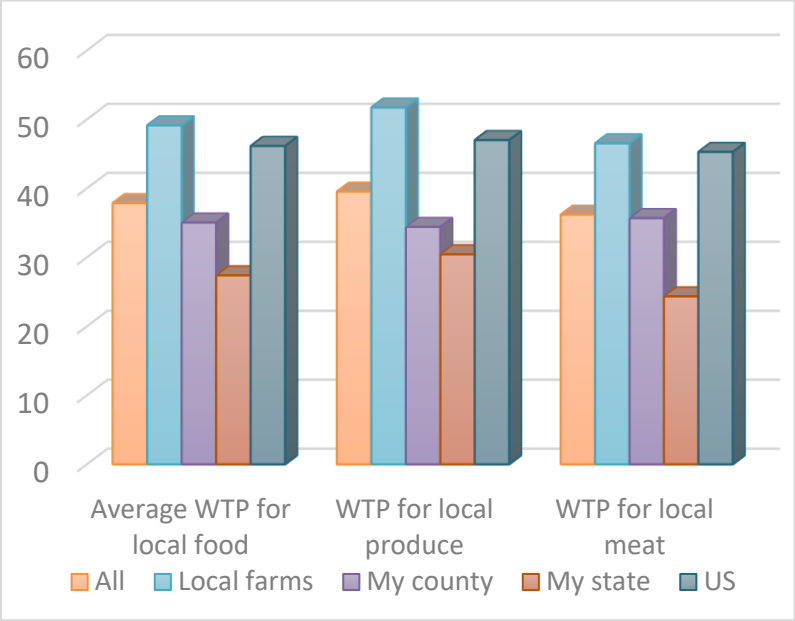

Figure 1.2 Average WTP for Local Food by Definitions of "Local"

1.3 Estimation strategy

1.3.1 Two-Limit Tobit Regressions

Our main goal in this study is to investigate how varying definitions of local based on the geographic scale affect participants' WTP for local food. In addition, because our survey was conducted during the COVID pandemic, we are also interested in the effect of experiences with COVID on the WTP for local food; thus, we estimate the following model:

$$Y_i = \alpha + \beta \quad Local\ definitions_i + \gamma \quad Experiences\ of\ COVID_i + \theta \boldsymbol{X}_i + \varepsilon_i \qquad (1)$$

where Y_i denotes the WTP for local food for participant i, β and γ are the coefficients we are interested in, and $\boldsymbol{X}$ is a vector of household characteristics.

Here, the dependent variable in (1) is the percentage WTP for local food is a continuous variable but bounded below and above by -100% and +100%. This bounding is generated by the survey design and the stepwise question that elicited WTP. Because of this double bounding, we employ a two-limit Tobit regression (Zuehlke, 2020). We thus estimate (1) with a two-limit Tobit regression that is double bounded at -100 and +100. More specifically, we estimate three two-limit Tobit regressions for different WTPs for local food indicators—average WTP for local food, WTP for local produce, and WTP for local meat, controlling for household characteristics, such as annual income, education, rurality of the household location, race, and the number of the

children in the household, that may influence WTP for local food through pathways instead of local definitions and COVID experiences. (As a robust check, Appendix A.1 and A.2 present similar results using ordinary least squares regressions instead of the two-limit Tobit regressions.) Our main coefficient of interest is β , which measures the effect of local definitions on WTP for local food. A priori, we expect that definitions of local scales have decreasing WTP effects, which means that when the local scale becomes geographically larger, the WTP for local food lessens, and vice versa. For example, when people think local food is grown in an area that is geographically close to them, they may be willing to pay more because they might know those products, farms, or farmers, and they might trust them and be willing to pay more for those products. We also expect a positive coefficient γ , which means that the COVID experiences have increasing WTP effects. In other words, when people have had experiences of COVID, they would probably consider local food as safer and healthier products and are willing to pay more for local food compared to conventional one.

Identification issues and strategy

The coefficient estimates in (1) are unbiased if all regressors are exogenous. However, if an unobserved variable exists that directly affects both the *Local definitions* variable and the dependent variable, then the estimated coefficients in (1) are not properly identified and may be biased. One possible unobserved variable (among many others) could be a consumer's knowledge of agriculture or agricultural practices. If such an unobserved variable exists, then the *Local definitions* variable should be treated as potentially endogenous. To solve the potential endogeneity bias, we must estimate an auxiliary equation that explains the *Local definitions* variable, and there must be at least one exogenous variable that directly influences the *Local definitions* variable but does not directly influence the WTP variable. The method we use for this auxiliary equation and the re-estimation of (1) is a Two-stage Residual Inclusion Approach, explained next.

1.3.2 Two-stage Residual Inclusion Approach

We use the Two-stage Residual Inclusion Approach (2SRI), also known as control function, to address the potential endogeneity problem of the $Local\ definitions_i$ variable. The 2SRI uses an instrumental variable (IV) for the identification of causal effects. It is more flexible than standard IV estimators, such as Two-stage Least Squares (2SLS); for example, in our case, the potential endogenous variable, *local definitions*, could lead to nonlinear solutions. In such cases, the 2SRI

is more efficient than the 2SLS (Ogutu and Qaim, 2019; Guo and Small, 2017; Wooldridge, 2015; Terza, 2008).

The 2SRI approach includes two stages. The first-stage regression model of determinants of local definitions must include one or more valid IV. The predicting residuals from first-stage regression are then included in the second-stage regression, the model of determinants of WTP for local food, as an additional covariate.

When the coefficient of the residual term in the second stage is significant, it means that our local definitions variable is endogenous. In this case, including the residual term would address the endogeneity problem of the coefficient β. However, when the coefficient of the residual term in the second stage is insignificant, it means that our *local definitions* variable is exogenous. The null hypothesis of exogeneity of the local definitions cannot be rejected. In this case, excluding the residual term from second-stage regression could produce unbiased and more efficient estimates (Ogutu and Qaim, 2019; Guo and Small, 2017; Wooldridge, 2015; Terza, 2008).

As we mentioned before, the 2SRI approach involves one or more valid IVs in the first-stage regression. A valid IV must be correlated with the definitions of the local scale but not affect consumers' WTP for local food through other direct mechanisms. We then use the variable of nationalism, described in the data section, as the IV in our first stage. Previous literature indicates that nationalism is highly correlated to how people define their local scale, and from an econometrics viewpoint, that correlation is also significant (p-value=0.005). The local scale becomes larger when the value of nationalism becomes higher. The definitional group, grown within the U.S., has the highest value with 8.13, followed by the group of one's own state, group of one's own county, and group of local farms, with 7.95, 7.68, and 7.4, respectively. In addition, we find that the nationalism does not affect our dependent variables through mechanisms rather than local definitions in our model. The IV is not significantly associated with any of our dependent variables—average WTP, WTP for local produce, and WTP for local meat—with p-values of 0.14, 0.17, and 0.21, respectively.

1.3.3 Multinomial Logistic Regression

The goal in the first stage is to investigate what factors drive how people define local, and thus we estimate the following model:

$$Y_{i,j} = \alpha + \delta\, nationalism_i + \eta \boldsymbol{X}_i + \varepsilon_i \qquad (2)$$

where $Y_{i,j}$ denotes chosen local definition *j*, where *j* = 1, 2, 3, 4 for the four definitional choices, for participant i, *nationalism* is a variable, described above, that denotes how consumers prioritize

national versus global policymaking, and $\boldsymbol{X}$ is a vector of household characteristics. More specifically, the dependent variable in (2) is the consumer's choice of local definition, a categorical variable that involves four different categories for local definitions, --i.e., one based on sales at local farms, one based on a county scale, one on a state scale, and the last at a U.S. scale. Since our dependent variable is a categorical variable, we employ a Multinomial Logistic Regression that requires a categorical dependent variable with two or more discrete outcomes, which is identical to logistic regression but with multiple outcomes instead of just one (Starkweather and Moske, 2011). We thus estimate (2) with a Multinomial Logistic Regression. More specifically, in this stage, we estimate the Multinomial Logistic Regression for the endogenous variable, the definitions of local scales, on the instrumental variable, the nationalism, and other control variables. Here we control the heterogeneity among groups as shown in Table 1.2, especially for those variables that might potentially be correlated to the local definitions. Thus, we control the race, age, rurality, and education variables, since people from different origins, in different ages, in different locations, and with different education levels, might have different definitions of local scales. (As a robustness check, we also estimate an Ordinal Logistic Regression and show the result in Appendix A.3).

A priori, we expect a positive coefficient δ , which means that when the value of the nationalism becomes larger, the local scale geographically increases, and vice versa. For example, when consumers who prioritize national policies rather than global, they tend to define local food with a broader, more national, definition of local.

As mentioned before, we use a Two-stage residual approach to solve the potential endogeneity problem. More specifically, we have no reason to believe that this nationalism variable (reflecting national versus global policymaking priorities) should directly affect consumers' WTP for local food. Thus, this variable should work well as an IV in the first stage and can be excluded in the second-stage model. In sum, in the first stage, we estimate model (2) with a Multinomial Logit, and in the second stage, we re-estimate model (1) with a two-limit Tobit after adding the estimated residuals from model (2).

1.4 Results

The results are presented in two subsections: what factors affect how people define local scales, and the effects of local definitions and experiences of COVID on WTP for local food.

1.4.1 What Factors Affect How People Define Local Scales

As mentioned above, to solve the potential endogeneity problem, we induce the Two-stage residual inclusion approach, and in the first stage, we set the nationalism variable as an excluded variable that is in the first stage only but not in the second stage, which means that it only affects WTP for local food through local definitions. In the first stage, except for nationalism, we also include all potential factors that might affect the local definitions. The estimation results, using the U.S. scale as the reference group, for model (2) are shown in Table 1.3.

Table 1.3 shows that the nationalism variable has negative and significant effects on the local farms and county scale groups, which means that if the level of nationalism is higher, people are less likely to choose local farms and county scale, in comparison to the U.S. scale. We also compute the marginal effects for better interpretation. When nationalism increases one unit, the likelihood of the local farms option being selected would be -1.57%, -0.79% for the county scale, 0.96% for the state scale, and 1.39% for the U.S. scale.

Table 1.3 Multinomial Logit Estimates of the Model of Local Definitions

	Local farms	County scale	State scale	US scale
Nationalism	-0.15**	-0.12*	-0.06	
	(0.07)	(0.07)	(0.07)	
Race:				
Black	-0.41	-0.59	-0.96**	
	(0.43)	(0.45)	(0.45)	
Asian	-0.19	-0.34	-1.11**	
	(0.51)	(0.52)	(0.56)	
Others	-0.74	-0.51	-0.38	
	(0.61)	(0.61)	(0.55)	
Age	-0.00	0.01	0.02**	
	(0.01)	(0.01)	(0.01)	
Rurality:				
Suburban	0.51	0.60*	0.68**	
	(0.35)	(0.35)	(0.33)	
Rural	0.37	-0.05	-0.12	
	(0.41)	(0.43)	(0.40)	
Education	0.01	0.17*	0.11	
	(0.10)	(0.11)	(0.10)	
Observation	509			
LR Chi2 test:	49.14			
Significance:	0.00			

Note: Here, the U.S. scale is used as the reference group so all estimated coefficients are relative to that group. The Likelihood Ratio (LR) Chi-Square test shows that for both equations at least one of the predictors' regression coefficients is not equal to zero. The small p-value from the LR test would lead us to conclude that at least one of the regression coefficients in the model is not equal to zero. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Black and Asian people compared to White people are less likely to pick the state scale, in comparison to the U.S. scale. In other words, the state scale option is 1.21% less likely to be selected by Black people compared to White people, and it is also 1.74% less likely to be chosen by Asian people compared to White people. When age increases, people are more likely to choose the state scale instead of the U.S. scale. To be more specific, when people get one more year old, the likelihood of the state scale being selected would be 0.36% , -0.26% for local farms, 0.04% for county scale, and -0.14% for the U.S. scale. People who live in suburban areas compared to urban areas are 5.57% more likely to choose the state scale and 7.8% less likely to choose the U.S. scale, and people who live in rural areas compared to urban areas are 8.36% more likely to choose local-farm scale and 4.9% less likely to select state scale. Finally, when people have higher education, they are more likely to choose the county scale instead of the U.S. scale. Overall, the results are not surprising. The more nationalism the larger the scale in which people define local. Older people and those who live in suburban areas are more likely to choose the state scale, and people who live in rural areas are more likely to choose the local-farm scale, in comparison to those who live in urban areas.

1.4.2 The Effects of Local Definitions and Experiences of COVID on WTP for Local Food

As mentioned before, considering the potential endogeneity problem, we use the Two-stage residual inclusion approach to address this problem and estimate model (1) after adding the estimated residuals from the first stage, which is shown above in Table 1.3. Results from the re-estimated version of the second stage, with the included residuals, is shown in Table 1.4. There, we see that the residual terms are insignificant in all models shown in Table 1.4. Thus, we cannot reject the null hypothesis of local definitions being exogenous. We then also provide the results of the model without the residual terms shown in Table 1.5. Comparing results from Tables 4 and 5, the magnitudes of the estimated local definitions coefficients are different when including and not including residual terms. The magnitudes of coefficients in the models with residual terms are much higher. Based on the previous literature, removing the insignificant residual term from the model would produce more efficient estimates; we then use the results without residual terms to further interpretation.

Table 1.4 Two-Limit Tobit Estimates of WTP for Local Food with Residual Term

	(1) Average WTP for local food	(2) WTP for local produce	(3) WTP for local meat
Definitions of local:			
County scale	-68.15*	-59.06	-95.92*
	(36.36)	(57.59)	(53.26)
State scale	-75.54**	-64.04	-107.87**
	(36.57)	(57.39)	(52.99)
U.S. scale	-54.12	-42.46	-81.36
	(38.40)	(57.52)	(52.87)
Residual	-53.41	-38.63	-84.95
	(37.80)	(56.79)	(51.78)
COVID experiences:			
Personal infected	26.83***	30.21***	28.14**
	(7.86)	(9.33)	(12.46)
Family infected	7.04	5.65	10.16**
	(4.37)	(4.26)	(4.50)
Annual income	1.53*	1.99	1.33
	(0.82)	(1.25)	(0.98)
Education	0.18	-1.01	1.49
	(1.72)	(2.27)	(1.99)
Race:			
Black	-19.63***	-20.38**	-20.88**
	(6.83)	(8.92)	(9.30)
Asian	-6.49	-7.96	-7.35
	(10.63)	(11.83)	(10.28)
Others	-18.38	-18.59	-21.71
	(12.47)	(14.97)	(15.98)
Urban area:			
Suburban	-13.77***	-20.33***	-10.14
	(4.59)	(6.60)	(6.60)
Rural	-17.22**	-18.84*	-19.06*
	(7.65)	(9.98)	(11.44)
Number of children	2.44	2.69	3.46
	(2.44)	(3.12)	(2.86)
Constant	90.92***	91.81**	107.54***
	(28.07)	(42.36)	(39.53)
Observation	509	509	509
F test:	98.38	123.17	61.73
Significance	(p=0.00)	(p=0.00)	(p=0.00)

Note: F test tests the joint significance. Bootstrapped standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table 1.5 Two-Limit Tobit Estimates of WTP for Local Food without Residual Term

	(1) Average WTP for local food	(2) WTP for local produce	(3) WTP for local meat
Definitions of local:			
County scale	-15.24**	-20.77***	-11.71*
	(6.62)	(7.32)	(6.80)
State scale	-23.00***	-26.02***	-24.27***
	(6.78)	(6.06)	(6.81)
U.S. scale	-1.28	-4.22	2.73
	(7.79)	(8.59)	(8.64)
COVID experiences:			
Personal infected	27.71***	30.84***	29.56***
	(9.19)	(10.05)	(9.33)
Family infected	6.86*	5.53	9.86*
	(3.88)	(4.97)	(5.11)
Annual income	1.41	1.91*	1.15
	(0.92)	(1.07)	(1.37)
Education	-0.91	-1.78	-0.23
	(1.37)	(1.61)	(2.14)
Race:			
Black	-16.50**	-18.12**	-15.97
	(7.14)	(9.23)	(11.53)
Asian	-0.94	-3.94	1.52
	(9.24)	(9.46)	(9.97)
Others	-20.30	-20.01	-24.84
	(13.78)	(17.57)	(18.48)
Rurality:			
Suburban	-13.67**	-20.28***	-10.01*
	(5.34)	(6.93)	(6.01)
Rural	-12.02*	-15.10**	-10.80
	(6.23)	(6.13)	(9.63)
Number of children	3.20	3.23	4.68*
	(2.11)	(3.10)	(2.50)
Constant	53.34***	64.61***	47.70***
	(8.10)	(8.94)	(12.48)
Observation	509	509	509
F test:	191.13	65.16	72.61
Significance	(p=0.00)	(p=0.00)	(p=0.00)

Note: F test tests the joint significance. Bootstrapped standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table 1.5 presents the effects of local definitions and the experiences of COVID on WTP for local food. In column (1), we regress the average WTP for local food (average of WTP for local produce and meat) on local definitions, experiences with COVID, and control variables. We control those potentially confounding factors, such as annual income, education, race, rurality,

and the number of children in the household, that might influence the results. The estimates in column (1) suggest that people stated that local food is grown in their own county rather than grown in the local farms, their average WTP for local food is significantly less by 15.24 percentage points. For people that stated the local scale is their own states instead of local farms, and their average WTP for local food is significantly less by 23 percentage points. For the experiences of COVID, having personal infected experiences significantly increases the average WTP for local food by 27.71%, and having family infected experiences also significantly increases the average WTP for local food by 6.86%.

Table 1.5's column (2) shows the effects of local definitions and experiences of COVID on WTP for local produce. Similar results to column (1), the estimated WTP for local produce significantly decreases when people choose the county scale and state scale instead of the local-farm scale (by less than 20.77% for county scale and 26.02% for state scale). Having personal experiences with COVID infections significantly increases the average WTP for local produce by 30.84%.

Column (3) shows the effects of local definitions and COVID experiences on WTP for local meat. Similarly, the WTP for local meat significantly decreases when people choose county scale and state scale, in comparison to a local-farm scale (by less than 11.71% for county scale and 24.27% for state scale). A COVID experience significantly increases the average WTP for local meat by 29.56%, and a family member's experience with COVID increases WTP by 9.86%.

All estimates of other regressors in the three models depicted in Table 1.5 have same signs and similar significances. When annual income increases one unit (here, one unit is $25000), WTP for local produce increases by 1.91%. Black people are willing to pay 16.50% less for the average WTP for local food compared to White people, 18.12% less for local produce, and 15.97% less for local meat, but the latter finding is not significant. People who live in suburban areas are willing to pay 13.67% less for local food, 20.28% less for local produce, and 10.01% less for local meat, in comparison to people who live in urban areas. People who live in rural areas are willing to pay 12.02% less for local food, 15.10% less for local produce, and 10.80% less for local meat, in comparison to people who live in urban areas; however, the later estimate is statistically insignificant. When one more child is in the household, people are willing to pay the price premium for local meat by 4.68%. Overall, people who live in urban areas are willing to pay the most for local food, followed by those who live in suburban and rural areas. The reason could probably be the accessibility; since the produce and meat are mainly produced in rural areas and

far from urban areas, people are willing to pay the price premium for local food when it is far from their locations.

Our primary goal of the study is to determine the effects of local definitions and experiences of COVID on WTP for local food. Overall, people are willing to pay the most for local food when they define local at the local-farm scale, followed by the county scale and state scale. This result means that the larger geographic scale used to define local, the less they are willing to pay for the local food. The results are not surprising. We can imagine that we draw a circle of the "locality", and our home is the center of the circle. The circle of the local-farm scale would be the smallest, and the circle of the U.S scale would be the largest one, and it is just like the trust circle. You trust the products that are within the smallest circle the most, and so on, since they are just like your neighborhood. You trust your neighborhood because the information in your community is easier to access compared to the information within your state. The results are consistent with previous literature that indicates increased trust and reduced information asymmetry could lead to consumers paying the price premium for food—the more you trust the more you are willing to pay (Choe, 2009; Dickinson and Bailey, 2005). In addition, overall, when the local scale becomes larger, the proportion of the declining level of the WTP for local produce is relatively larger than the proportion for local meat, which also makes sense. Fresh produce is easier to be identified as "fresh" with naked eyes and taste compared to fresh meat; thus, when the local scale is larger, the produce becomes not that macroscopically fresher when consumers purchase it. Hence, consumers would probably be willing to pay less for the produce compared to the meat. The results are also similar to previous literature that indicates that the discounts for kilometers traveled are higher for perishable goods such as apples than for non-perishable ones like wine (Grebitus, 2013).

However, people who stated that local scale is nation-wide are willing to pay the price premium almost the same as people who define local as local-farm scale, even though the results are not significant. This result may be due to some other factors, such as irrational behavior, religion, or other personal beliefs, that we did not capture in this study. The result that having experiences of COVID could lead to higher WTP for local food is not surprising, either. Since local food could easily be linked to healthier and safer food, people who have had experiences of COVID would probably be more concerned about those issues and be willing to pay more for local food.

1.5 Discussion and Conclusion

Local food is accepted worldwide because it can improve the economic situation of small-scale farmers and rural communities, develop environmental sustainability, and increase consumers' benefits and social welfare (Curtis, 2004). Some literature uses "food miles" to refer to "local food." The food mile is the distance between the location at which the food is grown and the location where it is consumed. The distance has increased steadily over the past fifty years (Hill, 2008). On average, the travel distance of processed food in the U.S. is more than 1300 miles; meanwhile, fresh produce travels over 1500 miles. Food miles vary among local and non-local food; for example, the local apples in Iowa travel less than 60 miles, but the conventional apples travel over 1700 miles before they are consumed (Pirog, 2004).

A lot of research discusses local food, but it seems little previous literature investigates what kinds of distance people consider as "local." Is the local food grown in their own counties, states, or within the entire United States? What factors affect how people define local? How do the definitions affect WTP for local food? In addition, since our survey was conducted during the COVID pandemic, we also wondered if experiences with COVID would affect consumers' WTP for local food.

In short, the goals of this study are to find: (1) What factors affect peoples' definition of local, and (2) Whether these personal definitions affect their WTP for local food. To address the potential endogeneity problem, we use a Two-Stage Residual Inclusion approach. For the first stage, we use Multinomial Logistic regression by regressing the potential endogenous variable (local definitions) on the instrumental variable (nationalism) and control variables.

We found that the more nationalistic tendencies a person has, the larger the geographic scale he or she will use to define local. Most of the participants identify the "locality" as within their state, and we also found that the elderly and people who live in suburban areas are more likely to choose the state scale, and people who live in rural areas are more likely to choose the local-farm scale, in comparison to those who live in urban areas. For the second stage, we use two-limit Tobit regression by including the residual term from the first stage; however, the estimates of the residuals are not significant, so we then use the results of excluding the residuals for interpretation because it could produce more efficient estimates. The results in the second stage show that the larger scale people define as local, the less they are willing to pay for local food, except for people who recognized local food as food grown within the U.S., who are willing to pay almost the same as those who define it as local-farm scale. We also found that people who have had experiences of COVID, especially those who have personal infected experiences, are

willing to pay more for the local food compared to others who haven't had the experiences. People who live in urban areas are willing to pay the most, followed by those who live in suburban and rural areas.

The limitation of this study is that we did not know why some people identify "local" with a national scale, and why they are willing to pay more for it at this scale. On the one hand, it could be related to concerns over imported foods. On the other hand, it could probably be less related to food preference and due to more complicated "Pro America" reasons, irrational behaviors, religion, or other personal beliefs. The original survey was not designed to capture any of these factors. A related limitation may stem from imprecise wording of the survey question regarding the participant's own definition of local food.[1] More specifically, we attribute the smallest geographic scale to the definition of local food when a survey participant answered either "Grown by a farmer I know" or "Purchased at a local farm stand or at a locally owned and operated food store" to the question "How would you define local food?" Because the second of these options has the words "local" and "locally" in the answer, some readers might have either been confused when answering the "How" question or nudged to pick this answer instead of a more appropriate one. While we are assuming that respondents understood the question and were not inadvertently influenced to pick this answer, it is possible that the question wording may have hampered or influenced respondents, thus creating a potential problem or limitation with our study.

Regarding the relationships between local definitions and WTP for local food, based on our first-stage specification, we found no endogeneity problem based on the analyses of our dataset. However, some might argue that, for some other specifications, there are still some unobserved variables that could affect local definitions and WTP for local food at the same time. Better

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1. The exact wording of the local-food survey question is as follows:
   In this study, we define as local food that was grown, produced, or processed within 50 miles. We here ask you about your personal definition of local food.
   How would you define local food? Select all that apply.
   Local food is ...
   Grown by farmer I know (1)
   Purchased at a local farm stand or at a locally owned and operated food store (2)
   Grown in my county (3)
   Grown in my state (4)
   Grown in the United States (5)

instrumental variables could be included or other approaches can be induced to solve the endogeneity problem, and we hope the problem will be solved in the future.

Despite the possible limitations, this study has important implications for policy and marketing. Large food miles might require more fossil fuel use for transportation, which will lead to environmental impacts, such as greenhouse gas emissions and non-point pollution, which cause global warming (Hill, 2008; Shortle and Horan, 2002). Previous literature shows that consumers love local food and are willing to pay more for local food than conventional food. The results of this study could help us to have a good understanding of local food—what factors affect how people define local and how the definitions affect their WTP for local food. For the marketing strategy, sellers could understand how to market their products more efficiently and profitably and use this information to make targeted promotion and targeted marketing. The retailers in Pennsylvania, for example, could market their products as "from our local farm XXX" or "from our neighbor XXX farm" instead of "from PA," and the producers could sell their products in the farmer's market or in their farms to make more profit. In addition, focusing on "healthy" and "safe" could be more profitable when making promotions.

For the policy implementation, local government could have a better understanding of consumer characteristics and preferences and can further make a better policy to promote their local products. In addition, the results show that almost 20% of the participants use a national scale to define local food; however, the U.S. is 3.8 million square miles and is the third-largest country in the world, which is much larger than what previous research indicated as the distances between local products purchased and origin, ranging from 30 to 500 miles. In this case, it could cause a huge environmental burden when people are buying their so-called "local food;" thus, more agricultural education needs to be involved.

Chapter 2

Effects of Environmental and Health Information on Willingness to Pay for Local and Organic Foods in Taiwan

2.1 Introduction

The global shift toward healthier consumption habits in recent years has led to the blossoming of both the organic food and local food markets. In the organic sector, numerous major food and agribusiness companies have actively entered this market, and Pollan (2007) refers to this phenomenon as the advent of the "large-scale organic" era, which is characterized by reliance on machinery, long-distance transportation, and refrigeration. Guthman (2004) terms this industrial involvement in organic farming as "conventionalizing organic," an approach that seemingly diverges from the founding principles of organic agriculture, which aim to minimize environmental harm. Meanwhile, the local food movement, which favors shorter distances from farm to table, is thriving worldwide (Enthoven and Van den Broeck, 2021; Printezis, Grebitus, and Hirsch, 2019; Johnson and Cowan, 2019). In Taiwan, the Low-Carbon Food program is gaining traction. Some local governments have initiated certification for low-carbon, environmentally friendly restaurants that source locally grown food (Lin, 2020).

Previous research predominantly emphasizes the environmental and health advantages of organic and local food consumption (Zeynalova and Namazova, 2022; Tian et al., 2021; Ha, Shakur, and Pham, 2019; Kautish and Dash, 2017; Kecinski et al., 2017; Hempel and Hamm, 2016; Minton and Rose, 1997). Nevertheless, these studies have paid minimal attention to the potentially higher environmental costs associated with imported organic food due to long travel distances involved. This scant attention may reflect the higher interest in health advantages over environmental advantages. If so, this perspective would align with Huang's (2015) findings that health and food-safety concerns are the primary motivations for consumers' preference for organic products.

Despite a wealth of research comparing consumers' willingness to pay (WTP) across various product categories, such as organic vs. local, locally grown organic vs. imported organic, organic vs. non-organic, and local vs. non-local food (Davidson, Khanal, and Messer, 2023; Vecchi, Jaenicke, and Schmidt, 2022; Yang et al., 2021; Printezis and Grebitus, 2018; Janssen, 2018; Berg and Preston, 2017; Xu, Loke, and Leung, 2015; Grebitus, Lusk, and Nayga, 2013; and Loureiro,

McCluskey, and Mittelhammer, 2001), few studies simultaneously address both the localness and organic status of a product. For example, Costanigro et al. (2011) offer valuable insights by comparing WTP for local and organic apples and examining the role of social desirability in decision-making, yet their experimental design does not include a "free-gift" option of a non-local, non-organic product. Akaichi et al. (2022) also investigate the influence of organic and local labels; however, that study is primarily focused on meat products and the role of an "animal friendly" label.

The simultaneous assessment of consumers' value for localness and organic status is a key feature of our study. A second key feature is the lab-in-the-field setting: a farmers market and a supermarket in Taichung, the second largest city in Taiwan. In two important ways, this setting is ideal: First, Taiwan is a relatively small island nation where local food is easily and clearly defined as food grown domestically (and not imported). Second, the national organic standards in Taiwan call for zero pesticide residues, a requirement that plays an important role in our experiment's information treatments, which are aimed at understanding motivations behind consumers' valuation for localness or organic status and comprise our study's third key feature.

While a wide range of factors might influence consumers' choice and WTP for local or organic food, we focus on two: environmental concerns and health concerns. Some participants in our lab-in-the-field experiment receive environment-related information about the average food miles from potatoes imported from the top three countries of origin, and we hypothesize that this treatment will increase the "premium" for local potatoes, where the premium is defined as a difference in WTP, in this case between local and non-local organic or non-organic potatoes. Other participants receive information about the average amount of pesticide residues of non-organic potatoes, and we hypothesize that this health-related information treatment will increase the premium for organic potatoes. Without any information treatment, we hypothesize that consumers will be willing to pay a premium for local potatoes, organic potatoes, and potatoes that are both local and organic. However, we have no formal hypotheses on the relative size of these premiums.

The results confirm many of our hypotheses: Without any information treatments, consumers have the highest WTP for local organic potatoes, followed by imported organic potatoes, local non-organic potatoes, and lastly imported non-organic. There is a strong premium for organic potatoes – both local and non-local. However, there is only a very weak premium for local potatoes – both organic and non-organic. The food-miles information treatment, as expected, generally favors local potatoes, but just organic ones, and it seems to do so by lowering the WTP for imported (organic) potatoes rather than by increasing the WTP for local potatoes. The pesticide residue information

treatment, as expected, generally favors organic potatoes, but just local ones: this treatment significantly increases the WTP for local organic potatoes.

Overall, our study adds fresh insights into the ongoing academic conversation on organic and local foods and helps underscore the importance of how the two attributes, organic and local, interact to shape preferences and valuations. In addition, the results help explain the relative importance of environmental motivations (via the food miles information treatment) and personal health motivations (via the pesticide residue information treatment) in consumer decisions about local and organic food. We describe these insights in greater detail below. However, we first explain our experimental design and empirical analyses before revisiting our results and conclusions.

2.2 Experimental Design

2.2.1 Sample and Recruitment

We implement a lab-in-the-field experiment in Taichung, the second most populous city in Taiwan, located in its central region. To ensure a broad representation of consumers and shopping behaviors, we target shoppers at one farmers market and one supermarket who expressed an interest in purchasing potatoes. Participants must be 18 years of age or older and are not known to have a food allergy to potatoes. Our initial pool comprised 410 participants. After excluding three invalid responses (due to incomplete surveys), we have 407 participants: 199 from a farmers market setting and 208 from the supermarket setting.

This study is approved by the Institutional Review Board at The Pennsylvania State University. Data was collected from February 4 to 19, 2023. Participants spend roughly 15 minutes completing a paper survey and receive NTD200 (approximately US$7) as compensation, a portion of which might be used to buy potatoes at the end of the experiment.

To recruit participants, we set up sidewalk signs at the entrances to the markets. Interested shoppers who meet the criteria are guided to small tables next to the recruitment site. Since the farmers market operates only on weekends, we ensure data balance by conducting the experiment at both locations during weekends, which coincides with the period when most Taiwanese typically do their grocery shopping.

2.2.2 Local Definition and the Selection of Potato for the Experiment

Our study takes place in Taiwan largely due to the clear geographic-based definition of local food that the island provides. In many other research contexts, the term "local food" often varies, contingent on the author and the research objectives (Enthoven and Van den Broeck, 2021; Printezis, Grebitus, and Hirsch, 2019). As an island slightly larger than the state of Maryland in the U.S., or Belgium in Europe, Taiwan offers a clear delineation for local. In our study, local potatoes refer to those grown within Taiwan, while non-local potatoes refer to those imported into Taiwan.

At the outset of our survey, we introduce our definition of local to ensure a common understanding of the term among all participants. Based on this definition, participants are asked to indicate their WTP for potatoes.

Although potatoes are not a staple food in Taiwan, the influence of Western food culture has led to a significant increase in potato consumption. However, domestic potato production only reaches around 50,000 tons per year, leading to a substantial gap between supply and demand. In 2022, Taiwan imported over 160,000 tons of potatoes at a cost exceeding 165 million U.S. dollars to meet this demand.[2] Given their affordability and widespread availability, potatoes serve as an excellent product for our experiment.

2.2.3 Treatments

In this study, we explore how consumer valuation of different types of potatoes is influenced by specific information. Before making the WTP decisions, participants are randomly assigned to two information treatments: the *Food Miles* information treatment, and the *Pesticide Residue* information treatment. This resulted in four experimental conditions: (i) *Control* condition, not receiving any information; (ii) *Food Miles* condition; (iii) *Pesticide Residue* condition; and (iv) *Food Miles and Pesticide Residue* condition, receiving both information.

For the *Food Miles* information treatment, participants are exposed to a brief article discussing the environmental impact of food miles associated with the transportation of local versus imported potatoes. This information is based on research by Grebitus et al. (2013) and official information from the website of Taiwan's Ministry of Agriculture.[3] We hypothesize that this information either

[2] Data sourced from the Import and Export Statistics of Agricultural Products on the Ministry of Agriculture's website in Taiwan: https://m.coa.gov.tw/FarmProductStat/Index

[3]Data were sourced from the Import and Export Statistics of Agricultural Products on the Ministry of Agriculture's website in Taiwan: https://m.coa.gov.tw/FarmProductStat/Index. In the survey, the food mile

increases participants' WTP for local potatoes or lowers their WTP for non-local potatoes, both in organic and non-organic varieties. Specifically, we anticipate a rise in the local premium, which we define as the difference in WTP between local organic and imported organic potatoes, as well as between local non-organic and imported non-organic potatoes.

For the *Pesticide Residue* information treatment, participants are exposed to a health-related article discussing the higher pesticide residues found in conventional potatoes as compared to organic potatoes, which have zero residues. This information is corroborated by findings from Chiu et al. (2018) and data from Taiwan's Ministry of Agriculture.[4] We hypothesize that this information elevates the WTP for organic potatoes or lowers the WTP for non-organic potatoes, both local and imported. Thus, we anticipate an increase in the organic premium, which is the difference in WTP between organic and non-organic potatoes, both for local and imported options.

2.2.4 WTP for Potatoes

After presenting the information treatments, we collect the WTP for four types of white potatoes: local organic, local non-organic, imported organic, and imported non-organic. Each variety is offered in bags of similar weight (600g, a typical weight for a bag of vegetables in Taiwan), each containing approximately three white potatoes.

To elicit WTP, we use a format known as the Multiple Price List (MPL) (Andersen et al., 2006), and specify a range of prices from 0 to NTD130. The MPL presents participants with a list of prices and asks them at each price point whether they would purchase the potatoes. Participants see the four different types of bags of potatoes on the same page and express their WTP for all four potatoes simultaneously, as represented in Figure 2.1, which shows the image of part of the WTP page. Additionally, the types of potatoes are listed in random order.

Alongside the MPL, we employ the Becker-DeGroot-Marschak (BDM) mechanism (Becker, DeGroot, and Marschak, 1964), an incentive-compatible auction procedure widely acknowledged in experimental economics. According to this mechanism, if a participant's stated maximum WTP equals or exceeds a randomly drawn selling price, a transaction occurs, and the participant acquires

distance for imported potatoes was determined by taking the mean of the top importing counties to calculate the average food miles. For local potatoes, the food mile represents the distance between Taichung, the experimental location, and the primary region where the local potatoes are grown.

[4] Data obtained from 2020 inspection report of the Agricultural Drugs and Toxic Test Institute of the Ministry of Agriculture's website.

the potatoes at the selling price. If the participant's maximum WTP is below the selling price, no transaction occurs.

Would you buy each type of potatoes at different prices, from $0 to $130? If you would buy each type of potatoes at the listed price, please mark the "yes" box; If you don't want to buy the potatoes at the listed price, please mark the "no" box. All potatoes are the same weight: 0.6 kilograms per bag. Please make the decisions for each type of potato separately.

Local organic			Local non-organic			Imported organic			Imported non-organic		
Priced	Yes	No	Priced	Yes	No	Priced	Yes	No	Priced	Yes	No
$0			$0			$0			$0		
$5			$5			$5			$5		
$10			$10			$10			$10		
$15			$15			$15			$15		
$20			$20			$20			$20		
$25			$25			$25			$25		
$30			$30			$30			$30		
$35			$35			$35			$35		

Figure 2.1 Image of the WTP Page on the Experiment Survey

At the beginning of the survey, we instruct participants about the BDM mechanism to ensure they understand their indicated WTP could lead to an actual transaction rather than a hypothetical one. For each participant, only one type of potato is randomly selected for the purchase. Consequently, participants received either only cash or a combination of cash and a bag of potatoes at the end of the experiment.

2.2.5 Personal Local Definition, Urban-Rural Identity, and Other Demographic Information

Following the WTP elicitation stage, participants are asked to complete a brief survey capturing their attitudes toward food and socio-demographic information. We pay specific attention to questions of where participants live: i.e., we ask whether they live in an urban, suburban, or rural setting. Additionally, we ask participants about their personal definitions of local food. The complete set of survey questions is available in Supporting Information: Appendix D.2.

2.3 Empirical Analysis

2.3.1 Empirical Strategy

As described above, we investigate the impact of the food miles and pesticide residues information treatments on the WTP for four different types of potatoes: (i) WTP for local organic; (ii) WTP for local non-organic; (iii) WTP for imported organic; and (iv) WTP for imported non-organic potatoes.

We also delineate five different specifications for price premiums: (i) the local premium for organic, representing the difference in WTP between local organic and imported organic potatoes; (ii) the local premium for non-organic, representing the difference in WTP between local non-organic and imported non-organic potatoes; (iii) the organic premium for local, representing the difference in WTP between local organic and local non-organic potatoes; (iv) the organic premium for imported, representing the difference in WTP between imported organic and imported non-organic potatoes; and finally (v) the "environmental – health benefit" premium, which we define as the difference in WTP between local non-organic and imported organic potatoes. This final difference helps us gauge consumer perceptions of the environmental benefits associated with local produce (fewer food miles) and health benefits associated with organic produce (free from pesticide residues). If the environmental – health benefit premium is greater than 0, consumers may care more about environmental benefits than health ones when choosing between local non-organic and imported organic potatoes. Conversely, if environmental – health benefit premium is less than 0, consumers may prioritize health benefits over environmental benefits.

Initially, we present a descriptive data summary to help understand the data and to determine if the observable demographic characteristics are balanced across various treatments. We next present a parametric analysis comparing the WTP and price premium outcomes across the treatment groups. We use pooled data across two survey venues (farmers market and supermarket) to capture the sentiment of general shoppers. We then conduct separate parametric analyses for each shopping venue.

Subsequently, we estimate the following linear model for the nine different outcomes described above:

$$Y_i = \alpha + \beta_1 \times Food\ Miles_i + \beta_2 \times Pesticide\ Residues_i + \beta_3 \times Food\ Miles\&Pesticide\ Residues_i + \varepsilon_i\ , \quad (1)$$

where, Y_i denotes one of the nine outcome variables for participant i, i.e., four WTP for separate types of potatoes and five premiums that represent pairwise differences in WTP. $Food\ Miles_i$, $Pesticide\ Residues_i$, and $Food\ Miles\&Pesticide\ Residues_i$ are indicator variables for the three condition groups: $Food\ Miles$ indicates the group receiving the food miles information treatment, $Pesticide\ Residues$ indicates the group receiving the pesticide residues information treatment, and $Food\ Miles\&Pesticide\ Residues$ indicates group that receives information on both food

miles and pesticide residues. The parameters β_1, β_2, and β_3 are our coefficients of interest. Finally, ε_i represents an idiosyncratic error term. In our robustness checks found in Appendix B, we include a vector of control variables X_i, comprised of demographic variables that display significant differences across treatments. We estimate (1) using two-limit Tobit regressions, double bounded at 0 and NTD130, when the dependent variables are the WTPs for potato types. Alternatively, we estimate (1) using Ordinary Least Squares (OLS) regressions when the outcome variables are the five price premiums. For the supplementary investigation in Appendix B, we also rely on Logit regressions to investigate the rare cases when participants WTP for the potatoes equal zero.

Lastly, in the survey we asked several questions regarding participants' attitudes toward food, and we supplement our main analysis by using this information to investigate whether attitudinal and demographic factors may influence WTP differences between the farmers market and supermarket settings. More specifically, in Appendix B.6, we investigate perceptions of conventional and organic produce, trust in Taiwanese agricultural regulations, individual environmental behaviors, and food information-seeking patterns between the farmers market and supermarket subsamples, and we identify any significant differences between the two samples. Given that this study predominantly focuses on how different information affects consumers' WTP for local and organic products, we omit detailed discussion of differences across the two sample; however, may find more details in Appendix B.6 Table B.15 in the Supporting Information.

2.3.2 Descriptive Statistics

Table 2.1 summarizes the demographic characteristics of the participants in our study sample. Specifically, the table includes the following information: (i) average data levels across all sample conditions, namely the pooled sample, farmers market sample, and supermarket sample, as shown in columns (1), (3), and (5); (ii) results of an *F*-test comparing the four treatment conditions, *Control*, *Food Miles* treatment, *Pesticide Residue* treatment, and both *Food Miles and Pesticide Residue* information treatment, across different samples as shown in columns (2), (4), and (6); and (iii) outcomes of the *t*-test contrasting means between the two locations, farmers market and supermarket, as shown in column (7).

Table 2.1 shows that 49% of respondents are from the farmers market and 51% from the supermarket. In terms of gender, 74% of the participants are females and 26% are males. The average age of the participants is 48 years. Interestingly, there is a marked age disparity between the shoppers from the farmers market and the supermarket: participants from the farmers market

setting have an average age of 54, while those from the supermarket have an average age of 42. The mean household size stands at 4.13 members.

Table 2.1 shows a clear divergence in educational attainment between the two venues: 21% of the shoppers at the farmers market hold postgraduate degrees as opposed to 12% at the supermarket. There is also a difference in family size: farmers market shoppers report having an average of 1.49 children, whereas supermarket shoppers report 1.08 children on average.

Regarding self-identified residence, 88% of shoppers in the farmers market classify their habitat as urban, compared to 82% of supermarket shoppers. Additionally, 8% of farmers market shoppers identify their location as suburban, a figure that rises to 15% for supermarket shoppers. Only 4% of all participants identify their residence as rural.

While much of our pooled sample's demographics align with 2020 national reports[5], there are noticeable deviations in age and gender. Our sample's average age is 47.58, slightly higher than the national 42. Our experiment requires participants to be 18 or older, unlike the National Statistics' 15, potentially explaining this age difference. As for the gender skew, our ratio is heavily female at 0.35:1, diverging from the national 0.96:1. The presence of older/retired housewives among our respondents, a reflection of Taiwanese cultural practices, likely accounts for these age and gender variations.

Upon analyzing demographic variations across the treatments, we find significant differences in education, monthly income, and self-identified residence within the three sample groups. Due to these disparities, these variables will be integrated as controls in our robustness regression analysis described in Appendix B. For detailed demographic data across treatments and sample sizes, see Tables B.1, B.2, and B.3 in Appendix B.1 of the Supporting Information.

[5] Data obtained from the National Statistics, Taiwan website: https://eng.stat.gov.tw/Default.aspx.

Table 2.1 Demographic Characteristics of Study Participants

	(1) Pooled sample	(2) Treatments *F*-test (*p*-value)	(3) Farmers mkt	(4) Treatments *F*-test (*p*-value)	(5) Supermkt	(6) Treatments *F*-test (*p*-value)	(7) Locations *t*-test (*p*-value)
Location:							
Farmers market	0.49	0.94	1.00	.			.
Supermarket	0.51	0.94			1.00	.	.
Gender:							
Female	0.74	0.96	0.77	0.99	0.72	0.79	0.24
Male	0.26	0.96	0.23	0.99	0.28	0.79	0.24
Age	47.58 (15.49)	0.22	53.71 (15.13)	0.20	41.68 (13.43)	0.66	**0.00**
Household #	4.13 (1.76)	0.85	3.94 (1.63)	0.31	4.30 (1.87)	0.83	**0.04**
Education:							
High school/less	0.28	0.11	0.24	0.85	0.31	**0.02**	0.11
2-year college	0.17	0.57	0.15	0.58	0.19	**0.05**	0.32
4-year college	0.39	0.69	0.40	0.65	0.38	0.98	0.80
Postgraduate	0.16	0.53	0.21	0.97	0.12	0.32	**0.01**
Income:							
≤ 30,000	0.14	0.87	0.16	0.94	0.13	0.48	0.30
30,001-50,000	0.28	0.92	0.23	0.36	0.32	0.94	**0.05**
50,001-70,000	0.19	0.91	0.23	0.72	0.15	0.96	**0.05**
70,001-90,000	0.15	0.35	0.13	**0.07**	0.17	0.61	0.29
90,000-110,000	0.10	0.34	0.08	0.21	0.12	0.60	0.13
≥ 110,000	0.14	0.96	0.17	0.64	0.12	0.82	0.11
Children #	1.28 (1.21)	0.47	1.49 (1.20)	0.27	1.08 (1.19)	0.41	**0.00**
Purchase role	3.46 (1.09)	0.36	3.72 (0.98)	0.72	3.22 (1.14)	0.38	**0.00**
Self-identified residence:							
Urban	0.85	**0.04**	0.88	0.23	0.82	**0.07**	**0.08**
Suburban	0.12	**0.07**	0.08	0.63	0.15	**0.09**	**0.03**
Rural	0.04	0.40	0.04	0.18	0.03	0.70	0.73
Self-identified City:							
Taichung	0.87	0.70	0.89	**0.01**	0.86	0.30	0.33
Taipei	0.01	0.32	0.02	0.30	0.01	0.58	0.84
New Taipei	0.02	0.15	0.01	0.62	0.03	**0.06**	0.14
Taoyuan	0.02	0.28			0.04	0.30	0.60
Tainan	0.00	0.41	0.01	0.45			
Kaohsiung	0.00	0.38			0.00	0.38	0.53
Changhua	0.03	**0.03**	0.03	**0.05**	0.03	**0.01**	0.29
Chiayi	0.01	0.12	0.01	0.15			
Hsinchu	0.01	0.31	0.01	0.45	0.01	0.55	0.95
Miaoli	0.01	0.81	0.01	0.57	0.00	0.43	0.53
Nantou	0.01	0.12	0.02	0.36	0.00	0.37	0.29
Yunlin	0.01	**0.09**	0.01	**0.08**	0.01	0.59	0.95
N	407	407	199	199	208	208	407

Notes: Options for the gender question were female, male, and other; however, none of the participants selected other. Purchase role is measured on a 5-point scale in the analysis, ranging from "I am never the shopper" to "I am the only shopper", meaning a higher score indicates greater responsibility for grocery shopping within the participant's household. Self-identified residence assesses participants' perceptions of their living area, asking whether they consider it to be urban, suburban, or rural.

2.3.3 Estimates of WTPs for Four Potato Types and Five Price Premiums

Figure 2.2 shows the impact of various information treatments on WTP for four distinct types of potatoes: local organic, local non-organic, imported organic, and imported non-organic. In the pooled sample as shown in Figure 2.2 (a), local organic potatoes have the highest WTP in the *Control* group (without any information treatment) at NTD73 per bag. They are followed by imported organic at NTD67, local non-organic at NTD48, and imported non-organic at NTD42. Regarding the treatments, significant changes are observed: in the *Food Miles* treatment, the WTP for imported organic decreases by NTD9, from NTD67 to NTD58; meanwhile, the *Pesticide Residue* treatment increases the WTP for local organic by NTD8, from NTD73 to NTD81. Note that these Figure 2.2 results are also seen in Table 2.2, reflecting marginal effects on the WTP for the four potato types.

Figure 2.2 (b) and (c) highlight the distinct responses from farmers market and supermarket shoppers. Farmers market shoppers demonstrate significant sensitivity to the *Food Miles* treatment, leading to a decrease in mean WTP for imported organic potatoes from NTD66 to NTD46 and for imported non-organic potatoes from NTD37 to NTD29. In contrast, supermarket shoppers appear more influenced by the *Pesticide Residue* treatment, which raises their mean WTP for local organic potatoes from NTD71 to NTD82 and for imported organic potatoes from NTD67 to NTD81.

While Figure 2.2 can also be used to examine the five price premiums by comparing different pairs of estimates, this task is more easily done using Table 2.3, which presents the results of the price premium estimations. In the full sample and subsamples, the estimated coefficients on the constant terms in Table 2.3 reflect the five price premiums in the absence of any information treatment, i.e., the control group. Here, we see that the largest premiums are for organic potatoes in columns (3) and (4), which both equal about NTD25.00 for the pooled sample. The estimated local premiums in columns (1) and (2) are non-zero but smaller, with both equal to about NTD6.00 for the pooled sample. Interestingly, control group participants in the farmers market subsample have higher premiums for both organic (columns 3 and 4) and local (columns 1 and 2). Control group participants in the supermarket subsample do not have a local premium (columns 1 and 2) that is statistically different from zero. Finally, control group participants in both the full sample and subsamples have a negative environmental – health benefit premium. This finding emphasizes the fact that participants WTP for imported organic is greater than their WTP local non-organic, suggesting that organic potatoes are preferred to non-organic even when the organic ones are imported.

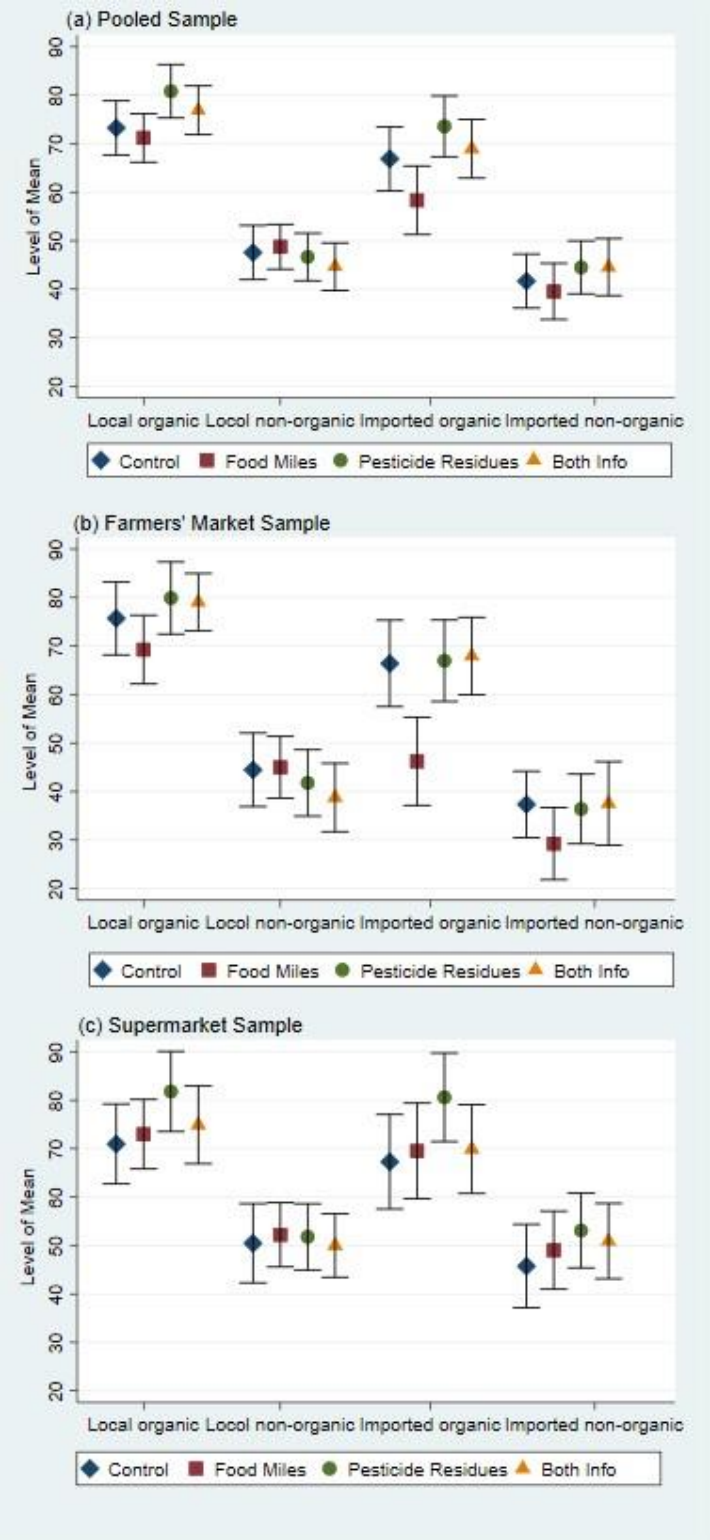

Figure 2.2 Mean WTP for Potatoes in the Full Sample and Two Subsamples.

Note: Whiskers Indicate 95% Confidence Intervals.

2.3.4 Effect of Information Treatments on WTP for Potatoes and Price Premiums

2.3.4.1 Impact of Information Treatments on WTP for Different Potato Types

Table 2.2 illustrates the marginal effects of information treatments on WTP for potatoes using a two-limit Tobit model when estimating equation (1). When shoppers are provided with food miles information, there is a statistically significant decline in WTP for imported organic potatoes by NTD10.2. On the other hand, providing pesticide residue information boosts the WTP for local organic potatoes by NTD 8.3. Both of these results are consistent with our pre-study hypotheses. Notably, these two coefficients differ significantly, as underscored by the Wald test of equality of the food miles, pesticide residues, and both information coefficients.

Zooming in on the subsample from farmers markets, the food miles information leads to a decrease in WTP for imported organic potatoes by NTD23.6 and for imported non-organic potatoes by NTD13.1. Again, these results are consistent with our hypotheses. The magnitudes of these changes are almost one-third of the WTPs in the *Control* group. In the supermarket subsample, the introduction of pesticide residue information increases the WTP for local organic potatoes by NTD10.8 and for imported organic potatoes by NTD13.3.

In Appendix B.2, we control for unbalanced demographic variables across treatments in the three sample sizes, and our results consistently maintain their robustness. Beyond our primary findings, when including the control variables in both pooled and supermarket samples, a higher education level corresponds to a higher WTP for local organic. For a more detailed breakdown, readers can refer to Supporting Information: Table B.4, Table B.5, and Table B.6 in Appendix B.

Appendix B.3 also presents a supplementary examination of the rare occurrences when WTP equals zero. Out of a total of 407 participants, 0 indicate zero WTP for local organic, 25 indicate zero WTP for local non-organic, 30 indicate zero WTP for imported organic, and 67 indicate zero WTP for imported non-organic. These numbers correspond to percentages of 0%, 6%, 7%, and 16%, respectively. Additionally, none of the participants indicate zero WTP for local non-organic when provided with information on food miles. To further examine information effects on the likelihood of zero WTP for potatoes, we estimate zero/non-zero WTPs using Logit regressions. In the pooled sample and the supermarket subsample, there are no significant information effects on zero WTP for any type of potatoes. However, in the farmers market subsample, food miles information increases the likelihood of indicating zero WTP for imported varieties. When both types of information are provided, shoppers are more likely to indicate zero WTP for non-organic varieties,

as shown in Supporting Information: Table B.7 in Appendix B. We also control for demographic variables that differed among treatment groups across the three different sample sizes, and our findings remained consistently robust. For a more detailed breakdown, readers can refer to Supporting Information: Tables B.8, B.9, and B.10 in Appendix B.

Table 2.2 Marginal Effects on WTP for Potatoes from Tobit Model Estimation of Equation (1)

	(1) WTP for Local Organic	(2) WTP for Local Non-organic	(3) WTP for Imported Organic	(4) WTP for Imported Non-organic
Pooled sample: N=407				
Food miles	-1.966	1.688	-10.236*	-3.575
	(4.093)	(3.872)	(5.317)	(4.894)
Pesticide residues	8.300**	-1.370	6.948	2.506
	(4.071)	(3.854)	(5.269)	(4.840)
Both information	3.973	-3.653	1.972	2.112
	(4.066)	(3.859)	(5.268)	(4.851)
Constant	73.811***	47.140***	66.916***	39.615***
	(2.886)	(2.738)	(3.748)	(3.440)
Wald test	3.185	0.963	5.574	0.968
Significance	*p*=0.042	(*p*=0.383)	(*p*=0.004)	(*p*=0.381)
Farmers market subsample: N=199				
Food miles	-6.474	0.674	-23.584***	-13.049*
	(5.452)	(5.549)	(7.063)	(6.934)
Pesticide residues	4.774	-4.127	-0.247	-3.055
	(5.331)	(5.444)	(6.848)	(6.687)
Both information	3.392	-8.143	0.444	-3.444
	(5.425)	(5.572)	(6.978)	(6.862)
Constant	76.325***	44.326***	66.999***	36.168***
	(3.836)	(3.912)	(4.940)	(4.795)
Wald test:	2.566	1.248	7.553	1.325
Significance	(*p*=0.079)	(*p*=0.289)	(*p*=0.001)	(*p*=0.268)
Supermarket subsample: N=208				
Food miles	2.019	1.731	2.212	3.269
	(5.693)	(5.075)	(6.808)	(5.772)
Pesticide residues	10.838*	1.319	13.292*	7.331
	(5.749)	(5.126)	(6.876)	(5.830)
Both information	3.946	-0.481	2.600	5.157
	(5.640)	(5.028)	(6.745)	(5.718)
Constant	71.415***	49.828***	66.733***	43.135***
	(4.268)	(3.719)	(5.396)	(4.594)
Wald test:	1.289	0.113	1.606	0.196
Significance	(*p*=0.278)	(*p*=0.893)	(*p*=0.203)	(*p*=0.822)

Note: Wald test of the equality of the food miles, pesticide residues, and both information coefficients. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

2.3.4.2 Effect of Information Treatments on Price Premiums

Table 2.3 presents results that describe the impact of the information treatments on the five calculated price premiums: i.e., local premium for organic, local premium for non-organic, organic premium for local, organic premium for imported, and "environmental – health benefit premium". We check the means and standard errors of price premiums across four treatment conditions and two venues, along with a *t*-test comparison between the means of the two venues. A comprehensive review of these results is available in Appendix B.4, under Supporting Information: Table B.11.

The *Food Miles* information treatment: In the pooled results, Table 2.3 shows that providing the *Food Miles* information treatment leads to (a) an increase of NTD6.46 in the local premium for organic potatoes and (b) a decrease in the organic premium for imported potatoes by NTD6.40. Both results are consistent with our prior hypotheses. Result (b) might be due to the fact that receiving information about food miles redirects participants' focus from organic attributes to local ones, thereby decreasing the premium for imported organic products. This information treatment also leads to an increase in the "environmental – health benefit premium" metric by 9.71. While we did not have a hypothesis specifically related to this latter result, since this premium defined as the WTP difference between local non-organic and imported organic potatoes, this result is consistent with the general hypothesis that the food miles treatment could cause an increase in in WTP for local (non-organic) potatoes and/or a decrease in WTP for imported (organic) potatoes.

Interestingly, these impacts are amplified when only the farmers market subsample is examined, but diminished when only the supermarket subsample is examined. For the supermarket subsample, Table 2.3 shows the *Food Miles* information treatment causes no statistically significant change to the five WTP premiums. However, for the farmers market subsample, Table 2.3 shows that the *Food Miles* information treatment causes a statistically significant increase to the local premiums for both organic and non-organic potatoes (columns 1 and 2) and statistically significant decrease in the organic premium for imported potatoes (column 4). Each of these results are consistent with our prior hypothesis. The *Food Miles* treatment also increases the environmental – health benefit premium by over NTD20, which is also consistent with our general hypotheses.

The *Pesticide Residue* information treatment: Providing the *Pesticide Residue* information treatment in the pooled sample increases the organic premium for local potatoes by NTD8.48 as hypothesized, but has no statistical effect on the organic premium for imported potatoes. This information treatment decreases the "environmental – health benefit premium" metric by NTD7.63

(which is statistically significant with only 90 percent confidence). This result is also consistent with the general hypothesis that the pesticide residue information treatment could cause a decrease in the WTP for (local) non-organic potatoes and/or raise the WTP for (imported) organic potatoes.

Table 2.3 OLS Estimates for Five WTP Premiums and Information Treatment Effects Across Study Locations

	(1) Local Premium for Organic	(2) Local Premium for Non-organic	(3) Organic Premium for Local	(4) Organic Premium for Imported	(5) Environmental – Health Benefit Premium
Pooled sample: N=407					
Food miles	6.464*	3.309	-3.243	-6.398*	9.707**
	(3.858)	(3.396)	(3.472)	(3.560)	(4.379)
Pesticide residues	0.847	-3.755	8.482**	3.880	-7.635*
	(3.829)	(3.371)	(3.447)	(3.534)	(4.347)
Both information	1.526	-5.794*	6.540*	-0.781	-5.013
	(3.829)	(3.371)	(3.447)	(3.534)	(4.347)
Constant	6.386**	5.891**	25.693***	25.198***	-19.307***
	(2.721)	(2.395)	(2.449)	(2.511)	(3.089)
Wald test:	1.270	3.980	6.586	4.216	9.159
Significance	(p=0.282)	(p=0.019)	(p=0.002)	(p=0.015)	(p=0.000)
Farmers market sample: N=199					
Food miles	13.735**	8.586*	-6.954	-12.102**	20.689***
	(5.818)	(5.078)	(5.469)	(5.320)	(6.472)
Pesticide residues	3.639	-1.765	6.889	1.484	-3.250
	(5.678)	(4.955)	(5.337)	(5.192)	(6.316)
Both information	1.837	-5.918	9.082*	1.327	-7.245
	(5.788)	(5.052)	(5.440)	(5.293)	(6.438)
Constant	9.286**	7.143**	31.224***	29.082***	-21.939***
	(4.093)	(3.572)	(3.847)	(3.743)	(4.553)
Wald test:	2.439	4.330	5.078	4.341	10.945
Significance	(p=0.090)	(p=0.014)	(p=0.007)	(p=0.014)	(p=0.000)
Supermarket sample: N=208					
Food miles	-0.192	-1.538	0.288	-1.058	-0.481
	(4.882)	(4.476)	(4.158)	(4.707)	(5.837)
Pesticide residues	-2.454	-6.012	9.519**	5.962	-11.973**
	(4.930)	(4.521)	(4.200)	(4.754)	(5.895)
Both information	1.346	-5.637	4.427	-2.557	-3.080
	(4.837)	(4.434)	(4.119)	(4.663)	(5.783)
Constant	3.654	4.712	20.481***	21.538***	-16.827***
	(3.452)	(3.165)	(2.940)	(3.328)	(4.128)
Wald test:	0.305	0.613	2.422	1.838	2.083
Significance	(p=0.738)	(p=0.543)	(p=0.091)	(p=0.162)	(p=0.127)

Note: Wald test of the equality of the food miles, pesticide residues, and both information coefficients. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

When we examine the subsample results in Table 2.3, we note two developments: First, we see that the *Pesticide Residue* information treatment effects noted above for the pooled sample are amplified for the supermarket subsample. That is, for the supermarket subsample, this information treatment leads to an even greater increase in the organic premium for imported potatoes and the environment – health benefit premium. Second, we note that we see more statistically significant results in the supermarket subsample and less in the farmers market sample, contrary to what observed with the *Food Miles* treatment.

Supplementary analysis found in the Appendix: Appendix B.5 investigates the differential impacts of the information treatments across the two study settings in greater detail. It includes tables similar to Table 2.3, featuring OLS regression of the five WTP premiums. The analysis incorporates as addition regressors the demographic variables that were not balanced across treatment groups and participant samples. The results remain robust to the additional regressors. Within the supermarket sample, a higher education level corresponds to a higher organic premium for imports. A comprehensive review of these tests is available in Appendix B.5, under Supporting Information: Tables B.12, B.13, and B.14.

Drawing from our primary findings, it is clear that shopping venues significantly influence consumer reactions to information: farmers market patrons are chiefly swayed by food miles information, whereas supermarket shoppers are more impacted by pesticide residue information. While our main study delves into the effects of information on consumers' WTP for local and organic potatoes, our survey uncovers the unique environmental attitudes and perceptions of participants from the two shopping venues. As noted in Appendix B.6, these insights might explain the varied reactions to the same information. For example, supermarket attendees tend to believe more strongly that conventional produce contains pesticide residues, and they view insect bites on produce as an indication of no pesticide use. In contrast, farmers market shoppers display heightened environmental consciousness, often preferring eco-friendly choices like using reusable bags or walking instead of driving.

Additionally, our survey examines participants' understanding of local food. Most associate it with being grown in Taiwan. Supermarket attendees associate it more broadly with Taiwan, whereas farmers market patrons emphasized produce grown closer to home. For more details, see Table B.15 in the Supporting Information.

2.4 Conclusion

Using a field experiment involving 407 participants nearly evenly distributed between a farmers market and a supermarket in Taiwan, we investigate the WTP for four types of potatoes – local and non-local, and organic and non-organic, as well as the impact of information treatments about food miles and pesticide residues on these WTPs. The results consistently indicate the highest WTP for local organic potatoes, followed in order by imported organic, local non-organic, and imported non-organic. These findings align with our initial expectations and mirror market prices.[6]

Introducing information about the environmental impact of food miles significantly reduces the WTP for imported organic potatoes. Conversely, information on the health consequences of pesticide residues increases the WTP for local organic varieties. The absence of a significant change in WTP for non-organic potatoes in response to these informational treatments might imply that consumers, when considering non-organic options, are mainly driven by price. In contrast, when choosing organic potatoes, consumers appear to value a broader range of factors, including environmental and health benefits.

We also draw inferences by comparing results across the two study venues: Farmers market attendees are heavily influenced by food mile information, and this influence appears to significantly boost the local premium for organic potatoes and reduce the environmental – health benefit premium metric to nearly zero. To these farmers market shoppers, local non-organic and imported organic seem almost equally desirable when provided with food miles information. Additionally, they are more likely to have a zero WTP for imported varieties when provided with food mile information. In contrast, results for supermarket shoppers underscore the significant impact of pesticide residue information, which elevates the organic premium for local potatoes and increases the negative value of the environmental – health benefit premium metric. Moreover, the WTPs of supermarket shoppers are more consistent across treatments compared to those of farmers market shoppers, and they show no preference for local over non-local options, regardless of whether they are choosing organic or non-organic potatoes.

While we anticipated that food mile information would impact WTP for local products, we find that it decreases WTP for imported goods rather than raising the value of local items. Possible explanations include: (i) Many consumers might have a shopping budget cap. Faced with food mile information, they might opt to lower their WTP for imports without boosting their budget for local

[6] Data obtained from the Taiwanese seasonal fruits and vegetables website: https://www.twfood.cc/vege

goods, possibly indicating a "WTP ceiling". (ii) Food mile information might frame imports in a negative light, making consumers less willing to pay a premium for them. (iii) An anchored price point in the consumer's mind could resist upward movement, even with new information. However, if a product seems less valuable, they might decrease its WTP.

Providing both information about food miles and pesticide residues negatively impacts the local premium for non-organic potatoes. Conversely, the same information increases the organic premium when choosing between local organic and local non-organic potatoes. These results indicate that consumers are willing to pay a premium for organic produce that is also local, as it aligns with both their health goals and environmental values. Without providing information, local premiums are around 1/4 to 1/5 the magnitude of organic premiums, suggesting that the local factor is much less significant than the organic factor. These findings could serve as an impetus for policymakers to incentivize local organic farming or even develop localized marketing campaigns for these products, emphasizing their dual benefits. However, our results suggest a significant challenge for local farmers producing conventional, non-organic potatoes. They might find it challenging to compete with local organic, imported organic, and imported non-organic options, potentially leading to the need to transition to organic farming practices, which requires considerable time and resources.

When examining different samples across two study venues, the metrics for the environmental – health benefit premium remain unaffected by providing both types of information. This result suggests that, irrespective of samples or demographic, consumers prioritize private benefits like health (absence of pesticide residues) over public benefits like environmental goods (fewer food miles). This result aligns with Costanigro et al. (2011), who assert that when balancing private and public benefits, consumers typically prioritize personal factors such as taste, healthfulness, value, and convenience over broader societal benefits like environmental sustainability and social fairness, and to a lesser degree with Fernández-Ferrín et al. (2017), who find that private motivations (via brand valuation) play a larger role in local food purchase intentions than public motivations (via local community identity).

However, in an era of expanding organic food markets and the rise of "large-scale organic" farming, there is a risk of what Guthman (2004) terms the "conventionalizing" of organics. This concept refers to the shift towards using more machinery and transportation to meet demand, straying from the eco-friendly origins of organic farming. If consumers focus more on private benefits, the expansion of large-scale organic farming may overshadow sustainability, undermining the core

principles of organic farming. It is possible that the emphasis will move towards large-scale organic farming operations that can deliver pesticide-free products but may neglect other eco-friendly practices. If so, this movement could disadvantage small, local farmers who might already employ more sustainable methods but haven't adopted organic farming. Policymakers are then presented with a complex conundrum: balancing the growing demand for organic products (often equated with "healthiness") with the need for sustainable, local agriculture that may not be certified organic but is potentially more environmentally friendly.

Our study offers insights beneficial for policy formulation and retail strategy. Understanding the nuanced consumer reactions to specific information can help retailers refine their promotional strategies. The divergent behaviors between farmers market goers and supermarket shoppers underscore the importance of specialized educational initiatives. Policymakers and agricultural educators can use these insights to craft targeted campaigns. However, one limitation of our study is that our sampling from two retail platforms might omit the behaviors of consumers who frequent both.

Chapter 3

What is "Local"? A Lab-in-the-Field Experiment on Rural-Urban Differences in Willingness to Pay for Different Definitions of Local Food

3.1 Introduction

The concept of local food encompasses a range of nuanced definitions, which are critical to studies focusing on consumers' willingness to pay (WTP) for it. These definitions vary from simple descriptors like "locally grown" to more complex notions involving brand affiliations, geographic labels, and specialized marketing programs such as "PA Preferred" for Pennsylvania-origin products (Enthoven and Van den Broeck, 2021; Printezis, Grebitus, and Hirsch, 2019). The prevailing understanding in the literature identifies local food based on the location of production rather than the place of sale. A broad consensus, drawing on both experimental and survey-based methodologies, suggests that consumers typically exhibit a higher WTP for local food items (Vecchi, Jaenicke, and Schmidt, 2022; Printezis, Grebitus, and Hirsch, 2019; Printezis and Grebitus, 2018; Berg and Preston, 2017; Xu, Loke, and Leung, 2015; Grebitus, Lusk, and Nayga, 2013; Loureiro, McCluskey, and Mittelhammer, 2001). However, there is a noticeable gap in the literature regarding the use of supermarket scanner data to investigate local food.

Technological advancements have paved the way for rich datasets such as supermarket scanner data, which offer detailed insights into consumer purchasing behaviors. Despite their richness, these datasets lack specific information on the origins of food products, making them less suitable for studying local food. Nevertheless, they do provide clear insights into where products are predominantly sold. In line with Reed et al. (2023), we propose a practical metric for defining local foods that is compatible with scanner data: if a product is primarily sold within a specific geographic region, such as within a state, it can be considered local or, more precisely, a locally sold product. However, this novel definition raises an important question: do consumers perceive these "locally sold products" as genuinely "local"?

Our study aims to discern whether consumers differentiate between two definitions of local food: one based on production location within a state, and another based on the primary sales location within a state. If consumers' WTP does not vary significantly between these definitions, then studies utilizing scanner data could feasibly adopt a sales-based definition for local food, facilitating more

practical research. Additionally, existing research indicates that rural households have a stronger preference for local products compared to urban dwellers (Ha, Shakur, and Pham Do, 2019; Khan and Prior, 2010). However, this has not been extensively explored in the U.S. context; thus, our study also investigates whether rural versus urban locations influence WTP for local food and the perception of the two definitions. We focus on Pennsylvania as the geographic criterion for "localness," both in terms of production and sales. Utilizing potato chips as the test product, we evaluate variations in WTP among supermarket shoppers in rural and urban areas of Pennsylvania based on these definitions.

In our lab-in-the-field experiment, participants from Huntingdon (rural area) and Altoona (urban area) are randomly assigned to one of two treatment conditions, each exposing them to a distinct definition of local: the first treatment condition defines local as food produced in Pennsylvania while the second defines local as food predominantly sold within Pennsylvania. Participants then indicate their non-hypothetical WTP for local and non-local potato chips. Data is collected from 402 participants – 203 in Huntingdon and 199 in Altoona – via online surveys on provided tablets or their personal cell phones, and socio-demographic information is gathered at the survey's conclusion.

Our findings reveal that WTP for potato chips does not significantly differ across the two definitions of "local." In both rural Huntingdon and urban Altoona, participants are willing to pay a premium for local potato chips compared to non-local ones. The premium in rural Huntingdon is higher than in urban Altoona; however, this difference is not statistically significant. Additionally, rural residents in Huntingdon exhibit a lower WTP for potato chips than their urban counterparts in Altoona. These findings may provide valuable insights for future research, especially those utilizing scanner data, and could inform diverse policy and marketing strategies in varying rural and urban contexts.

For the following sections, section 3.2 reviews relevant literature. In section 3.3, we detail the experimental design. Section 3.4 presents our empirical analysis and section 3.5 concludes.

3.2 Literature Review: Defining "Local" Food and Its Rural-Urban Implications

The increasing consumer interest in local food, driven by desires for closer connections to food sources and support for local economies, is well-documented (Feldmann and Hamm, 2015; Mount,

2012; Brown, 2003). However, research on this subject shows varied results, possibly due to the different definitions of what constitutes “local” food (Enthoven and Van den Broeck, 2021; Printezis, Grebitus, and Hirsch, 2019). Grebitus et al. (2013), for example, define local using a kilometer radius, showing that WTP varies with product perishability. Conversely, Adalja et al. (2015) found a universal premium for items labeled as “locally grown”. Most studies, whether surveys or experiments, make a binary comparison between local and non-local foods mainly based on production origin, emphasizing consumer preferences for freshness, environmental conservation, and regional agriculture support (Davidson, Khanal, and Messer, 2023; Vecchi, Jaenicke, and Schmidt, 2022; Printezis and Grebitus, 2018; Berg and Preston, 2017; Xu, Loke, and Leung, 2015; and Loureiro, McCluskey, and Mittelhammer, 2001). Nevertheless, a significant gap remains in how various definitions of “local” within a single study might influence consumer WTP and purchasing behavior.

An innovative approach suggested by Reed et al. (2023) involves using scanner data to define local foods based on their predominant sales within a specific region. This method compensates for the typical lack of information about food’s origin in scanner data. This practical metric challenges the conventional concept of local food, raising an important question: do consumers view these regionally dominant products as genuinely “local”? Our study aims to explore this by examining if and how different definitions of “local” food—production-based versus sales-based—affect consumer WTP.

Considering the widespread presence of state-based “buy local” campaigns in the U.S., consumers may generally accept that local food is produced within state boundaries (Chakrabarti et al., 2021; Onken and Bernard, 2010). Therefore, in our study, we choose the state as the geographic boundary for defining local food.

Urban consumers tend to engage less with local foods than their rural counterparts, often due to their reliance on large supermarkets offering limited local options. Urban residents often exhibit ambiguity towards the term “local,” with factors like perceived cost, limited accessibility, and time constraints hindering their purchases of local food (Ha, Shakur, and Pham Do, 2019; Khan and Prior, 2010). However, a significant gap in the literature is the absence of non-hypothetical studies exploring the disparities in WTP for local food between rural and urban areas within the U.S. context.

Accordingly, our study not only investigates whether consumers distinguish between two definitions of local food—one based on production within a state and the other on primary sales within a state—but also probes whether this distinction impacts WTP. This exploration could inform future research utilizing scanner data, making it feasible to adopt a sales-based definition of local food. Furthermore, our research seeks to understand if there are discernible differences in rural versus urban WTP for local food under these varying definitions.

3.3 Experimental Design

3.3.1 Recruitment, Product, and Location Selection

The experiment is conducted strategically in two distinct Pennsylvania locations: a supermarket in Huntingdon (representing a rural area) and another in Altoona (representing an urban area)[7], from August 16 to 23, 2023. We intentionally exclude weekends to mitigate potential holiday-induced biases that might lead participants to express an elevated WTP compared to typical weekdays (Rantsi et al., 2023). We recruit 402 participants, 203 from Huntingdon and 199 from Altoona, focusing on general supermarket shoppers aged 18 and above. We invite individuals with prior experience purchasing potato chips to participate in our study. We choose potato chips for two key reasons: First, they are popular among a wide range of consumers. Second, their non-perishable nature makes them ideal for an outdoor field experiment, notably in supermarket parking lots where our study takes place.

On average, participants spend 15 minutes completing an online survey on the Qualtrics platform. As compensation, each participant receives a $10 grocery gift card and $15 in cash, some of which they could use to participate in a potato chip purchasing game at the end of the experiment. This study is approved by the Institutional Review Board at The Pennsylvania State University.

Our location selection is significantly influenced by population density metrics. Huntingdon, representing the rural demographic, has far low population densities. The borough of Huntington is part of Huntington County, with a population density of 52 people per square mile. At the Census Tract level where our experiment occurs, the density is slightly higher at 72 people per square mile.

[7] We conduct the experiment at Giant Supermarket in Huntingdon and Martin's Supermarket in Altoona. Both are general supermarkets targeting the average shopper in Pennsylvania and are part of the Giant Company.

In contrast, Altoona, part of Blair County, has a population density of 242 individuals per square mile at the county level as of 2020. However, within the specific Census Tract where we conduct the experiments, the density escalates to 4,220 individuals per square mile, substantially surpassing the urban threshold defined by the Center for Rural Pennsylvania at 291 individuals per square mile[8]. The disparate densities between Huntingdon and Altoona lend a robust comparative dimension to our rural versus urban study focus.

3.3.2 Treatments and Willingness to Pay for Potato Chips

Participants are randomly divided into two distinct treatment conditions. In one condition, local food is defined as food produced within Pennsylvania, while in the other, it is defined as food primarily sold in the state, where over 50% of its sales occur in Pennsylvania. To ensure that participants pay attention to the provided definition of local, we ask them to correctly identify the definition immediately after it is provided. Participants need to answer correctly to proceed to the next page. Participants are then shown two 8 oz bags of Kettle-cut original flavor potato chips, one local and one non-local, and asked to state their willingness to pay for them. The range of the prices they could offer spanned from $0 to $15, in increments of $0.10. Since potato chips appeal differently to various individuals, a $0 valuation for a certain variety is fully acceptable, suggesting a strong lack of interest in that specific kind. To avoid an excessive number of $0 valuations for both types of chips, we inform potential participants about our experiment's focus, engaging only those interested in purchasing potato chips.

To elicit participants' non-hypothetical WTPs for potato chips, we apply the Becker-DeGroot-Marschak (BDM) method. According to this mechanism, if a participant's stated maximum WTP equals or exceeds a randomly drawn selling price, they acquire the potato chips at that price. If their maximum WTP is below the selling price, no transaction occurs. Therefore, before stating their maximum WTP, participants receive a brief explanation of the BDM methodology and their assigned definition. They are then required to correctly answer a series of questions on the BDM mechanism and the definition of local we provided. This process ensure that participants indicate their WTP in accordance with the provided definition and recognized that their expressed WTP is non-hypothetical, potentially leading to an actual purchase at the end. After passing all questions

[8] Data obtained from the website of the Center for Rural Pennsylvania: https://www.rural.pa.gov/datagram/113/Rural-Urban-Definitions

regarding the BDM and their assigned local definition, they then indicate their maximum WTP for both local and non-local potato chips.

Participants complete the Qualtrics survey either on the tablets we provided, or their personal cell phones. To neutralize brand preferences, the potato chips are covered with white labels. As shown in Figure 3.1, one is marked as “local potato chips,” and the other as “non-local potato chips,” thereby keeping the brands confidential. Moreover, during the purchasing phase, the chips are distributed in opaque bags to maintain brand anonymity.

Figure 3.1 An Image Displaying the Local and Lon-local Potato Chips

For their participation, each participant receives a $10 grocery gift card along with an additional $15 in cash. This extra cash is intended for a purchasing game, where participants could use a portion of it to purchase a bag of potato chips at a randomly drawn price. For each participant, only one type of potato chip is selected for the purchase. Consequently, participants receive either the gift card and cash or a combination of the gift card, cash, and a bag of potato chips at the end.

3.3.3 Personal Definitions, Attitudes, and Demographic Attributes

After reporting their WTP for local and non-local potato-chips, participants answered a survey about their perceptions and attitudes towards local food. For example, participants are asked to name the brand of eggs they most recently purchased and whether the brand is considered local. Participants are also asked to share their personal definitions of local food and about the scale and concept of their local definition.

Additional questions focus on how participants self-identified the nature of their residential area (rural, suburban, or urban), providing further insights into the alignment or misalignment between objective and subjective urban-rural classifications. Lastly, we collect participants' demographic information—including gender, race, age, and food shopping habits. The complete set of survey questions is available in Supporting Information: Appendix D.3.

3.4. Empirical Analysis

3.4.1 Empirical Strategy

The objective of our study is to scrutinize the influence of differing definitions of "local" on the WTP for potato chips. We also examine the differences in WTP among supermarket consumers in contrasting rural (Huntingdon) and urban (Altoona) settings. To achieve these aims, we utilize the following linear regression model:

$$Y_i = \alpha + \beta_1\, Local_i + \beta_2\, LocallySoldDef_i + \beta_3\, Huntingdon_i$$
$$+\beta_4\,(Huntingdon_i \times LocallySoldDef_i) + \beta_5\,(Huntingdon_i \times Local_i) + \varepsilon_i \qquad (1)$$

In equation (1), Y_i represents the outcome variable for participant i, which can be the WTP for potato chips or the choice of premium type (positive, negative, or zero) for local potato chips reflects the difference between WTP for local and non-local potato chips. The term $Local_i$ indicates whether the product is local potato chips, but this term is excluded when the dependent variable is the choice of premium type, as the local factor is already embedded in these dependent variables. The term $LocallySoldDef_i$ serves as an indicator variable corresponding to treatment conditions, 1 if the condition is local food is the food mainly sold in PA and 0 if the condition is local food is the food produced in PA. To examine rural-urban differences, we include a dummy variable, $Huntingdon_i$, to indicate whether the participant resides in Huntingdon (rural area). We also incorporate interaction terms such as $Huntingdon_i \times LocallySoldDef_i$ and $Huntingdon_i \times Local_i$ to examine how location status, in conjunction with treatment and local product, affects the outcome variable. Our coefficients of interest are β_1, β_2, β_3, β_4 and β_5.

For the empirical analysis, we employ two-limit Tobit regressions, which are bounded at both \$0 and \$15, when the outcome variables are WTP for potato chips. Additionally, Multinomial Logit regression is used for further investigation, when the outcome variables are the choices between

positive, negative, and zero premiums for local potato chips. Besides conducting the regression analysis on the pooled data from the two locations, we also estimate separate regressions for each location, Huntingdon and Altoona, excluding the dummy variable $Huntingdon_i$ and the interaction terms, to analyze the results independently. For robustness checks found in Table C.1 in Appendix C, we include a vector of control variables X_i, accounting for demographic variables that show significant differences across treatment conditions in three sample sizes. For additional robustness checks, as shown in Tables C.2 and C.3 (with and without control variables, respectively) in Appendix C, we employ Ordinary Least Squares (OLS) regressions to analyze the WTP for potato chips. ε_i represents an idiosyncratic error term. To address potential heteroscedasticity, we use cluster-robust standard errors at the participant level in the WTP estimations.

Lastly, in the survey, we ask participants several questions about their attitudes toward food. These questions include whether they know any farmers, the frequency of purchasing food directly from farmers, and their perceptions of local food, such as environmental sustainability, taste, nutritional value, freshness, price, emotional connection, and the importance of food origin. We then compare these factors between the Huntingdon and Altoona subsamples to identify any significant differences.

3.4.2 Descriptive Statistics

Table 3.1 summarizes the demographic characteristics of our study's sample. Specifically, the table details: (i) average levels across all sample sizes, namely the pooled sample, Huntingdon, and Altoona, shown in columns (1), (3), and (5); (ii) results of the T-test comparing the two treatment conditions—Control (*LocallyProducedDef*) and *LocallySoldDef* treatment—across different sample sizes, shown in columns (2), (4), and (6); and (iii) outcomes of the T-test contrasting means between the two locations, Huntingdon and Altoona, shown in column (7).

Half of the participants are from each location, Huntingdon and Altoona. In terms of gender, 67% of the participants are female, and 33% are male. The average age of the participants is 50 years old. However, there is a noticeable age disparity between the shoppers from Huntingdon, with an average age of 52, and those from Altoona, averaging 48 years. About 93% of the participants are non-Hispanic, while 3% are Hispanic. About 82% of the participants are white or Caucasian, while 4% are Black or African American, 2% are Asian, and 3% are other (including American Indian,

Native American, Alaska Native, Native Hawaiian or other Pacific Islander, or others). Comparing the two locations, Altoona has a higher percentage of Black or African American participants, at 7%, compared to 2% in Huntingdon.

Regarding education, 50% of the participants have a high school degree or less, 21% have some college education, 9% have a 2-year college degree, 13% have a 4-year college degree, and 7% have a postgraduate degree. Comparing the two locations, 10% of participants in Huntingdon have a postgraduate degree compared to 3% in Altoona. Overall, the income in Huntingdon is higher than in Altoona. For shopping roles within the household, 39% of the participants are the primary shopper, 37% are the sole shopper, 18% are the secondary shopper, 4% rarely shop, and 1% never shop. Comparing the two locations, 42% of participants in Altoona are the sole shoppers, compared to 33% in Huntingdon. The average household size is 2.82, with 2.68 in Huntingdon and 2.96 in Altoona.

Table 3.1 Demographic Characteristics of Participants

	(1) Pooled Sample	(2) Treatment T-test P-value	(3) Huntingdon	(4) Treatment T-test P-value	(5) Altoona	(6) Treatment T-test P-value	(7) Locations T-test P-value
Location:							
Altoona	0.50	0.28			1.00	.	
Huntingdon	0.50	0.28	1.00	.			
Gender:							
Female	0.67	0.57	0.66	0.61	0.67	0.76	0.78
Male	0.33	0.51	0.33	0.52	0.33	0.76	0.86
Other	0.00	0.34	0.00	0.36			0.32
Age	50.17 (19.21)	0.79	51.83 (19.34)	0.39	48.47 (18.96)	0.25	**0.08**
Hispanic:							
Hispanic	0.03	0.19	0.02	0.81	0.04	**0.06**	0.54
Non-Hispanic	0.93	0.17	0.94	0.95	0.91	**0.09**	0.42
Prefer not to Say	0.04	0.51	0.04	0.79	0.05	0.55	0.60
Race:							
White/Caucasian	0.82	0.71	0.84	0.85	0.79	0.81	0.17
Black/African American	0.04	0.20	0.02	0.81	0.07	0.14	**0.05**
American Indian	0.00	0.30			0.01	0.33	0.31
Asian	0.02	0.55	0.01	0.68	0.03	0.63	0.46
Other	0.03	0.88	0.04	0.79	0.03	0.97	0.61
Prefer not to Say	0.01	0.52	0.01	0.46			**0.09**
Education:							
High School/less	0.50	0.19	0.48	0.47	0.53	0.29	0.37
Some College	0.21	0.97	0.18	0.54	0.24	0.54	0.15
2-year College	0.09	0.79	0.07	0.52	0.11	0.33	0.20
4-year College	0.13	0.56	0.16	0.46	0.10	0.86	0.05

	(1) Pooled Sample	(2) Treatment T-test P-value	(3) Huntingdon	(4) Treatment T-test P-value	(5) Altoona	(6) Treatment T-test P-value	(7) Locations T-test P-value
Postgraduate	0.07	0.11	0.10	**0.10**	0.03	0.97	**0.00**
Income:							
≤ 10,000	0.12	0.77	0.11	0.66	0.13	0.45	0.49
$10,000 - $11,999	0.06	0.85	0.03	0.37	0.10	0.86	**0.01**
$12,000 - $14,999	0.05	0.35	0.02	0.85	0.09	0.18	**0.00**
$15,000 - $19,999	0.08	0.48	0.06	0.79	0.10	0.43	0.17
$20,000 - $24,999	0.08	0.16	0.05	0.54	0.11	0.15	**0.04**
$25,000 - $34,999	0.12	0.65	0.11	0.99	0.14	0.59	0.40
$35,000 - $44,999	0.10	0.67	0.09	0.85	0.10	0.69	0.82
$45,000 - $49,999	0.05	0.23	0.05	0.99	0.05	**0.08**	0.68
$50,000 - $59,999	0.06	0.66	0.10	0.62	0.02	0.58	**0.00**
$60,000 - $69,999	0.07	**0.07**	0.09	**0.03**	0.05	0.77	**0.06**
$70,000 - $99,999	0.11	0.78	0.14	0.21	0.08	**0.02**	**0.03**
≥$100,000	0.10	0.35	0.13	0.25	0.07	0.82	**0.02**
Purchase Role:							
Never the Shopper	0.01	**0.07**	0.01	0.12	0.01	0.33	0.58
Rarely the Shopper	0.04	**0.00**	0.03	**0.03**	0.05	0.06	0.43
Secondary Shopper	0.18	**0.09**	0.21	0.48	0.16	0.10	0.23
Primary Shopper	0.39	0.82	0.42	0.99	0.36	0.67	0.21
The Only Shopper	0.37	0.68	0.33	0.57	0.42	0.86	**0.04**
Household #	2.82 (1.57)	0.25	2.68 (1.37)	0.38	2.96 (1.74)	0.37	**0.07**
Self-identified Residence:							
Urban	0.24	**0.06**	0.09	0.85	0.40	**0.09**	**0.00**
Suburban	0.26	0.72	0.14	0.73	0.38	0.87	**0.00**
Rural	0.50	**0.06**	0.76	0.68	0.22	**0.07**	**0.00**
N	402	402	203	203	199	199	402

Note: Abbreviations: Household #, household number.

Regarding self-identified residence, on average, 24% of the participants classify their habitat as urban, 26% as suburban, and 50% as rural. In Huntingdon, 76% of participants identify their location as rural, 14% as suburban, and 9% as urban. Conversely, in Altoona, 40% identify their location as urban, 38% as suburban, and 22% as rural. Our location choices for the study, objectively identified as rural (Huntingdon) and urban (Altoona), are affirmed by the subjective self-identification of our participants. In Huntingdon, 76% of participants perceive themselves as living in a rural area, while in Altoona, 78% identify their living environment as urban or suburban. This alignment between our objective selection and the participants' subjective views effectively validates our categorization of the locations for the study.

While much of our pooled sample's demographics align closely with the 2023 United States Census Bureau reports for Pennsylvania[9], our sample's average age of 50.17 is higher than Pennsylvania's median age of 40.9. Our study includes participants starting from age 18, unlike the median calculation method used in state statistics which considers all age ranges, potentially explaining this age discrepancy. As for gender distribution, our sample is predominantly female, with 67% of participants being female, diverging from the state level where women constitute approximately 51%. The median household income among our participants is around $40,000, which is significantly lower than Pennsylvania's median income of $71,798. The high proportion of older/retired housewives among our respondents could be a primary reason for this disparity.

In analyzing demographic variations across the treatment conditions, we find significant differences in aspects such as Hispanic identity, education level, income, and shopping role in the household within the three sample groups. Due to these disparities, we will integrate these variables as controls in our robustness regression analysis to ensure that these differences do not affect our primary findings.

3.4.3 Effect of Local Definition Treatment on WTP for Potato Chips

Table 3.2 presents the mean WTP for local (including locally sold and locally produced) and non-local potato chips under different definitions of local conditions in two locations. Column (1) shows the mean WTP for non-local potato chips in Huntingdon and Altoona, alongside the difference between them and the significance level from t-test comparison of the means for the two locations. Column (2) details the WTP for locally sold potato chips in both locations and the difference between them. Column (3) presents the WTP for locally produced potato chips. Column (4) provides the average WTP for local potato chips, obtained by averaging the WTP for locally sold and locally produced chips. Column (5) displays the locally sold premium, which is the difference between WTP for locally sold potato chips and non-local, including its significance level. Column (6) shows the locally produced premium, the difference between WTP for locally produced potato chips and non-local. Column (7) indicates the difference between WTP for locally sold and locally

[9] Data obtained from United States Census Bureau website:
https://www.census.gov/quickfacts/fact/table/PA/PST045223#PST045223

produced potato chips. Finally, column (8) reveals the difference between the average WTP for local and non-local potato chips.

In Huntingdon, WTP for non-local potato chips is $4.15, $4.7 for locally sold potato chips, and $4.5 for locally produced potato chips, with the average WTP for local potato chips being $4.61. Participants in Huntingdon are statistically willing to pay $0.55 more for locally sold potato chips and $0.35 more for locally produced potato chips. On average, they are willing to pay $0.46 more for local potato chips. On the other hand, in Altoona, participants are willing to pay $4.6 for non-local potato chips, $4.93 for locally sold potato chips, $4.83 for locally produced potato chips, and the average WTP for local potato chips is $4.88. In Altoona, under all definition conditions, people are generally willing to pay more for local potato chips; however, only the average local premium, at $0.28, is statistically significant. When comparing the difference in WTP for local and non-local potato chips across the two locations, participants in Huntingdon generally show a lower WTP for all kinds of potato chips. However, they are only statistically willing to pay $0.45 less for non-local potato chips. Regarding the differences between the two locations, participants in Huntingdon overall show a higher willingness to pay a local premium compared to those in Altoona, but none of these differences are statistically significant. There is no significant difference between the locally sold and locally produced conditions in either Huntingdon or Altoona, as shown in Column (7).

Table 3.2 Average WTP for Local and Non-local Potato Chips Under Different Definitions of Local Conditions in Two Locations (In Dollars)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Non-Local	Locally Sold	Locally Produced	Average Local	Difference (2) - (1)	Difference (3) - (1)	Difference (2) - (3)	Difference (4) - (1)
Huntingdon	4.148	4.696	4.500	4.607	0.548***	0.352**	0.196	0.459***
	(0.126)	(0.174)	(0.166)	(0.121)	(0.149)	(0.159)	(0.240)	(0.097)
Altoona	4.601	4.926	4.827	4.875	0.325	0.226	0.099	0.275**
	(0.138)	(0.212)	(0.209)	(0.149)	(0.202)	(0.189)	(0.297)	(0.127)
Difference: Huntingdon - Altoona	-0.452**	-0.229	-0.327	-0.268	0.223	0.125	0.098	0.184
	(0.186)	(0.275)	(0.267)	(0.192)	(0.251)	(0.247)	(0.382)	(0.160)
Participants	402	209	193	402				

Note: Standard errors are clustered at the participant level and are shown in parentheses. Significance levels from t-test comparison of means for the two locations are indicated as: *p<0.1, **p<0.05, ***p<0.01

Table 3.3 displays the marginal effects of the local definition treatment on WTP for potato chips using a two-limit Tobit Model across three sample sizes. Column (1) examines the effects of the

product's locality, the *LocallySoldDef* treatment, location, and the interactions between location and both the *LocallySoldDef* treatment and product locality on WTP for potato chips. Separate regressions are conducted for each location, with results for Huntingdon in column (2) and for Altoona in column (3).

Table 3.3 indicates that, on average, participants are willing to pay $0.283 more for potato chips if they are labeled as local. In Huntingdon, people show a willingness to pay an additional $0.483 for local potato chips. In Altoona, this premium is $0.284 more for local potato chips. The introduction of the *LocallySoldDef* treatment does not significantly alter WTP for potato chips compared to the control group, which received the locally produced definition. This finding is consistent across separate analyses for each location, indicating no significant treatment effects on WTP for potato chips. A notable location effect is observed: participants in Huntingdon are willing to pay $0.514 less for potato chips than their counterparts in Altoona. Though Huntingdon exhibits a higher local premium than Altoona, the interaction between location and product locality is not statistically significant, indicating that the difference is not substantial. The Wald test results further confirm that the *LocallySoldDef* treatment does not significantly differ from the control in terms of its effect on WTP for potato chips.

Table 3.3 Marginal Effect on WTP for Potato Chips from Tobit Model

	(1) Pooled Sample	(2) Huntingdon	(3) Altoona
Local	0.283** (0.129)	0.483*** (0.102)	0.284** (0.129)
LocallySoldDef	0.052 (0.258)	0.121 (0.230)	0.051 (0.259)
Huntingdon	-0.514** (0.256)		
Huntingdon * *LocallySoldDef*	0.069 (0.346)		
Huntingdon * Local	0.203 (0.164)		
Constant	4.569*** (0.184)	4.058*** (0.176)	4.568*** (0.184)
Observation	804	406	398
Wald test: Significance	0.040 (p=0.841)	0.277 (p=0.599)	0.039 (p=0.844)

Note: Wald test evaluates if *LocallySoldDef* coefficient significantly differs from zero. Standard errors are clustered at the participant level and are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

For the robustness check, we include unbalanced demographic variables between treatment conditions. The results remain consistent, suggesting that participants perceive the two definitions of "local" similarly. For detailed results, please refer to Table C.1 in Appendix C of the Supporting Information. We also employ OLS regressions for additional robustness checks. Again, the results remain consistent, as shown in Tables C.2 and C.3 (without and with control variables, respectively) in Appendix C.

Next, we analyze the variations in positive, negative, and zero premiums for local potato chips across three samples. Table 3.4 displays the distribution of positive, negative, and zero premiums for local potato chips in each sample. On average, most people, about 43%, are willing to pay a positive premium for local potato chips. This is followed by 31% of participants indicating a negative premium, and lastly, 26% showing a zero premium (indicating no difference in their willingness to pay for local and non-local potato chips). Notably, when comparing the two locations, a significantly higher proportion of participants in Altoona demonstrate a negative premium compared to those in Huntingdon. The possible reasons are that people in urban areas might have a lesser sense of community than those in rural areas, or they are exposed to more intense marketing for non-local brands and have a wider range of choices, leading to different preferences in food sourcing.

Table 3.4 Positive, Negative, and Zero Premium for Local Potato Chips

	(1) Pooled Sample	(2) Huntingdon	(3) Altoona	Min	Max	Locations T-test P-value
Positive Premium	0.43	0.47	0.39	0	1	0.12
Negative Premium	0.31	0.27	0.35	0	1	**0.08**
Zero Premium	0.26	0.26	0.26	0	1	0.91
N	402	203	199	402	402	402

Note: A positive premium signifies a willingness to pay more for local chips compared to non-local, a negative premium indicates a willingness to pay less, and zero premium denotes no difference in willingness to pay. The "Min" and "Max" denote the range (0 to 1) for the dummy variables indicating whether participants expressed a positive, negative, or zero premium for local potato chips (0 represents no premium of that type, 1 represents a premium of that type). The T-test results (P-value) compare the rural (Huntingdon) and urban (Altoona) samples to assess statistical significance in the observed differences.

Table 3.5 presents the results of a Multinomial Logit analysis examining the choice of positive, negative, or zero premium for local potato chips. The analysis reveals no significant treatment effects on the choice of price premium for local potato chips. In the pooled sample and the Altoona sample, individuals are less likely to opt for a zero premium over a positive premium. In

Huntingdon, people show a lower tendency to choose either a negative or a zero premium compared to a positive premium for local potato chips, confirming our main result that a relatively higher local premium is observed in the rural area.

Table 3.5 Multinomial Logit Analysis of Choices Between Positive, Negative, and Zero Premium for Local Potato Chips

	Pooled Sample		Huntingdon		Altoona	
	(1)	(2)	(3)	(4)	(5)	(6)
Baseline: Positive Premium	Negative Premium	Zero Premium	Negative Premium	Zero Premium	Negative Premium	Zero Premium
LocallySoldDef	0.051	0.012	-0.123	-0.043	0.051	0.012
	(0.329)	(0.360)	(0.340)	(0.345)	(0.329)	(0.360)
Huntingdon	-0.346	-0.129				
	(0.340)	(0.359)				
Huntingdon * *LocallySoldDef*	-0.175	-0.055				
	(0.473)	(0.499)				
Constant	-0.134	-0.431*	-0.480*	-0.560**	-0.134	-0.431*
	(0.231)	(0.252)	(0.250)	(0.256)	(0.231)	(0.252)
N	402		203		199	

Note: A positive premium signifies a willingness to pay more for local chips compared to non-local, a negative premium indicates a willingness to pay less, and zero premium denotes no difference in willingness to pay. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

3.4.4 Personal Definitions of Local and Perceptions of Local Egg Brands

In addition to our primary goal of examining how two different but related definitions of local affect consumers' WTP for local and non-local potato chips, we also inquired about participants' personal definitions of local at the end of the survey to see if these aligned with our definitions[10].

Figure 3.2 shows that, on average, 45.2% of participants define local as food both produced and sold within a specific region, followed closely by 44.5% who define it as food produced in specific regions. A smaller proportion, 10.3%, define it as food primarily sold within specific regions. Under all definitions, most people recognize the scale of local as within the Pennsylvania boundary, followed by local counties, within Pennsylvania and its neighboring states, and lastly, within the entire U.S. Comparing the two locations, slightly more participants in Huntingdon define local food

[10] We perform a Chi-Square Test to examine the independence between the treatment groups and personal definitions of local. The results show no significant correlation between the treatment conditions and personal definitions, indicating that participants' personal definitions of local are not influenced by the treatments provided in our study.

as food produced in specific regions than food both produced and mainly sold in specific regions, in contrast to Altoona. However, this difference is subtle. T-tests comparing the two locations reveal no significant differences in the distribution of personal local definitions.

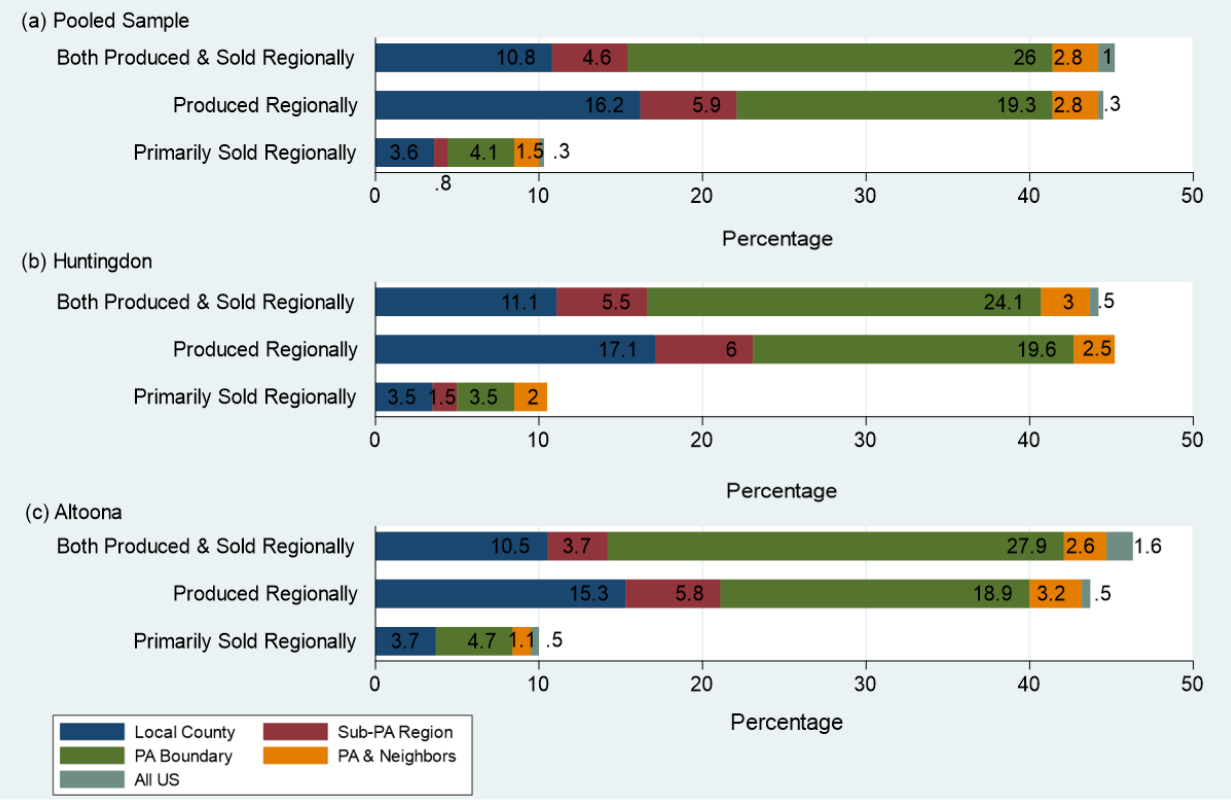

Figure 3.2 Distribution of Personal Definitions of Local (In Percentages)

Lastly, to further understand how consumers define "local," we asked participants about the brand of eggs they most recently purchased and whether they consider it local. Table 3.6 presents the average percentages of participants who purchased eggs from specific brands and how they identify the brands' local status. This includes choices from Giant[11] or other store brands, Nature's Promise, Eggland's Best, Nellie's, Pete and Gerry's, and other brands or direct purchases from farmers. The first row shows the percentage of people who last purchased eggs from Giant and other store brands; the second row indicates the percentage of these buyers who consider the brand local. Subsequent rows follow a similar pattern for Nature's Promise, Eggland's Best, and other brands.

[11] General supermarkets in Pennsylvania and also where we conducted our experiment.

On average, 61% of participants buy eggs from store brands, with 63% of these buyers in Altoona considering them local, compared to 48% in Huntingdon. In Altoona, 20% of participants purchase Eggland's Best, versus 6% in Huntingdon; among these buyers, 50% in Altoona and 15% in Huntingdon consider it local. 11% of participants in Huntingdon bought eggs from other brands or directly from farmers, compared to 3% in Altoona, with nearly all of these consumers considering their purchase local. 3% of participants bought eggs from Pete and Gerry's, with 83% in Altoona and 29% in Huntingdon considering it local. These findings suggest a variance in perception between the two locations regarding what is qualified as a "local" product, even when purchasing from the same type of store brand.

Table 3.6 Percentage of Egg Brand Purchased and Indication of Its Local Status

	(1) Pooled Sample	(2) Huntingdon	(3) Altoona	Min	Max	Locations T-test P-value
GIANT/Store Brands	0.61	0.62	0.61	0	1	0.80
Local	0.55	0.48	0.63	0	1	**0.02**
Nature's Promise	0.05	0.06	0.04	0	1	0.26
Local	0.42	0.42	0.43	0	1	0.96
Eggland's Best	0.13	0.06	0.20	0	1	**0.00**
Local	0.42	0.15	0.50	0	1	**0.03**
Nellie's	0.01	0.01	0.02	0	1	0.40
Local	0.50	0.50	0.50	0	1	1.00
Pete and Gerry's	0.03	0.03	0.03	0	1	0.81
Local	0.54	0.29	0.83	0	1	**0.05**
Others	0.07	0.11	0.03	0	1	**0.00**
Local	0.82	0.78	1.00	0	1	0.27
Don't Remember	0.03	0.04	0.03	0	1	0.42
Never Brought Before	0.06	0.06	0.06	0	1	0.87
N	402	203	199			

Note: "Min" and "Max" represent the range for the dummy variables used in the study, where 0 means "not this brand" or "not local", and 1 means "yes, this brand" or "local". This indicates whether participants purchased a specific brand of eggs and whether they consider it to be local. The T-test P-value compares the perceptions between Huntingdon and Altoona.

We also asked questions regarding participants' attitudes toward local food, such as whether they know a farmer, how frequently they buy food directly from a farmer, and their attitudes toward local food. We perform T-tests to determine if there are any differences between the two locations. Overall, participants in Huntingdon report knowing more farmers and place a higher value on local food, showing more concern for the origin of food than those in Altoona. For more details, please refer to Table C.4 in Appendix C of the Supporting Information.

3.5 Conclusion

Technological advancements have provided access to extensive supermarket scanner data, offering unparalleled insights into consumer purchasing behaviors. However, these datasets lack specific information on local food designations or product origins. Inspired by the study by Reed et al. (2023), which introduces a novel concept of "local" that diverges from the general understanding by defining local food based on its sales geography, our study sets out to explore whether this definition affects consumer WTP for local products. We aim to examine how consumers' WTP varies across two definitions of local food: 1) a conventional definition where local is defined as food produced in Pennsylvania, and 2) an unconventional but practical definition where local is regarded as food primarily sold within the state. This latter definition, easily discernible from large datasets, could help bridge the gap between experimental or survey-based studies and the broader insights provided by big data. Additionally, our study seeks to address a gap in the literature regarding rural-urban differences in WTP for local food within the U.S. context.

We conduct a lab-in-the-field experiment in Pennsylvania, comparing consumer WTP for local and non-local potato chips in rural (Huntingdon) and urban (Altoona) settings. The experiment takes place in supermarket parking lots, offering an ideal setting to examine how different definitions of local influence WTP among supermarket shoppers.

Our findings indicate that the WTP for potato chips is significantly impacted by the definitions of local, whether it implies locally sold or locally produced in Pennsylvania, in both rural and urban settings. This outcome suggests that future studies utilizing supermarket scanner data could feasibly adopt a sales-based definition of local food.

Our study reveals that, overall, people are willing to pay $0.28 more for local potato chips than for non-local ones. In rural Huntingdon, the premium for local potato chips is slightly higher at $0.48, compared to $0.28 in urban Altoona. Additionally, a higher proportion of people in Altoona indicate a negative premium for local chips compared to those in Huntingdon (with 90% confidence level). This could be attributed to a greater appreciation for local food and connections to local agriculture in rural areas, while urban consumers are often exposed to more intense marketing for non-local brands and have a wider range of choices, leading to different priorities in food sourcing. However, the differences between rural and urban areas are either subtle or not statistically significant, indicating no clear rural-urban disparity toward local food.

In addition, people in Huntingdon are willing to pay $0.51 less for potato chips compared to their counterparts in Altoona. This could be due to the living costs and price levels in the rural area being relatively lower than in urban Altoona. Under all conditions, participants are willing to pay between $4.15 and $4.93 for an 8-oz bag of potato chips. This WTP aligns with the market price range of $3.79 to $5.89[12], lending credibility to the robustness of our non-hypothetical findings.

The implications of this study are multifaceted. The subtle differences in rural and urban willingness to pay more for local potato chips underline a general preference for local food, suggesting opportunities for policy and marketing strategies to support local agriculture. Furthermore, this study offers valuable insights for future research on local food, especially for those utilizing scanner data. By adopting the "locally sold" definition for local food, researchers can explore more diverse and insightful results from scanner data analyses.

In summary, this research offers useful insights for a wide range of policy and commercial strategies aimed at promoting local products and understanding consumer preferences in greater depth. While our study focused on potato chips, future research could incorporate a variety of products, such as perishable produce or long-storage items like jams and jellies, to observe potential variations in consumer behavior. Such comprehensive comparisons could yield even more nuanced findings, contributing to our understanding of the dynamics between local food, consumer preferences, and market strategies.

[12] Instant market price check conducted on the Giant supermarket's website as of 1/13/2024.

APPENDIX A

APPENDIX FOR CHAPTER 1

Table A.1 OLS Estimates of WTP for Local Food with Residual Term

	(1) Average WTP for local food	(2) WTP for local produce	(3) WTP for local meat
Definitions of local:			
County scale	-58.65*	-41.15	-76.15*
	(33.17)	(41.81)	(41.76)
State scale	-64.57**	-43.66	-85.48**
	(32.74)	(42.77)	(41.52)
The US scale	-46.84	-28.23	-65.45
	(32.73)	(43.18)	(43.69)
Residual	-46.34	-24.86	-67.83
	(32.05)	(41.64)	(40.22)
Experiences of COVID:			
Personal infected	20.62***	21.32***	19.92**
	(5.67)	(7.03)	(8.15)
Family infected	5.59*	3.35	7.82*
	(3.22)	(4.01)	(4.15)
Annual income	1.33*	1.61**	1.05
	(0.75)	(0.79)	(0.79)
education	0.00	-1.08	1.08
	(1.61)	(2.00)	(1.54)
Race:			
Black	-15.95**	-14.91*	-16.99**
	(7.07)	(8.50)	(7.62)
Others	-15.86	-15.57	-16.14
	(11.69)	(10.33)	(14.54)
Asian	-5.99	-6.15	-5.83
	(7.15)	(8.31)	(8.78)
Rurality:			
Suburban	-11.30**	-15.33**	-7.27
	(4.84)	(6.25)	(5.53)
Rural	-14.37**	-13.75*	-14.99*
	(6.15)	(7.45)	(8.77)
Number of children	2.04	1.74	2.34
	(1.76)	(2.38)	(2.23)
Constant	80.94***	72.67**	89.21***
	(24.51)	(31.45)	(32.30)
Observation	509	509	509
F test:	113.05	86.68	96.77
Significance	(p=0.00)	(p=0.00)	(p=0.00)

Note: F test tests the joint significance. Bootstrapped standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table A.2 OLS Estimates of WTP for Local Food without Residual Term

	(1) Average WTP for local food	(2) WTP for local produce	(3) WTP for local meat
Definitions of local:			
County scale	-12.72**	-16.51***	-8.92
	(5.74)	(4.76)	(6.77)
State scale	-18.98***	-19.20***	-18.75***
	(5.48)	(4.95)	(6.19)
The US scale	-0.98	-3.63	1.67
	(7.09)	(5.40)	(8.05)
Experiences of COVID:			
Personal infected	21.35***	21.71***	20.98***
	(5.36)	(6.19)	(7.19)
Family infected	5.42*	3.26	7.58**
	(3.26)	(4.30)	(3.74)
Annual income	1.23*	1.56	0.90
	(0.70)	(1.01)	(0.63)
education	-0.94	-1.59	-0.30
	(1.12)	(1.47)	(1.37)
Race:			
Black	-13.25*	-13.46*	-13.03**
	(6.81)	(7.46)	(5.92)
Asian	-1.22	-3.59	1.16
	(5.89)	(8.82)	(7.82)
Others	-17.51*	-16.46	-18.56
	(9.26)	(11.58)	(13.82)
Rurality:			
Suburban	-11.21**	-15.29***	-7.14
	(4.96)	(4.85)	(5.90)
Rural	-9.85*	-11.33**	-8.37
	(5.62)	(4.54)	(6.07)
Number of children	2.71	2.10	3.32
	(2.19)	(2.07)	(2.45)
Constant	48.34***	55.18***	41.49***
	(5.72)	(7.95)	(8.33)
Observation	509	509	509
F test:	117.58	91.92	71.12
Significance	(p=0.00)	(p=0.00)	(p=0.00)

Note: F test tests the joint significance. Bootstrapped standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table A.3 Ordinal Logistic estimates of the model of local definitions

Local definitions	Coefficient	Standard error	Z	P-value
Nationalism	0.09**	0.04	2.20	0.03
Race:				
Black	0.24	0.29	0.81	0.42
Asian	-0.20	0.33	-0.61	0.54
Others	0.33	0.38	0.87	0.39
Age	0.01	0.01	0.94	0.35
Rurality:				
Suburban	-0.17	0.20	-0.83	0.41
Rural	-0.29	0.25	-1.16	0.25
Education	0.03	0.06	0.49	0.62

Observation: 509
LR Chi2 test: 12.43
Significance: 0.13
The p-value from LR test shows that model is not a good one.

Note: Standard errors appear in parentheses. Likelihood Ratio (LR) Chi-Square test that for both equations at least one of the predictors' regression coefficient is not equal to zero. The small p-value from the LR test would lead us to conclude that at least one of the regression coefficients in the model is not equal to zero. Significance levels are indicated as follows: * $p<0.1$, ** $p<0.05$, *** $p<0.01$

APPENDIX B

APPENDIX FOR CHAPTER 2

B.1 Demographic Data Across Treatments and Sample Sizes

Tables B.1 to B.3 summarize the raw survey data across treatments and sampling venues.

B.2 Adding Regressors to Estimated WTP for Potato Types to Account for Unbalanced Variables

Tables B.4 to B.6 present estimates from Equation 1 for the four types of potatoes after adding regressors that reflect demographic variables that were unbalanced across treatments. These results are qualitatively similar to the results presented in the main text.

B.3 Analysis of Cases where Study Participants Have Zero WTP for Potatoes

Tables B.7 to B.10 present results of Logit estimations where the dependent variable is a binary indicator, where a 0 indicates the study participate has a positive WTP for a type of potatoes and a 1 indicates the participant has a 0 WTP for potatoes. Table B.7 shows that, overall, in the pooled sample and the supermarket subsample, the information treatments do not significantly affect the likelihood of indicating zero WTP for all kinds of potato types (except for the local organic one, as no one indicated zero WTP for it). However, farmers market shoppers demonstrate an increased likelihood of having a zero WTP for imported varieties when given food mile information, and an increased likelihood of having a zero WTP for non-organic varieties when provided with both food miles and pesticide residue information. We control for unbalanced demographic variables across treatments in the three sample sizes in Tables B.8 to B.10, and our results consistently maintain their robustness.

B.4 Mean Price Premiums by Treatment and Venue with t-test Analysis

Table B.11 shows that, in the control group, the local premium is NTD6.4 for organic products, and NTD5.9 for non-organic products. The organic premium is NTD25.7 for local products, and NTD25.2 for imported products. The measure labeled environmental – health benefit premium shows a negative value (-19.3 in this case), a value that indicates consumers are likely to value health benefits more highly than environmental benefits. However, upon closer examination of the different samples, significant differences emerge in the preferences for all mentioned premiums between farmers market and supermarket shoppers.

The impact of information treatments on local premiums varies between farmers markets and supermarkets. In farmers markets, providing food miles information increases the local premium significantly, especially organic, while pesticide residue information has a moderate effect. In supermarkets, the influence of these information treatments on local premiums is comparatively lower, reducing WTP for non-organic local products.

Environmental – health benefit premium in the farmers market and the supermarket: Under the food mile treatment, the environmental – health benefit premium is -1.25 in the farmers market and -17.3 in the supermarket.

Farmers market patrons consistently show a higher premium for organic and local features across various treatments. This result suggests that these consumers value organic and local attributes more than supermarket shoppers. Given that the environmental – health benefit premium metric is more negative in the supermarket (-17.3) than in the farmers' market (-1.3) after providing food mile information, this suggests that farmers' market shoppers value local non-organic potatoes more than supermarket shoppers do when informed about food miles. This may imply that farmers' market shoppers place greater emphasis on environmental benefits than supermarket shoppers do after receiving information on food miles.

B.5 Adding Regressors to Estimated Premiums to Account for Unbalanced Variables

Tables B.12 to B.14 present re-estimates from Equation 1 for the four types of potatoes after adding regressors that reflect demographic variables that were unbalanced across treatments. These results are qualitatively similar to the results presented in the main text.

B.6 Differences in Attitudes Between Farmers Market and Supermarket Shoppers

Table B.15 shows that supermarket shoppers are more likely to believe conventional produce contains pesticides, and organic produce has no detectable residues. Both groups trust Taiwan's food regulation equally, but farmers market shoppers demonstrate greater eco-friendly behaviors, like using reusable bags and preferring public transport. They also seek more information on food and agriculture. Most shoppers define "local food" as produce grown within Taiwan, but farmers market visitors often specify their own city or region.

Table B.1 Demographic Data Across Treatments for the Pooled Sample

	All	Control	Food Miles	Pesticide Residues	Both Information	F-test on treatments P-value
Location:						
Supermarket	0.51	0.51	0.52	0.49	0.52	0.94
Farmers' market	0.49	0.49	0.48	0.51	0.48	0.94
Gender:						
Female	0.74	0.72	0.75	0.75	0.74	0.96
Male	0.26	0.28	0.25	0.25	0.26	0.96
Age	47.58	48.89	49.46	46.36	45.65	0.22
	(15.49)	(15.84)	(13.80)	(16.43)	(15.63)	
Household #	4.13	4.23	4.02	4.16	4.09	0.85
	(1.76)	(1.96)	(1.86)	(1.51)	(1.73)	
Education:						
High school or less	0.28	0.35	0.28	0.29	0.19	0.11
2-year college	0.17	0.14	0.21	0.16	0.17	0.57
4-year college	0.39	0.36	0.39	0.38	0.44	0.69
Postgraduate studies	0.16	0.16	0.12	0.17	0.19	0.53
Income:						
Less than 30,000	0.14	0.16	0.13	0.16	0.13	0.87
30,001-50,000	0.28	0.29	0.27	0.29	0.25	0.92
50,001-70,000	0.19	0.18	0.18	0.19	0.21	0.91
70,001-90,000	0.15	0.10	0.18	0.17	0.15	0.35
90,000-110,000	0.10	0.13	0.09	0.06	0.12	0.34
More than 110,000	0.14	0.15	0.15	0.13	0.15	0.96
Children #	1.28	1.33	1.41	1.22	1.17	0.47
	(1.21)	(1.18)	(1.22)	(1.23)	(1.20)	
City:						
Taichung	0.87	0.91	0.87	0.85	0.86	0.70
Taipei	0.01	0.00	0.01	0.01	0.03	0.32
New Taipei	0.02	0.00	0.04	0.01	0.03	0.15
Taoyuan	0.02	0.02	0.02	0.00	0.04	0.28
Tainan	0.00	0.00	0.00	0.01	0.00	0.41
Kaohsiung	0.00	0.01	0.00	0.00	0.00	0.38
Changhua	0.03	0.06	0.00	0.04	0.01	0.03
Chiayi	0.01	0.00	0.00	0.02	0.00	0.12
Hsinchu	0.01	0.00	0.01	0.02	0.00	0.31
Miaoli	0.01	0.00	0.01	0.01	0.01	0.81
Nantou	0.01	0.00	0.00	0.03	0.01	0.12
Yunlin	0.01	0.00	0.03	0.00	0.01	0.09
Purchase role	3.46	3.50	3.60	3.40	3.35	0.36
	(1.09)	(1.01)	(1.08)	(1.14)	(1.14)	
Self-identified residence:						
Urban	0.85	0.91	0.77	0.87	0.83	0.04
Suburban	0.12	0.08	0.18	0.08	0.13	0.07
Rural	0.04	0.01	0.05	0.05	0.04	0.40
N	407	101	100	103	103	407

Note: “Purchase role” is measured on a 5-point scale in the analysis, ranging from "I am never the shopper" to "I am the only shopper." A higher score indicates greater responsibility for grocery shopping within the participant's household. "Self-identified residence" assesses participants' perceptions of their living area, asking whether they consider it to be urban, suburban, or rural. Abbreviations: Household #, household number, and Children #, the number of children.

Table B.2 Demographic Data Across Treatments for the Farmers Market Sample

	All	Control	Food Miles	Pesticide Residues	Both Information	F-test on treatments P-value
Farmers' market	1.00	1.00	1.00	1.00	1.00	.
Gender:						
Female	0.77	0.78	0.77	0.75	0.78	0.99
Male	0.23	0.22	0.23	0.25	0.22	0.99
Age	53.71	55.69	56.33	52.19	50.78	0.20
	(15.13)	(13.11)	(12.72)	(17.51)	(16.15)	
Household #	3.94	4.06	3.70	4.24	3.76	0.31
	(1.63)	(1.52)	(1.50)	(1.70)	(1.74)	
Education:						
High school or less	0.24	0.22	0.27	0.26	0.20	0.85
2-year college	0.15	0.20	0.15	0.15	0.10	0.58
4-year college	0.40	0.35	0.40	0.38	0.47	0.65
Postgraduate studies	0.21	0.22	0.19	0.21	0.22	0.97
Income:						
Less than 30,000	0.16	0.14	0.15	0.17	0.18	0.94
30,001-50,000	0.23	0.27	0.23	0.28	0.14	0.36
50,001-70,000	0.23	0.22	0.19	0.23	0.29	0.72
70,001-90,000	0.13	0.02	0.17	0.15	0.18	0.07
90,000-110,000	0.08	0.14	0.06	0.04	0.06	0.21
More than 110,000	0.17	0.20	0.21	0.13	0.14	0.64
Children #	1.49	1.69	1.54	1.50	1.22	0.27
	(1.20)	(1.18)	(1.22)	(1.23)	(1.16)	
City:						
Taichung	0.89	0.98	0.91	0.77	0.92	0.01
Taipei	0.02	0.00	0.02	0.00	0.04	0.30
New Taipei	0.01	0.00	0.00	0.02	0.02	0.62
Tainan	0.01	0.00	0.00	0.02	0.00	0.45
Changhua	0.03	0.02	0.00	0.08	0.00	0.05
Chiayi	0.01	0.00	0.00	0.04	0.00	0.15
Hsinchu	0.01	0.00	0.00	0.02	0.00	0.45
Miaoli	0.01	0.00	0.02	0.02	0.00	0.57
Nantou	0.02	0.00	0.00	0.04	0.02	0.36
Yunlin	0.01	0.00	0.05	0.00	0.00	0.08
Purchase role	3.72	3.80	3.80	3.61	3.69	0.72
	(0.98)	(0.84)	(1.07)	(1.08)	(0.92)	
Self-identified residence:						
Urban	0.88	0.96	0.83	0.85	0.88	0.23
Suburban	0.08	0.04	0.10	0.08	0.10	0.63
Rural	0.04	0.00	0.06	0.08	0.02	0.18
N	199	49	48	53	49	199

Note: “Purchase role” is measured on a 5-point scale in the analysis, ranging from "I am never the shopper" to "I am the only shopper." A higher score indicates greater responsibility for grocery shopping within the participant's household. "Self-identified residence" assesses participants' perceptions of their living area, asking whether they consider it to be urban, suburban, or rural. Abbreviations: Household #, household number, and Children #, the number of children.

Table B.3 Demographic Data Across Treatments for the Supermarket Sample

	All	Control	Food Miles	Pesticide Residues	Both Information	F-test on treatments P-value
Location:						
Supermarket	1.00	1.00	1.00	1.00	1.00	.
Gender:						
Female	0.72	0.67	0.73	0.76	0.70	0.79
Male	0.28	0.33	0.27	0.24	0.30	0.79
Age	41.68	42.48	43.12	40.04	41.00	0.66
	(13.43)	(15.62)	(11.63)	(12.55)	(13.69)	
Household #	4.30	4.39	4.31	4.09	4.40	0.83
	(1.87)	(2.30)	(2.09)	(1.28)	(1.68)	
Education:						
High school or less	0.31	0.46	0.29	0.32	0.19	0.02
2-year college	0.19	0.08	0.27	0.16	0.24	0.05
4-year college	0.38	0.37	0.38	0.38	0.41	0.98
Postgraduate studies	0.12	0.10	0.06	0.14	0.17	0.32
Income:						
Less than 30,000	0.13	0.17	0.12	0.14	0.07	0.48
30,001-50,000	0.32	0.31	0.31	0.30	0.35	0.94
50,001-70,000	0.15	0.13	0.17	0.16	0.15	0.96
70,001-90,000	0.17	0.17	0.19	0.20	0.11	0.61
90,000-110,000	0.12	0.12	0.12	0.08	0.17	0.60
More than 110,000	0.12	0.10	0.10	0.12	0.15	0.82
Children #	1.08	0.98	1.29	0.92	1.11	0.41
	(1.19)	(1.09)	(1.23)	(1.18)	(1.24)	
City:						
Taichung	0.86	0.84	0.84	0.94	0.81	0.30
Taipei	0.01	0.00	0.00	0.02	0.02	0.58
New Taipei	0.03	0.00	0.08	0.00	0.04	0.06
Taoyuan	0.04	0.04	0.04	0.00	0.07	0.30
Kaohsiung	0.00	0.02	0.00	0.00	0.00	0.38
Changhua	0.03	0.10	0.00	0.00	0.02	0.01
Hsinchu	0.01	0.00	0.02	0.02	0.00	0.55
Miaoli	0.00	0.00	0.00	0.00	0.02	0.43
Nantou	0.00	0.00	0.00	0.02	0.00	0.37
Yunlin	0.01	0.00	0.02	0.00	0.02	0.59
Purchase role	3.22	3.23	3.42	3.18	3.04	0.38
	(1.14)	(1.08)	(1.07)	(1.17)	(1.23)	
Self-identified residence:						
Urban	0.82	0.87	0.71	0.90	0.80	0.07
Suburban	0.15	0.12	0.25	0.08	0.15	0.09
Rural	0.03	0.02	0.04	0.02	0.06	0.70
N	208	52	52	50	54	208

Note: “Purchase role” is measured on a 5-point scale in the analysis, ranging from "I am never the shopper" to "I am the only shopper." A higher score indicates greater responsibility for grocery shopping within the participant's household. "Self-identified residence" assesses participants' perceptions of their living area, asking whether they consider it to be urban, suburban, or rural. Abbreviations: Household #, household number, and Children #, the number of children.

Table B.4 Marginal Effects on WTP for Potatoes Using a Tobit Model with Control Variables (Pooled Sample)

	WTP for local organic	WTP for local non-organic	WTP for imported organic	WTP for imported non-organic
Food miles	-2.455	0.825	-11.615**	-3.868
	(4.069)	(3.876)	(5.226)	(4.900)
Pesticide residues	7.103*	-2.217	7.157	3.183
	(4.010)	(3.822)	(5.135)	(4.799)
Both information	2.304	-4.840	0.279	1.904
	(4.016)	(3.837)	(5.147)	(4.819)
Education:				
2-year college	9.442**	2.551	10.277*	-1.827
	(4.478)	(4.263)	(5.736)	(5.378)
4-year college	10.603***	5.138	16.181***	7.162
	(3.737)	(3.569)	(4.795)	(4.489)
Postgraduate studies	16.421***	7.048	6.780	-1.380
	(4.921)	(4.691)	(6.324)	(5.942)
Income:				
30,001-50,000	5.515	9.726**	6.879	4.301
	(4.670)	(4.462)	(5.991)	(5.600)
50,001-70,000	0.111	6.011	0.604	-2.284
	(5.149)	(4.927)	(6.603)	(6.200)
70,001-90,000	2.716	2.756	2.076	-5.484
	(5.384)	(5.159)	(6.910)	(6.510)
90,000-110,000	-5.750	1.770	-1.809	-0.754
	(5.978)	(5.723)	(7.678)	(7.188)
More than 110,000	1.047	4.101	12.752*	8.962
	(5.826)	(5.570)	(7.466)	(6.984)
Self-identified residence:				
Suburban	-1.514	3.117	12.000**	8.000
	(4.522)	(4.314)	(5.772)	(5.436)
Rural	-3.025	10.978	-21.421**	-5.318
	(7.559)	(7.205)	(9.902)	(9.245)
Constant	65.000***	38.524***	53.887***	35.457***
	(4.604)	(4.397)	(5.923)	(5.524)
Observation	407	407	407	407
Wald test:	2.808	1.096	6.739	1.193
Significance	(p=0.062)	(p=0.335)	(p=0.001)	(p=0.304)

Note: Wald test of the equality of the Food miles, Pesticide residues, and Both information coefficients. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table B.5 Marginal Effects on WTP for Potatoes Using a Tobit Model with Control Variables (Farmers market Sample)

	WTP for local organic	WTP for local non-organic	WTP for imported organic	WTP for imported non-organic
Food miles	-6.913	1.045	-24.394***	-13.072*
	(5.381)	(5.461)	(7.051)	(6.850)
Pesticide residues	4.337	-4.650	0.220	-3.356
	(5.277)	(5.371)	(6.858)	(6.629)
Both information	3.058	-7.140	0.871	-2.602
	(5.407)	(5.526)	(7.027)	(6.843)
Education:				
2-year college	9.096	3.442	-0.102	-16.699**
	(6.303)	(6.436)	(8.209)	(8.068)
4-year college	6.056	2.016	1.218	-2.282
	(5.159)	(5.276)	(6.718)	(6.551)
Postgraduate studies	12.831**	6.656	-1.713	-4.249
	(6.083)	(6.192)	(7.933)	(7.739)
Income:				
30,001-50,000	11.208*	13.936**	5.792	5.518
	(6.252)	(6.408)	(8.161)	(7.952)
50,001-70,000	11.381*	16.960***	10.947	4.133
	(6.346)	(6.510)	(8.266)	(8.108)
70,001-90,000	14.494**	3.338	2.903	-5.820
	(7.284)	(7.495)	(9.501)	(9.365)
90,000-110,000	6.549	5.783	1.963	1.072
	(8.423)	(8.635)	(10.956)	(10.679)
More than 110,000	12.195*	9.385	23.626**	11.713
	(7.146)	(7.324)	(9.302)	(9.058)
Self-identified residence:				
Suburban	0.122	-0.737	5.774	-9.848
	(6.926)	(7.097)	(9.017)	(9.033)
Rural	5.009	17.281*	8.770	15.815
	(9.647)	(9.796)	(12.639)	(12.169)
Constant	60.230***	31.157***	57.595***	37.004***
	(6.188)	(6.313)	(8.064)	(7.792)
Observation	199	199	199	199
Wald test:	2.751	1.201	8.678	1.483
Significance	(p=0.066)	(p=0.303)	(p=0.000)	(p=0.230)

Note: Wald test of the equality of the Food miles, Pesticide residues, and Both information coefficients. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table B.6 Marginal Effects on WTP for Potatoes Using a Tobit Model with Control Variables (Supermarket Sample)

	WTP for local organic	WTP for local non-organic	WTP for imported organic	WTP for imported non-organic
Food miles	1.979	2.260	-0.742	2.371
	(6.048)	(5.316)	(7.243)	(6.397)
Pesticide residues	9.947*	1.313	12.682*	8.062
	(5.968)	(5.242)	(7.142)	(6.297)
Both information	2.500	-1.060	0.122	5.048
	(6.017)	(5.287)	(7.209)	(6.356)
Education:				
2-year college	9.935	0.976	16.910**	7.714
	(6.387)	(5.581)	(7.642)	(6.714)
4-year college	13.338**	8.300*	28.268***	14.914***
	(5.282)	(4.642)	(6.341)	(5.582)
Postgraduate studies	19.428**	10.219	20.268**	5.340
	(8.346)	(7.345)	(10.022)	(8.876)
Income:				
30,001-50,000	-1.392	1.934	4.523	-4.026
	(7.026)	(6.155)	(8.400)	(7.374)
50,001-70,000	-13.607*	-7.588	-11.053	-9.428
	(8.142)	(7.157)	(9.766)	(8.589)
70,001-90,000	-8.710	-1.419	0.148	-9.194
	(7.956)	(6.988)	(9.532)	(8.407)
90,000-110,000	-16.884*	-7.126	-8.489	-10.994
	(8.608)	(7.571)	(10.333)	(9.097)
More than 110,000	-10.920	-2.861	0.621	4.416
	(9.464)	(8.303)	(11.327)	(9.947)
Self-identified residence:				
Suburban	-2.674	3.622	11.566	12.151*
	(6.164)	(5.408)	(7.328)	(6.475)
Rural	-7.132	6.966	-50.432***	-27.285**
	(11.657)	(10.258)	(14.898)	(13.023)
Constant	71.146***	46.961***	53.459***	40.577***
	(6.860)	(6.020)	(8.254)	(7.245)
Observation	208	208	208	208
Wald test:	1.073	0.217	2.150	0.396
Significance	(p=0.344)	(p=0.805)	(p=0.119)	(p=0.674)

Note: Wald test of the equality of the Food miles, Pesticide residues, and Both information coefficients. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table B.7 Information Effects on Zero WTP for Potatoes from Logit Model

	(1) Zero WTP for Local Non-organic	(2) Zero WTP for Imported Organic	(3) Zero WTP for Imported Non-organic
Pooled sample: 407			
Food miles	0.000	0.041	0.072
	(.)	(0.034)	(0.053)
Pesticide residues	0.021	-0.026	0.020
	(0.042)	(0.041)	(0.056)
Both information	0.047	-0.013	0.058
	(0.040)	(0.039)	(0.053)
Observation	307	407	407
Wald test:	1.491	3.906	1.096
Significance	(p=0.475)	(p=0.142)	(p=0.578)
Farmers market sample: 199			
Food miles	0.000	0.126**	0.263***
	(.)	(0.063)	(0.095)
Pesticide residues	0.135	0.026	0.155
	(0.089)	(0.070)	(0.101)
Both information	0.190**	0.032	0.243**
	(0.087)	(0.070)	(0.096)
Observation	151	199	199
Wald test:	4.932	5.065	2.292
Significance	(p=0.085)	(p=0.079)	(p=0.318)
Supermarket sample: 208			
Food miles	0.000	-0.032	-0.068
	(.)	(0.045)	(0.060)
Pesticide residues	-0.051	-0.055	-0.064
	(0.045)	(0.051)	(0.060)
Both information	-0.054	-0.034	-0.073
	(0.045)	(0.045)	(0.060)
Observation	156	208	208
Wald test:	2.066	0.191	0.016
Significance	(p=0.356)	(p=0.909)	(p=0.992)

Note: None of the participants indicated a zero WTP for local organic potatoes, so we have omitted that category. Wald test of the equality of the Food miles, Pesticide residues, and Both information coefficients. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table B.8 Information Effects on Zero WTP for Potatoes from Logit Model (Pooled Sample)

	(1) Zero WTP for Local Non-organic	(2) Zero WTP for Imported Organic	(3) Zero WTP for Imported Non-organic
Food miles	0.000	0.039	0.061
	(.)	(0.033)	(0.053)
Pesticide residues	0.019	-0.043	0.000
	(0.043)	(0.040)	(0.055)
Both information	0.048	-0.020	0.045
	(0.041)	(0.038)	(0.053)
Education:			
2-year college	0.008	-0.008	0.038
	(0.050)	(0.037)	(0.056)
4-year college	0.030	-0.022	0.007
	(0.044)	(0.030)	(0.045)
Postgraduate studies	-0.021	0.098	0.100
	(0.048)	(0.065)	(0.070)
Income:			
30,001-50,000	-0.069	-0.026	-0.026
	(0.057)	(0.051)	(0.064)
50,001-70,000	-0.048	-0.035	-0.005
	(0.063)	(0.055)	(0.070)
70,001-90,000	0.027	0.003	0.095
	(0.076)	(0.061)	(0.080)
90,000-110,000	-0.053	-0.052	-0.051
	(0.068)	(0.060)	(0.076)
More than 110,000	-0.020	-0.095*	-0.087
	(0.076)	(0.049)	(0.069)
Self-identified residence:			
Suburban	-0.017	-0.062***	-0.039
	(0.050)	(0.020)	(0.050)
Rural	0.000	0.187*	0.080
	(.)	(0.110)	(0.110)
Observation	297	407	407
Wald test:	1.492	5.720	1.499
Significance	(p=0.474)	(p=0.057)	(p=0.473)

Note: None of the participants indicated a zero WTP for local organic potatoes, so we have omitted that category. Wald test of the equality of the Food miles, Pesticide residues, and Both information coefficients. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table B.9 Information Effects on Zero WTP for Potatoes from Logit Model (Farmers Market Sample)

	(1) Zero WTP for Local Non-organic	(2) Zero WTP for Imported Organic	(3) Zero WTP for Imported Non-organic
Food miles	0.000	0.144*	0.248***
	(.)	(0.075)	(0.093)
Pesticide residues	0.123	0.004	0.131
	(0.088)	(0.085)	(0.098)
Both information	0.175**	0.014	0.212**
	(0.087)	(0.087)	(0.095)
Education:			
2-year college	0.074	0.106	0.153
	(0.098)	(0.084)	(0.096)
4-year college	0.073	0.077	0.091
	(0.071)	(0.053)	(0.069)
Postgraduate studies	-0.028	0.175*	0.074
	(0.071)	(0.095)	(0.083)
Income:			
30,001-50,000	-0.090	0.006	0.017
	(0.108)	(0.091)	(0.104)
50,001-70,000	-0.152	-0.073	-0.033
	(0.094)	(0.080)	(0.099)
70,001-90,000	0.014	0.015	0.083
	(0.126)	(0.102)	(0.119)
90,000-110,000	-0.112	0.000	-0.088
	(0.124)	(.)	(0.124)
More than 110,000	-0.070	0.000	-0.125
	(0.119)	(.)	(0.099)
Self-identified residence:			
Suburban	0.017	-0.045	0.105
	(0.102)	(0.072)	(0.112)
Rural	0.000	-0.013	-0.119
	(.)	(0.103)	(0.095)
Observation	146	150	199
Wald test:	4.126	6.992	2.650
Significance	(p=0.127)	(p=0.030)	(p=0.266)

Note: None of the participants indicated a zero WTP for local organic potatoes, so we have omitted that category. Wald test of the equality of the Food miles, Pesticide residues, and Both information coefficients. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table B.10 Information Effects on Zero WTP for Potatoes from Logit Model (Supermarket Sample)

	(1) Zero WTP for Local Non-organic	(2) Zero WTP for Imported Organic	(3) Zero WTP for Imported Non-organic
Food miles	0.000	-0.013	-0.058
	(.)	(0.049)	(0.059)
Pesticide residues	-0.081	-0.050	-0.082
	(0.057)	(0.054)	(0.059)
Both information	-0.082	-0.044	-0.100
	(0.059)	(0.055)	(0.063)
Education:			
2-year college	0.008	-0.074	0.012
	(0.077)	(0.064)	(0.067)
4-year college	-0.027	-0.104*	-0.045
	(0.052)	(0.054)	(0.048)
Postgraduate studies	0.008	-0.013	0.197
	(0.092)	(0.120)	(0.136)
Income:			
30,001-50,000	0.000	-0.030	0.011
	(.)	(0.055)	(0.067)
50,001-70,000	0.000	0.013	0.022
	(.)	(0.077)	(0.080)
70,001-90,000	0.000	-0.007	0.106
	(.)	(0.066)	(0.084)
90,000-110,000	0.000	0.056	0.066
	(.)	(0.091)	(0.094)
More than 110,000	0.000	-0.004	-0.029
	(.)	(0.096)	(0.076)
Self-identified residence:			
Suburban	0.000	0.000	-0.109***
	(.)	(.)	(0.033)
Rural	0.000	0.440**	0.292
	(.)	(0.191)	(0.178)
Observation	116	177	208
Wald test:	2.911	0.503	0.382
Significance	(p=0.233)	(p=0.778)	(p=0.826)

Note: None of the participants indicated a zero WTP for local organic potatoes, so we have omitted that category. Wald test of the equality of the Food miles, Pesticide residues, and Both information coefficients. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table B.11 Mean Price Premiums by Treatment and Venue with t-test Analysis

	Pooled Sample		Farmers mkt Sample		Supermkt Sample		Locations T-test
	Mean	SE	Mean	SE	Mean	SE	P-value
Local Premium for Organic:							
Control	6.39	2.28	9.29	2.76	3.65	3.56	0.22
Food miles	12.85	3.43	23.02	5.62	3.46	3.67	**0.00**
Pesticide residues	7.23	2.41	12.92	3.52	1.20	3.11	**0.01**
Both information	7.91	2.61	11.12	3.96	5.00	3.42	0.24
Local Premium for Non-organic:							
Control	5.89	2.52	7.14	3.14	4.71	3.93	0.63
Food miles	9.20	2.69	15.73	4.35	3.17	3.06	**0.02**
Pesticide residues	2.14	1.69	5.38	2.49	-1.30	2.19	**0.05**
Both information	0.10	2.54	1.22	4.07	-0.93	3.17	0.67
Organic Premium for Local:							
Control	25.69	2.10	31.22	3.15	20.48	2.63	**0.01**
Food miles	22.45	1.70	24.27	2.55	20.77	2.27	0.31
Pesticide residues	34.17	3.07	38.11	4.50	30.00	4.11	0.19
Both information	32.23	2.62	40.31	4.50	24.91	2.53	**0.00**
Organic Premium for Imported:							
Control	25.20	2.40	29.08	3.75	21.54	2.98	0.12
Food miles	18.80	2.33	16.98	3.22	20.48	3.38	0.46
Pesticide residues	29.08	2.75	30.57	3.79	27.50	4.03	0.58
Both information	24.42	2.49	30.41	4.01	18.98	2.89	**0.02**
Environmental – Health Benefit Premium:							
Control	-19.31	3.02	-21.94	3.89	-16.83	4.59	0.40
Food miles	-9.60	3.37	-1.25	5.20	-17.31	4.12	**0.02**
Pesticide residues	-26.94	3.00	-25.19	4.31	-28.80	4.19	0.55
Both information	-24.32	2.92	-29.18	4.62	-19.91	3.59	0.11

Note: Abbreviations: SE, standard error of the mean; Local Premium for Organic, the additional amount consumers are willing to pay for local organic potatoes as compared to imported organic options; Local Premium for Non-organic, the additional amount consumers are willing to pay for local non-organic potatoes as compared to imported non-organic options; Organic Premium for Local, the additional amount consumers are willing to pay for organic potatoes when the choice is between local varieties; Organic Premium for Imported, the additional amount consumers are willing to pay for organic potatoes when the choice is between imported varieties; and "Environmental – Health Benefit Premium", the WTP difference between local non-organic and imported organic potatoes.

Table B.12 OLS Analysis on Information Effects on Price Premiums for Potatoes (Pooled sample)

	Local Premium for Organic	Local Premium for Non-organic	Organic Premium for Local	Organic Premium for Imported	Environmental – Health Benefit Premium
Food miles	7.516*	2.885	-2.877	-7.509**	10.394**
	(3.854)	(3.411)	(3.523)	(3.588)	(4.359)
Pesticide residues	-0.232	-4.933	8.180**	3.479	-8.411*
	(3.791)	(3.355)	(3.466)	(3.529)	(4.288)
Both information	1.718	-6.591*	6.104*	-2.205	-4.386
	(3.801)	(3.364)	(3.475)	(3.538)	(4.299)
Education:					
2-year college	-0.951	3.484	5.954	10.389***	-6.905
	(4.228)	(3.741)	(3.864)	(3.935)	(4.782)
4-year college	-5.092	-1.696	5.139	8.535***	-10.231**
	(3.539)	(3.132)	(3.235)	(3.294)	(4.003)
Postgraduate studies	8.494*	6.466	9.130**	7.102	-0.636
	(4.658)	(4.122)	(4.258)	(4.336)	(5.269)
Income:					
30,001-50,000	-1.211	5.201	-4.402	2.010	3.191
	(4.423)	(3.914)	(4.043)	(4.118)	(5.003)
50,001-70,000	-0.774	7.668*	-5.546	2.896	4.772
	(4.881)	(4.319)	(4.462)	(4.543)	(5.520)
70,001-90,000	0.168	6.531	-0.574	5.789	0.742
	(5.103)	(4.515)	(4.664)	(4.750)	(5.771)
90,000-110,000	-3.523	2.797	-6.913	-0.593	3.390
	(5.675)	(5.022)	(5.187)	(5.282)	(6.418)
>110,000	-10.419*	-3.443	-3.132	3.845	-7.287
	(5.521)	(4.886)	(5.047)	(5.139)	(6.245)
Self-identified residence:					
Suburban	-12.272***	-4.032	-3.997	4.243	-8.275*
	(4.288)	(3.795)	(3.920)	(3.992)	(4.850)
Rural	14.852**	13.633**	-12.258*	-13.477**	27.110***
	(7.182)	(6.355)	(6.565)	(6.685)	(8.123)
Constant	10.282**	1.817	25.692***	17.227***	-15.410***
	(4.366)	(3.864)	(3.991)	(4.065)	(4.939)
Observation	407	407	407	407	407
Wald test:	2.227	4.491	5.664	4.799	10.504
Significance	(p=0.109)	(p=0.012)	(p=0.004)	(p=0.009)	(p=0.000)

Note: Wald test of the equality of the Food miles, Pesticide residues, and Both information coefficients. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table B.13 OLS Analysis on Information Effects on Price Premiums for Potatoes (Farmers market sample)

	Local Premium for Organic	Local Premium for Non-organic	Organic Premium for Local	Organic Premium for Imported	Environmental – Health Benefit Premium
Food miles	14.178**	9.199*	-7.632	-12.611**	21.810***
	(5.958)	(5.096)	(5.636)	(5.386)	(6.649)
Pesticide residues	3.115	-1.841	7.035	2.079	-3.920
	(5.833)	(4.989)	(5.517)	(5.272)	(6.510)
Both information	1.305	-5.707	7.961	0.949	-6.656
	(5.984)	(5.118)	(5.660)	(5.409)	(6.678)
Education:					
2-year college	7.044	16.886***	4.655	14.498**	2.389
	(6.972)	(5.963)	(6.594)	(6.302)	(7.781)
4-year college	3.500	3.374	3.422	3.295	0.078
	(5.711)	(4.885)	(5.402)	(5.163)	(6.374)
Postgraduate studies	12.247*	8.940	5.876	2.569	6.371
	(6.725)	(5.751)	(6.361)	(6.079)	(7.505)
Income:					
30,001-50,000	4.895	7.005	-2.532	-0.423	7.428
	(6.930)	(5.927)	(6.555)	(6.264)	(7.734)
50,001-70,000	0.998	11.542*	-4.471	6.073	5.469
	(7.030)	(6.012)	(6.649)	(6.354)	(7.845)
70,001-90,000	10.074	7.313	9.731	6.970	0.343
	(8.057)	(6.891)	(7.621)	(7.283)	(8.992)
90,000-110,000	6.519	5.190	1.884	0.555	4.635
	(9.356)	(8.001)	(8.849)	(8.457)	(10.441)
>110,000	-9.082	-0.629	2.890	11.342	-11.972
	(7.918)	(6.772)	(7.490)	(7.157)	(8.837)
Self-identified residence:					
Suburban	-3.999	6.306	1.450	11.755*	-5.449
	(7.689)	(6.576)	(7.273)	(6.950)	(8.581)
Rural	-3.110	2.676	-10.126	-4.339	7.016
	(10.711)	(9.160)	(10.131)	(9.681)	(11.953)
Constant	3.242	-4.950	28.327***	20.136***	-25.085***
	(6.866)	(5.872)	(6.494)	(6.206)	(7.662)
Observation	199	199	199	199	199
Wald test:	2.833	4.740	5.016	4.837	11.586
Significance	(p=0.061)	(p=0.010)	(p=0.008)	(p=0.009)	(p=0.000)

Note: Wald test of the equality of the Food miles, Pesticide residues, and Both information coefficients. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table B.14 OLS Analysis on Information Effects on Price Premiums for Potatoes (Supermarket sample)

	Local Premium for Organic	Local Premium for Non-organic	Organic Premium for Local	Organic Premium for Imported	Environmental – Health Benefit Premium
Food miles	2.656	0.216	0.501	-1.940	2.156
	(4.745)	(4.486)	(4.309)	(4.780)	(5.721)
Pesticide residues	-2.011	-5.687	8.377*	4.701	-10.388*
	(4.677)	(4.422)	(4.248)	(4.711)	(5.639)
Both information	2.998	-5.009	3.708	-4.300	-0.709
	(4.716)	(4.458)	(4.283)	(4.750)	(5.685)
Education:					
2-year college	-5.955	-6.679	7.558*	6.835	-13.513**
	(4.986)	(4.714)	(4.528)	(5.023)	(6.011)
4-year college	-13.008***	-5.614	4.855	12.249***	-17.864***
	(4.144)	(3.918)	(3.764)	(4.175)	(4.996)
Postgraduate studies	-0.455	3.294	9.482	13.231**	-9.937
	(6.565)	(6.206)	(5.962)	(6.613)	(7.914)
Income:					
30,001-50,000	-5.715	5.993	-3.851	7.857	-1.864
	(5.506)	(5.206)	(5.001)	(5.547)	(6.638)
50,001-70,000	-4.004	1.740	-6.096	-0.352	2.092
	(6.394)	(6.045)	(5.807)	(6.441)	(7.709)
70,001-90,000	-8.293	6.534	-7.087	7.739	-1.205
	(6.245)	(5.904)	(5.672)	(6.291)	(7.529)
90,000-110,000	-9.108	3.430	-9.731	2.808	0.623
	(6.762)	(6.392)	(6.141)	(6.811)	(8.152)
>110,000	-11.549	-6.432	-8.182	-3.065	-3.367
	(7.427)	(7.021)	(6.745)	(7.481)	(8.953)
Self-identified residence:					
Suburban	-13.309***	-7.011	-5.775	0.523	-7.534
	(4.838)	(4.574)	(4.394)	(4.874)	(5.833)
Rural	32.986***	26.828***	-12.803	-18.961**	45.789***
	(9.180)	(8.679)	(8.337)	(9.247)	(11.067)
Constant	15.704***	4.267	23.268***	11.830**	-7.564
	(5.382)	(5.088)	(4.888)	(5.422)	(6.489)
Observation	208	208	208	208	208
Wald test:	0.696	1.043	1.672	1.926	2.618
Significance	(p=0.500)	(p=0.354)	(p=0.191)	(p=0.148)	(p=0.076)

Note: Wald test of the equality of the Food miles, Pesticide residues, and Both information coefficients. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table B.15 Comparative Consumer Attitudes in Farmers Market and Supermarket

	Pooled sample	Farmers mkt sample	Supermkt sample	Min	Max	T-test P-value
Conventional = pesticide residues	3.26 (1.10)	3.16 (1.18)	3.36 (1.01)	1	5	**0.07**
Organic = limited chemical use	3.35 (1.29)	3.19 (1.40)	3.50 (1.16)	1	5	**0.01**
No bites = no pesticides	3.06 (0.98)	2.89 (1.02)	3.22 (0.92)	1	5	**0.00**
Trust score	6.23 (1.11)	6.24 (1.19)	6.23 (1.02)	2	9	0.95
Environmental score	17.79 (3.27)	18.69 (3.15)	16.94 (3.17)	7	25	**0.00**
Information seeker	7.17 (2.31)	7.51 (2.37)	6.85 (2.21)	1	10	**0.00**
Local definition:						
Within city/town	0.13	0.18	0.09	0	1	**0.01**
Within specific region	0.26	0.27	0.25	0	1	0.55
In Taiwan	0.61	0.55	0.66	0	1	**0.02**
In Asia	0.00	0.01	0.00	0	1	0.31
Altruistic	0.11	0.14	0.09	0	1	0.16
N	407	199	208	407	407	407

Note: The outcomes of the “T-test P-value” highlight the differences in attitudes between the two locations: farmers' market and supermarket. If the p-value is less than 0.1, then we can assert that the attitudes between these two venues significantly differ. The terms "Conventional = pesticide residues," "Organic = limited chemical use," and "No bites = no pesticides" were each evaluated on a 5-point agreement scale, ranging from "strongly disagree" to "strongly agree". The respective statements they correspond to are: " Conventional produce that is sprayed with pesticides during cultivation must contain pesticide residues on it when we buy it.," "Organic produce can be sprayed with a small amount of chemical fertilizers and pesticides on it during cultivation, but the residues must not be detected when they are sold," and "Vegetables and fruits that have been bitten by insects mean that pesticides have not been applied during cultivation." The "Trust score" is a composite score that aggregates responses from two questions about participants' trust in Taiwan's agricultural regulations, with a higher score indicating greater trust. The "Environmental score" evaluates participants' pro-environmental behaviors. A higher score signifies more environmentally-friendly behavior, illustrated by statements like, “I use reusable containers/utensils/bags when I buy food/beverage outside,” also measured on the 5-point scale from "strongly disagree" to "strongly agree". "Information seeker" was determined using a 10-point scale based on participants' eagerness to seek information about food and related issues. Lastly, the term "Altruistic" refers to participants' rankings of ten factors they consider when selecting produce. If participants ranked benefits to others higher than benefits to themselves, they were classified as altruistic.

Appendix C

APPENDIX FOR CHAPTER 3

Table C.1 Marginal Effect on WTP for Potato Chips from Tobit Model – Robustness Check

	(1) Pooled Sample	(2) Huntingdon	(3) Altoona
Local	0.283**	0.483***	0.284**
	(0.129)	(0.102)	(0.129)
LocallySoldDef	-0.039	0.037	-0.070
	(0.264)	(0.233)	(0.270)
Huntingdon	-0.492*		
	(0.261)		
Huntingdon * *LocallySoldDef*	0.101		
	(0.349)		
Huntingdon * Local	0.203		
	(0.164)		
Hispanic:			
Non-Hispanic	0.280	0.074	0.976
	(0.462)	(0.386)	(0.794)
Prefer not to Say	0.151	0.514	0.501
	(0.573)	(0.718)	(0.883)
Education	0.031	0.092	-0.083
	(0.076)	(0.097)	(0.121)
Income	-0.004	-0.004	-0.004
	(0.003)	(0.004)	(0.005)
Shopper role:			
The only shopper			
Never the shopper	-0.016	-1.038**	2.287***
	(0.837)	(0.481)	(0.800)
Rarely the shopper	-0.406	-0.349	-0.254
	(0.427)	(0.568)	(0.616)
Secondary shopper	0.252	0.049	0.584
	(0.273)	(0.323)	(0.452)
Primary shopper	-0.014	0.217	-0.230
	(0.208)	(0.305)	(0.279)
Constant	4.422***	3.911***	3.994***
	(0.507)	(0.477)	(0.827)
Observation	804	406	398
Wald test:	0.022	0.025	0.068
Significance	(p=0.882)	(p=0.874)	(p=0.794)

Note: Wald test evaluates if Locally Sold coefficient significantly differs from zero. Standard errors are clustered at the participant level and are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01. In Huntingdon, individuals not responsible for shopping in the household are willing to pay less for potato chips compared to those who are the only shoppers, whereas in Altoona, the trend is opposite. However, since only three respondents indicate they never be shoppers, this significant finding can be disregarded.

Table C.2 OLS Analysis on Local Premium for Potato Chips – Robustness Check

	(1) Pooled Sample	(2) Huntingdon	(3) Altoona
Local	0.275** (0.127)	0.459*** (0.097)	0.275** (0.128)
LocallySoldDef	0.060 (0.258)	0.118 (0.227)	0.060 (0.258)
Huntingdon	-0.487* (0.251)		
Huntingdon * *LocallySoldDef*	0.059 (0.343)		
Huntingdon * Local	0.184 (0.160)		
Constant	4.571*** (0.184)	4.083*** (0.171)	4.571*** (0.184)
Observation	804	406	398
Wald test: Significance	0.054 (p=0.816)	0.272 (p=0.602)	0.054 (p=0.816)

Note: Wald test evaluates if *LocallySoldDef* coefficient significantly differs from zero. Standard errors are clustered at the participant level and are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01

Table C.3 OLS Analysis on Local Premium for Potato Chips (With Controls) – Robustness Check

	(1) Pooled Sample	(2) Huntingdon	(3) Altoona
Local	0.275**	0.459***	0.275**
	(0.128)	(0.098)	(0.129)
LocallySoldDef	-0.031	0.033	-0.059
	(0.265)	(0.232)	(0.271)
Huntingdon	-0.464*		
	(0.257)		
Huntingdon * *LocallySoldDef*	0.089		
	(0.348)		
Huntingdon * Local	0.184		
	(0.161)		
Hispanic:			
Non-Hispanic	0.281	0.088	0.966
	(0.465)	(0.392)	(0.803)
Prefer not to Say	0.162	0.513	0.527
	(0.575)	(0.727)	(0.890)
Education	0.032	0.093	-0.082
	(0.076)	(0.098)	(0.122)
Income	-0.004	-0.004	-0.004
	(0.003)	(0.004)	(0.005)
Shopper role:			
The only shopper			
Never the shopper	-0.034	-1.052**	2.279***
	(0.847)	(0.489)	(0.810)
Rarely the shopper	-0.419	-0.370	-0.261
	(0.430)	(0.574)	(0.625)
Secondary shopper	0.236	0.033	0.570
	(0.273)	(0.325)	(0.453)
Primary shopper	-0.019	0.213	-0.239
	(0.208)	(0.303)	(0.282)
Constant	4.428***	3.934***	4.004***
	(0.511)	(0.482)	(0.837)
Observation	804	406	398
Wald test:	0.014	0.020	0.048
Significance	(p=0.907)	(p=0.888)	(p=0.827)

Note: Wald test evaluates if *LocallySoldDef* coefficient significantly differs from zero. Standard errors are clustered at the participant level and are shown in parentheses. Significance levels are indicated as follows: * p<0.1, ** p<0.05, *** p<0.01. In Huntingdon, individuals not responsible for shopping in the household are willing to pay less for potato chips compared to those who are the only shoppers, whereas in Altoona, the trend is opposite. However, since only three respondents indicate they never be shoppers, this this significant finding can be disregarded.

Table C.4 Connectedness to Local Agriculture and Attitudes toward Local Food

	(1) Pooled Sample	(2) Huntingdon	(3) Altoona	Min	Max	T-test P-value
Knowing Farmers:						
Don't Know Any Farmers	0.51	0.32	0.70	0	1	**0.00**
Friend is a Farmer	0.34	0.48	0.21	0	1	**0.00**
Family is a Farmer	0.11	0.14	0.07	0	1	**0.02**
Parent is a Farmer	0.02	0.02	0.02	0	1	0.76
I am the Farmer	0.02	0.03	0.00	0	1	**0.01**
Direct Farm Buy Frequency	2.98	3.18	2.77	1	5	**0.00**
	(0.98)	(0.91)	(1.00)			
Environmental Sustainability	7.76	7.80	7.72	0	10	0.71
	(2.23)	(2.22)	(2.25)			
Tastes Better	7.42	7.60	7.24	0	10	0.12
	(2.35)	(2.29)	(2.40)			
Higher Nutritional Value	6.74	6.94	6.53	0	10	**0.10**
	(2.47)	(2.35)	(2.59)			
Fresher	8.30	8.60	8.01	0	10	**0.00**
	(2.04)	(1.87)	(2.17)			
Less Expensive	6.45	6.34	6.56	0	10	0.37
	(2.49)	(2.50)	(2.48)			
Emotional Connection	7.13	7.36	6.89	0	10	0.06
	(2.46)	(2.36)	(2.55)			
Importance of Food Origin	7.83	8.33	7.32	0	10	**0.00**
	(2.33)	(1.83)	(2.66)			
N	402	203	199	402	402	402

Note: Standard errors are shown in parentheses. “Knowing Farmers” categories include responses to whether participants know any farmers personally, ranging from friends, family members, to being farmers themselves. The “Direct Farm Buy Frequency” measures how often participants buy food directly from farmers or visit farmers' markets on a scale of 1 (never) to 5 (always). Other questions explore attitudes towards local food, assessing perceptions of environmental sustainability, taste, nutritional value, freshness, price, emotional connection, and the importance of food origin on a scale from 0 (low) to 10 (high). The T-test P-values compare responses between Huntingdon and Altoona.

Appendix D

FULL SURVEYS

D.1 Full Survey Associated with Chapter 1

(This study uses the data of control group from an experimental survey conducted by Martina Vecchi, Edward C. Jaenicke, and Claudia Schmidt "Local food in times of crisis: The impact of COVID-19 and two reinforcing primes")

Introduction

Welcome, and thank you for participating in this study!

This study is conducted by university researchers to help inform policy. In order for the information from this research to be the most helpful it is important that you try to be as accurate, complete, and honest as possible with your answers. To do this, it is important to think carefully about each question, search your memory, and take time in answering. Are you willing to do this?

Yes, I agree
No, but I will proceed anyway

Please be assured that your responses are completely confidential; only statistical summaries will be used in reports, so that no individual person's answers will ever be identified.

To start the survey and participate, please click on the 'next' button.

If you have any questions about this survey or its outcomes, please contact [*name of the author*] at [*email address of the author*].
Thank you very much for your help with this project.

COVID-19 reminder

Control Group

[No reminder**]**

Treatment Group – Individual prime

1. To what extent has your personal life been affected by the current coronavirus pandemic?
   Use this scale where 0 means “not at all affected” and 10 means “extremely affected”.

   [0 1 2 3 4 5 6 7 8 9 10]

2. How concerned are you about the financial impact of the current coronavirus pandemic on your personal life?
   Use this scale where 0 means “not at all concerned” and 10 means “extremely concerned”.

   [0 1 2 3 4 5 6 7 8 9 10]

3. How concerned are you about the health impact of the current coronavirus pandemic on your personal life?
   Use this scale where 0 means “not at all concerned” and 10 means “extremely concerned”.

   [0 1 2 3 4 5 6 7 8 9 10]

4. Please describe one of the biggest or most important ways that your life has personally been affected by the current coronavirus pandemic.

Treatment Group – Community prime

1. To what extent has your local community been affected by the current coronavirus pandemic?
   Use this scale where 0 means “not at all affected” and 10 means “extremely affected”.

   [0 1 2 3 4 5 6 7 8 9 10]

2. How concerned are you about the financial impact of the current coronavirus pandemic on your local community, and its local economy, including local farmers and food retailers?
   Use this scale where 0 means “not at all concerned” and 10 means “extremely concerned”.

   [0 1 2 3 4 5 6 7 8 9 10]

3. How concerned are you about the health impact of the current coronavirus pandemic on your local community?
   Use this scale where 0 means “not at all concerned” and 10 means “extremely concerned”.

   [0 1 2 3 4 5 6 7 8 9 10]

4. Do you know of any businesses in your local community than had been forced to close because of the pandemic? Please describe one of the biggest or most important ways that your local community has been affected by the current coronavirus pandemic.

Outcome variables

[We measure the impact of the Covid-19 on preference for local food and donation to charity.]

5. In this survey we define "local", food that was grown, produced, or processed within 50 miles. Use this definition of local when answering the following questions. In the next few questions, we will ask you about your preferences about local and non-local fruit and vegetables.

    - If you were buying fruit or vegetables and you could choose at equal prices between local food produce and non-local produce, which one would you choose?

        Local produce (1)

        Non-local produce (2)

    - If instead the price of locally grown produce was [5%, 10%, 15%, 20%, 25%, 30%...] more expensive than non-local produce, which one would you choose?

        Local produce (1)

        Non-local produce (2)

    Or

    - If instead the price of locally grown produce was [5%, 10%, 15%, 20%, 25%, 30%...] less expensive than non-local produce, which one would you choose?

        Local produce (1)

        Non-local produce (2)

6. In this survey we define "local" as food that was grown, produced, or processed within 50 miles. Use this definition of local when answering the following questions. In the next few questions, we will ask you about your preferences about local and non-local meat and poultry.
    - If you were buying meat and poultry, and you could choose at equal prices between local food products and non-local products, which one would you choose?

        Local produce (1)

        Non-local produce (2)

    - If instead the price of locally grown animal products was [5%, 10%, 15%, 20%, 25%, 30%...] more expensive than non-local products, which one would you choose?

        Local produce (1)

        Non-local produce (2)

    Or

    - If instead the price of locally grown animal products was [5%, 10%, 15%, 20%, 25%, 30%...] less expensive than non-local products, which one would you choose?

Local produce (1)

Non-local produce (2)

7. **In the following part, you have the chance to receive $25 dollars**.

A randomized group of participants will be selected, at the end of the survey, to earn the additional points equivalent to $25. If you are selected, the additional point equivalent to $25 will be added to your account within 3 weeks.

If you are selected to receive the $25 bonus, you can also choose to donate part of it to charity. You can give any portion of the $25 bonus to three charitable organizations listed below or keep it for your own personal use. You will be paid the additional points equivalent to the amount you decide to keep. Please **think carefully about your choices:** you and the charitable organizations will be paid according to your choice if you are selected.
The three charitable organizations are:

1. **Farm Aid.** ***Their mission is to build a system of agriculture that values family farmers.*** From their website: "Farm Aid is best known for our annual music, food and farm festival, but the truth is we work each and every day, year-round to build a system of agriculture that values family farmers, good food, soil and water, and strong communities. *Our work celebrates and strengthens farmers, advocates for fair farm policies, connects farmers and eaters, and brings family farm food to everyone."*

2. **Farmers market coalition.** ***Their mission is strengthening farmers markets across the United States so that they can serve as community assets*****. From their website "Since the Farmers Market Coalition was founded in 2007, it has served as a resource and a guide to farmers markets across the United States. […] FMC has grown to be the only national organization advocating for and supporting the needs of farmers markets."**

3. **World central kitchen.** ***WCK is working across America to safely distribute individually packaged, fresh meals in communities that need support*** **– for children and families to pick up and take home, as well as delivery to seniors who cannot venture outside. From their website "Together, we can help each other get through this time, share our hope and positivity, and make sure everyone has access to fresh meals."**

In the sliders below, indicate the portion of the $25 bonus you want to allocate to each of the four options. To do so, simply drag the slider to the corresponding number.

The total of the four options must be 25!

Keep for myself *$0* _____ *$25*

Farm Aid *$0* _____ *$25*

Farmers market coalition *$0* _____ *$25*

World central kitchen *$0* _____ *$25*

Manipulation checks

8. How would you describe your sense of belonging to your local community?

   Very weak (1)
   Weak (2)
   Average (3)
   Strong (4)
   Very strong (5)

9. [State-Trait Anxiety Inventory (STAI) – Short form of the state scale (Marteau and Bekker, 1992)]
   A number of statements which people have used to describe themselves are given below. Read each statement and then select the most appropriate answer to the right of the statement to indicate **how you feel right now, at this moment.** There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.
   [Rating of each statement on 5-point scale: 1 = "not at all", 2 = "somewhat", 3 = "moderately", 4 = "very much"]

   1. *I feel calm*
   2. *I am tense*
   3. *I feel upset*
   4. *I am relaxed*
   5. *I feel content*
   6. *I am worried*

Background questions

10. Who is responsible for grocery shopping in your household?

    I am the only shopper (5)
    I am the primary shopper (4)
    I am the secondary shopper (3)
    I am rarely the shopper (2)
    I am never the shopper (1)

11. How often did your household purchase food in each of these venues? [Rating of each location on 6-point scale: 1= "never"; 2= "sometimes"; 3= "about half the time"; 4= "most of the time"; 5= "always"; 6= "do not know"]

1. *Supermarket*
2. *Specialty food store*
3. *Directly from producers / Community Supported Agriculture (CSA)/ Farmers markets*
4. *Convenience/ corner store*
5. *Health/ natural food store*

12. Did you increase the use of food delivery (at home or curbside) during the Covid pandemic? Please indicate to what extent you increased the use of delivery (at home or curbside) during the Covid pandemic.

Not at all (1)
To a small extent (2)
To some extent (3)
To a moderate extent (4)
To a great extent (5)
I only use delivery (6)

13. Approximately what percentage of the food you purchased last month was local?
Please give your best guess on the percentage of food that was local.

0% _____ *100%*

14. In the next few questions, we will ask you about your personal motives for buying local food. We ask you to indicate your level of agreement or disagreement with each of the following statements.
[Rating of each statement on 5-point scale: 1 = “strongly disagree”, 2 = “disagree”, 3 =neutral, 4= “agree”, 5 = “strongly disagree”]

1) *I purchase local food since it is better for the local economy than purchasing food produced farther away.*
2) *I purchase local food since it is safer to eat than purchasing food produced farther away.*
3) *I purchase local food since it is better for the environment than purchasing food produced farther away.*
4) *I purchase local food since it is fresher than food produced farther away.*
5) *I purchase local food since it tastes better than food produced farther away.*
6) *Support of local economy is important when buying food.*

15. In this study, we define as local food that was grown, produced, or processed within 100 (30-50?) miles. We here ask you about your personal definition of local food. How would you define local food? Select all that apply.
Local food is ...

Grown by farmer I know (1)
Purchased at a local farm stand or at a locally owned and operated food store (2)
Grown in my county (3)
Grown in my state (4)
Grown in the United States (5)

16. [Altruism] How do you assess your willingness to share with others without expecting anything in return when it comes to charity? Please use a scale from 0 to 10, where 0 means you are "completely unwilling to share" and a 10 means you are "very willing to share". You can also use the values in between to indicate where you fall on the scale.

    [completely unwilling to share] 0 1 2 3 4 5 6 7 8 9 10 [very willing to share]

17. Which of the following statements best describes your approach to charitable giving?

    I regularly give a substantial portion of my income to charities of my choice. (6)
    I regularly give a moderate portion of my income to charities of my choice. (5)
    I regularly give a small portion of my income to charities of my choice. (4)
    I sometimes give to charities of my choice, but not on a regular basis. (3)
    I rarely give to charities. (2)
    I never give to charities. (1)

18. Were you already familiar with any of the three charities listed above? Select all that apply.

    Farm aid (1)
    Farmers market coalition (2)
    World Central Kitchen (3)

19. Did you yourself get infected with COVID-19?

    Yes no

20. Did anyone in your family or close circle of friends get infected with COVID-19?

    Yes no

21. Did you lose your job or were your work hours reduced because of the pandemic?

    Yes no

22. Did anyone in your family or close circle of friends lose their job because of the pandemic?

    Yes no

23. What is your year of birth?

    _____

24. To which gender identity do you most identify?

Male (1)
Female (2)
Transgender (3)
Other (4)
Prefer not to say (5)

25. In What state or U.S. territory do you live?

[List of the states]

26. Which of the following best describes the area you live in?

Urban (1)
Suburban (2)
Rural (3)

27. What is the highest degree or level of school you have completed?

High school graduate or less (1)
Some college (2)
Technical degree (2-year college) (3)
4-year college degree (4)
Postgraduate studies (e.g. MBA, PhD) (5)

28. What is your marital status?

Single, never married (1)
Living with partner (2)
Married (3)
Widowed (4)
Separated or divorced (5)

29. How many people are living or staying at your current address? Insert a number. Include yourself and any other adults or children who are currently living or staying at this address for at least two months.

_____

30. How many children under the age of 18 are living in your household? Insert a number.

_____

31. Are you of Hispanic, Latino, or Spanish origin?

No, not of Hispanic, Latino, or Spanish origin (1)
Yes, Mexican, Mexican Am., Chicano (2)
Yes, Puerto Rican (3)
Yes, Cuban (4)

Yes, another Hispanic, Latino, or Spanish origin – Print, for example, Salvadoran, Dominican, Colombian, etc (5)

_____

Prefer not to say (9)

32. Choose one or more races that you consider yourself to be:

White (1)
Black or African American (2)
American Indian or Alaska Native (3)
Asian (4)
Native Hawaiian or Pacific Islander (5)
Other (6) _____
Prefer not to say (7)

33. Which statement best describes your current employment status?

Employed full-time (1)
Employed part-time (2)
Self-employed (3)
Unemployed (0)
Full-time parent, homemaker (10)
Retired (11)
Not working (unable to work) (12)
Student (13)

34. [if works/ if retired] Please indicate which category best describes your occupation/ Please indicate your past occupation:

Management, professional, and related (1)
Service (2)
Sales and office (3)
Farming, fishing, and forestry (4)
Construction, extraction, and maintenance (5)
Production, transportation, and material moving (6)
Government (7)
Education (10)
Health care (11)
Other (12) _____

35. Please indicate your annual household income in 2019 before taxes. Please give your best guess, if unsure.

Under $ 24,999 (1)
$25,000 to $49,999 (4)

$50,000 to $74,999 (5)
$75,000 to $99,999 (6)
$100,000 to $104,999 (7)
$125,000 to $149,999 (8)
$150,000 to $174,999 (9)
$175,000 and over (10)

36. Generally speaking, do you usually think of yourself as:

Republican (1)
Democrat (2)
Independent (3)
Other (4) _____
No preference (5)

37. [Nationalism] Should your country's leaders give priority to solving global problems or should they give priority to solving your country's problems?
Use this scale where 0 means "absolute priority to solving global problems" and 10 means "absolute priority to solving my country's problems."

[0 1 2 3 4 5 6 7 8 9 10]

End of Survey Message

[If not selected for the donation] Thanks for participating to our study!
We regret to inform you that you were not selected in the lottery for the $25 allocation.

[If selected for the donation] Thanks for participating in our study.

We are happy to inform you that you were selected in the lottery for the $25 bonus!

We will donate $ {donation amount} to "Farm Aid", {donation amount} to "Farmers Market Coalition" and $ {donation amount} to "World Central Kitchen". You will be paid points equivalent to $ {kept amount} to your account in the next 3 weeks.

D.2 Full survey associated with chapter 2

(We have one control group: no information treatment and three information treatment groups: (i) food miles; (ii) pesticide residues; and (iii) food miles and pesticide residues. All contexts will be translated into Mandarin)

Welcome, and thank you for participating in this study! Your participation will be very helpful and important for research use.

This study is conducted by university researchers from Penn State University in the U.S. and National Chung Hsing University to help inform food policy. Please be assured that your responses are completely anonymous and no personally identifiable information is needed. Only statistical summaries will be used in reports. The experiment will last around 15 minutes, and you can withdraw from the experiment at any time if you don't feel comfortable. You will receive NTD 200 for your participation and use part of it to buy potatoes. In this study, we will ask whether you would buy four different potatoes with different prices and give you a short survey about yourself. After that, we will play a game with you about buying potatoes. Please do not communicate with any other participants while you are in this experiment.

To start the experiment and participate, please tick "yes".

Yes	No
☐	☐

To make the information from this research the most helpful, it is important that you try to be as accurate, complete, and honest as possible with your answers. Are you willing to do this?

Yes, I agree	No, but I will proceed anyway
☐	☐

If you have any questions about this experiment or its outcomes, please contact Chiu-Lin Huang at cph5592@psu.edu or phone number: 0963096537

Thank you very much for your help with this project.

Please carefully read the following instructions before proceeding and do not communicate with others while you are making your decisions

In the following, all potatoes have similar features and are the same weight (0.6 kilograms per bag) except that they vary regarding their origin and production method. We will give you NTD 200 that you may use to purchase potatoes in this study. In this survey, you would either say “yes” or “no” to buying four different potatoes at the listed price. **Depending on the choices you made in the survey, you will receive a combination of cash and a bag of potatoes.**

Guidelines for this study:

1. Decide whether you would buy four different types of potatoes at different prices.
2. Fill out a short survey.
3. Play a game with us. Randomly pick one of the four types of potatoes offered to you in stage 1 from a box containing all four types of potatoes available for purchase. Then pick one price as the selling price from another box containing all the prices shown in stage 1, except for "$0”, since potatoes still need to be bought with money! If in the survey you said "yes" to purchasing the selected type of potatoes at the selected price, then you do acquire the potatoes by paying the selling price; if you said "no" to purchasing the selected type of potatoes at the selected price, then there will be no transaction. The decisions you make in the survey are just like the decisions you would make when you are shopping.

Example 1: You draw “potato A” and draw the price “NTD 50”. If in the survey, you said “yes” to purchasing potato A at NTD 50, then, you would receive the bag of potato A and NTD 150 in cash (NTD 200- NTD 50 = NTD 150).

Example 2: You draw “potato B” and draw the price “NTD 80”. If in the survey, you said “no” to purchasing potato B at NTD 80, then, you would receive no potatoes and NTD 200 in cash.

For you, just make an intuitive judgment as you make decisions while you are shopping.

If you have any further questions, please let us know now; if you don’t have any questions, please go to the next page.

Part I: Say YES or NO to purchasing potatoes with different prices

First, we would like to give you an example of how to state whether you would buy potato A with different prices. From top to bottom, you will face potato A with increasing prices**. Please determine whether you would buy this item or not in sequential priced order and go through all prices carefully**. If you would buy potato A priced from 0 to 80, say "yes" for the prices from 0 to 80; if you don't want to buy potato A priced from 85 to 130, say "no" for prices from 85 to 130. **Please mark your answers like the example below. Note that you will have to do the following for four different types of potatoes, and please consider each type of potatoes separately. Since only one type of potatoes will be selected in the game of purchase, you will not be asked to purchase more than one type of potatoes.**

Potato A		
Priced	Yes	No
$0		
$5		
$10		
$15		
$20		
$25		
$30		
$35		
$40		
$45		
$50		
$55		
$60		
$65		
$70		
$75		
$80		
$85		
$90		
$95		
$100		
$105		
$110		
$115		
$120		
$125		
$130		

In this survey, we define “local potatoes” as potatoes grown in Taiwan; “imported potatoes” as potatoes grown outside Taiwan; and organic potatoes as potatoes certified by the Taiwanese government. Use the definitions when answering the following questions.

Before you proceed with this section, we would like to give you some information about potatoes to help you make the decisions:

(For the first information treatment: food miles)
Imported food, whether it is organic or not, is packed, refrigerated, and shipped with long distancing. For example, local potatoes in Taiwan travel less than 180 kilometers (115 miles), but the imported potatoes, mainly from the U.S., Denmark, and the Netherlands, travel over 10,200 kilometers (6324 miles) on average before they are consumed[13]. It costs more fossil fuels than for local food, and it could bring a burden on the environment[14].

(For the second information treatment: pesticide residues)
A 2020 inspection report of the Agricultural Drugs and Toxic Test Institute of the Agricultural Committee of the Executive Yuan indicates that 617 root vegetables (including carrots, onions, potatoes, radishes, sweet potatoes, and jicama, etc.) were randomly tested. 83 of them contained pesticide and fungicide residues, including 8 insecticides, 4 fungicides, one nematicide, and one growth regulator. Intaking these chemicals might increase the risk on health[15]. According to agricultural regulations, organic food produced in Taiwan is required to have zero pesticide residue[16].

(For the third information treatment: food miles and pesticide residues)
Imported food, whether it is organic or not, is packed, refrigerated, and shipped with long distancing. For example, local potatoes in Taiwan travel less than 180 kilometers (115 miles), but the imported potatoes, mainly from the U.S., Denmark, and the Netherlands, travel over 10,200 kilometers (6324 miles) on average before they are consumed. It costs more fossil fuels than for local food, and it could bring a burden on the environment.

A 2020 inspection report of the Agricultural Drugs and Toxic Test Institute of the Agricultural Committee of the Executive Yuan indicates that 617 root vegetables (including carrots, onions, potatoes, radishes, sweet potatoes, and jicama, etc.) were randomly tested. 83 of them contained pesticide and fungicide residues, including 8 insecticides, 4 fungicides, one nematicide, and one growth regulator. Intaking these chemicals might increase the risk

[13] Data from Council of Agriculture, Executive Yuan.

[14] Grebitus, C., Lusk, J. L., and Nayga, R. M. (2013). Effect of distance of transportation on willingness to pay for food. Ecological Economics, 88, 67.

[15] Chiu, Y. H., Williams, P. L., Mínguez-Alarcón, L., Gillman, M., Sun, Q., Ospina, M., Calafat, A. M., Hauser, R., & Chavarro, J. E. (2018). Comparison of questionnaire-based estimation of pesticide residue intake from fruits and vegetables with urinary concentrations of pesticide biomarkers. Journal of exposure science & environmental epidemiology, 28(1), 31–39.

[16] Data from Council of Agriculture, Executive Yuan.

on health. According to agricultural regulations, organic food produced in Taiwan is required to have zero pesticide residue.

Would you buy each type of potatoes at different prices, from $0 to $130? If you would buy each type of potatoes at the listed price, please mark the “yes” box; If you don’t want to buy the potatoes at the listed price, please mark the “no” box. All potatoes are the same weight: 0.6 kilograms per bag. Please make the decisions for each type of potato separately.

Local organic			Local non-organic			Imported organic			Imported non-organic		
Priced	Yes	No	Priced	Yes	No	Priced	Yes	No	Priced	Yes	No
$0			$0			$0			$0		
$5			$5			$5			$5		
$10			$10			$10			$10		
$15			$15			$15			$15		
$20			$20			$20			$20		
$25			$25			$25			$25		
$30			$30			$30			$30		
$35			$35			$35			$35		
$40			$40			$40			$40		
$45			$45			$45			$45		
$50			$50			$50			$50		
$55			$55			$55			$55		
$60			$60			$60			$60		
$65			$65			$65			$65		
$70			$70			$70			$70		
$75			$75			$75			$75		
$80			$80			$80			$80		
$85			$85			$85			$85		
$90			$90			$90			$90		
$95			$95			$95			$95		
$100			$100			$100			$100		
$105			$105			$105			$105		
$110			$110			$110			$110		
$115			$115			$115			$115		
$120			$120			$120			$120		
$125			$125			$125			$125		
$130			$130			$130			$130		

(We will also randomize the labels and the prices to avoid the order effect. There are eight different versions of the table in total)

Part II: In this section, we would ask you to indicate your personal experiences with food and agricultural information.

1. Did you already know the information, the words in bold on the last page, before this experiment?

Yes ☐ No ☐

2. How important is the source of food and agricultural information to you? Use the scale where 1 means the source is not important for you at all and 10 means the source is very important for you.

The sources of information:	**The level of importance (use a scale from 1 to 10)**
From television, such as TV news and shows	
From hardcopy, such as newspapers, magazines, and agricultural-related books	
From schools or public sector agencies	
From search browsers, such as Google/Firefox/Safari	
From social media, such as Facebook/Instagram/Twitter/Youtube/blogs/podcast	
From friends or family	
Others, such as_____ (If applicable)	

3. Do you love to seek out information on food and food issues? Use the scale where 1 means you "do not love it at all" and 10 means you "love it very much".

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

Now we are going to ask you to answer a few questions about your agreement or disagreement with each of the following statements.

4. Conventional produce that is sprayed with pesticides during cultivation must contain pesticide residues on it when we buy it.

Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree ☐

5. Organic produce can be sprayed with a small amount of chemical fertilizers and pesticides on it during cultivation, but the residues must not be detected when they are sold.

Strongly disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly agree ☐

6. Vegetables and fruits that have been bitten by insects mean that pesticides have not been applied during cultivation.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
☐	☐	☐	☐	☐

7. The regulations of pesticide residues on organic produce are more restricted in the U.S., Europe, and Japan than in Taiwan.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
☐	☐	☐	☐	☐

8. Pesticide residues on produce are at a safe level if they meet the standards set by the government.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
☐	☐	☐	☐	☐

Now, we are going to ask about your preferences when you are purchasing, please rank your preferences in order.

9. Assuming the prices and appearances are the same, what origin would you prefer when you are purchasing produce? **Please rank your preferences. Mark 1 means you are most inclined to choose this origin of the produce, mark 4 means you are least inclined to choose this origin of the produce.**

U.S.	Europe	Japan	Taiwan
☐	☐	☐	☐

10. What is your concern(s) when you are purchasing produce? **Rank your care level on different statements. Mark 1 means you care about this statement the most, mark 10 means you care about this statement the least.**

When I am choosing the produce, I care about _____.	**The rank of your care level (use 1-10 to rank your care level):**
The price of the produce	
The appearance/taste/freshness of the produce	
The food safety of the produce	
The health benefits of the produce	
The convenience to acquire the produce	
The produce causes fewer carbon emissions	
The produce causes less harm to farmland	

The producers could get a better profit	
The produce could enhance the local culture	
The produce is better for the local economy	

11. In this study, we define "local food" as food grown in Taiwan. Now, we ask you about your personal definition of local food. How would you define local food? Local food is... (Please tick the best description)

☐ Grown in my county/city

☐ Grown in my region, such as northern Taiwan, central Taiwan, southern Taiwan, or eastern Taiwan

☐ Grown in Taiwan

☐ Grown in Asia

Now, we are going to ask some questions about your living habits.

12. Who is responsible for grocery shopping in your household?

I am the only shopper	I am the primary shopper	I am the secondary shopper	I am rarely the shopper	I am never the shopper
☐	☐	☐	☐	☐

13. How often did your household purchase produce from these locations in the past month?

Locations:	**Frequency:**				
Traditional markets	Never ☐	Rairly ☐	Sometimes ☐	Often ☐	Always ☐
Supermarkets	Never ☐	Rairly ☐	Sometimes ☐	Often ☐	Always ☐
Directly from producers: Farmers' markets/ Farms/Community supported agriculture, Farmers' online purchase website, etc.	Never ☐	Rairly ☐	Sometimes ☐	Often ☐	Always ☐
Organic food stores	Never ☐	Rairly ☐	Sometimes ☐	Often ☐	Always ☐
Others, such as:_____	Never ☐	Rairly ☐	Sometimes ☐	Often ☐	Always ☐

If you do not know, please tick here: ☐

14. I use reusable containers/utensils/bags when I buy food/beverage outside.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
☐	☐	☐	☐	☐

15. I prefer to walk/ride a bike/take public transportation anywhere instead of motorcycling or driving a car.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
☐	☐	☐	☐	☐

16. I participate in/donate to environmental organizations.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
☐	☐	☐	☐	☐

17. I try to reduce the amount of meat I eat every day.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
☐	☐	☐	☐	☐

18. During the summer, I set the AC temperature to no lower than 26°C (78.8°F).

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
☐	☐	☐	☐	☐

For the following, we ask you about your demographic information.

19. What is your gender?

Female	Male	Other
☐	☐	☐

20. How old are you?

_____years old

21. What city/county do you live in? What's the zip code?

_____

22. What do you think about the area you live in? Is it urban, suburban, or rural?

Urban	Suburban	Rural
☐	☐	☐

23. How many people live in your household, including yourself?

_____

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

High school graduate or less	Technical degree (2-year college)	4-year college degree	Postgraduate studies (Master's degree/Ph.D.)
☐	☐	☐	☐

25. Please indicate your approximate **monthly household income**:

Less than 30,000	30,001-50,000	50,001-70,000	70,001-90,000	90,000-110,000	More than 110,000
☐	☐	☐	☐	☐	☐

26. Do you have children? If so, how many children do you have?

Yes	No
I have _____ children.	☐

Thank you so much for your time spent taking this survey.

Please submit this survey to the investigator and go through the compensation process!

D.3 Full survey associated with chapter 3

Welcome, and thank you for participating in this study! Your participation will be extremely valuable and important for research purposes.

This study, conducted by researchers from Penn State University and the USDA, aims to help inform food policy. To protect your privacy, your responses will be completely anonymous. The experiment takes around 15 minutes, and you can withdraw at any time if you don't feel comfortable. After finishing the survey, you'll receive a $10 grocery gift card as a participation fee and an additional $15 in cash for a purchasing game, where you might buy a bag of potato chips using part of the cash. In this study, we will ask you how much you're willing to pay for buying different potato chips and have you complete a short survey about yourself. Following that, we will play a game with you about buying potato chips. Please avoid communicating with other participants during the experiment.

To begin the experiment and participate, please click "Yes".

- ○ Yes
- ○ No

To make the information from this research the most helpful, it is important that you try to be as accurate, complete, and honest as possible with your answers. Are you willing to do this?

- ○ Yes, I agree
- ○ No, but I will proceed anyway

If you have any questions about this experiment or its outcomes, please contact
Edward Jaenicke at tjaenicke@psu.edu
Thank you very much for your help with this project!

Please read these instructions carefully and do not talk to others during the study.

In this study, all chips have the same flavor and approximately the same weight (Kettle cooked original potato Chips, 8.0oz per bag). You will receive a $10 grocery gift card for your participation. Additionally, we'll provide you with $15 in cash that you can use to buy potato chips in this study. You will state the most you would like to pay for two types of potato chips: local and non-local ones. Depending on the choices you make in the survey, you will receive a gift card and cash or a mix of a gift card, cash, and a bag of potato chips.

Guidelines for this study:

1. Decide the most you are willing to pay for each of two different types of potato chips.

2. Fill out a short survey.

3. Play a drawing-like game with us, in which you will pick a ball from two separate boxes. One box contains two balls marked with "local" and "non-local," representing the potato chip types. The other box contains balls marked with selling prices ranging between $0.50 and $15, in increments of 50 cents. If, in stage 1, you indicated that the most you are willing to pay for the selected chip type is equal to or higher than the picked price, then you will buy the chips at the picked price; otherwise, no transaction occurs.

Since only one potato chip type will be selected in the game of purchase, you will not be asked to buy more than one type of potato chips.

Here is an example of playing the game:

Remember, you have a $10 grocery gift card for your participation and an additional $15 in cash for chip-buying game.

Example: Let's say you draw "local potato chips" and the price "$2." If in the survey, you indicated that the most you are willing to pay for the "local potato chips" is $10, then at the end, you will receive:

Since you indicated that the most you are willing to pay for selected chip type “local potato chips” is $10, which is higher than the picked price “$2”, you will buy the “local potato chips” at the picked price of “$2” leaving the remaining cash as $13 ($15 - $2 = $13). You will also receive a $10 grocery gift card as a participation fee.

In short, you would end up with three items:
1. A $10 grocery gift card
2. A bag of local potato chips
3. $13 in cash

To make sure you understand the game, please answer the questions for the following scenarios:

Scenario 1: Let's say you draw "local potato chips" and the price "$5." If in the survey, you indicated that the most you are willing to pay for the "local potato chips" is $7, then what would you receive at the end?

- ○ Receive a $10 grocery gift card, a bag of non-local potato chips, and $10 cash
- ○ Receive a $10 grocery gift card, a bag of local potato chips, and $8 cash
- ○ Receive a $10 grocery gift card, a bag of local potato chips, and $10 cash
- ○ Receive a $10 grocery gift card and $15 cash

Display This Question:

If Scenario 1: Let's say you draw "local potato chips" and the price "$5." If in the survey, you ind... = Receive a $10 grocery gift card, a bag of local potato chips, and $10 cash

Awesome! Your answer is correct!

Display This Question:

If Scenario 1: Let's say you draw "local potato chips" and the price "$5." If in the survey, you ind... != Receive a $10 grocery gift card, a bag of local potato chips, and $10 cash

Sorry, your answer is incorrect.

In scenario 1, you draw “local potato chips” and draw the price “$5”. If in the survey, you indicated that the most you are willing to pay for the "local potato chips" is $7, then, you will receive a $10 grocery gift card, a bag of local potato chips, and the remaining $10 in cash from the game ($15 - $5 = $10).

If it is not clear, please just ask our people to make sure you fully understand the game!

Display This Question:

If Scenario 1: Let's say you draw "local potato chips" and the price "$5." If in the survey, you ind... != Receive a $10 grocery gift card, a bag of local potato chips, and $10 cash

Please click the right answer again:
Scenario 1: Let's say you draw "local potato chips" and the price "$5." If in the survey, you indicated that the most you are willing to pay for the "local potato chips" is $7, then what would you receive at the end?

- Receive a $10 grocery gift card, a bag of non-local potato chips, and $10 cash
- Receive a $10 grocery gift card, a bag of local potato chips, and $8 cash
- Receive a $10 grocery gift card, a bag of local potato chips, and $10 cash
- Receive a $10 grocery gift card and $15 cash

Scenario 2: Let's say you draw “non-local potato chips" and draw the price “$6”. If in the survey, you indicated that the most you are willing to pay for the "non-local potato chips" is $5, then what would you receive at the end?

- Receive a $10 grocery gift card, a bag of non-local potato chips, and $9 cash
- Receive a $10 grocery gift card, a bag of non-local potato chips, and $10 cash
- Receive a $10 grocery gift card, a bag of local potato chips, and $10 cash
- Receive a $10 grocery gift card and $15 cash

Display This Question:

If Scenario 2: Let's say you draw “non-local potato chips" and draw the price “$6”. If in the survey... = Receive a $10 grocery gift card and $15 cash

Awesome! Your answer is correct!

Display This Question:

If Scenario 2: Let's say you draw “non-local potato chips" and draw the price “$6”. If in the survey... != Receive a $10 grocery gift card and $15 cash

Sorry, your answer is incorrect.

In scenario 2, you draw “non-local potato chips” and draw the price “$6”. If in the survey, you indicated that the most you are willing to pay for the "non-local potato chips" is $5, then, you would not buy the chips since the drawn price is higher than the most you are willing to pay. You would receive the $10 grocery gift card and $15 in cash.

If it is not clear, please just ask our people to make sure you fully understand the game!

Display This Question:

If Scenario 2: Let's say you draw “non-local potato chips" and draw the price “$6”. If in the survey... != Receive a $10 grocery gift card and $15 cash

*

Please click the right answer and make sure you fully understand the rules of the game.

Scenario 2: Let's say you draw “non-local potato chips" and draw the price “$6”. If in the survey, you indicated that the most you are willing to pay for the "non-local potato chips" is $5, then what would you receive at the end?

- ○ Receive a $10 grocery gift card, a bag of non-local potato chips, and $9 cash
- ○ Receive a $10 grocery gift card, a bag of non-local potato chips, and $10 cash
- ○ Receive a $10 grocery gift card, a bag of local potato chips, and $10 cash
- ○ Receive a $10 grocery gift card and $15 cash

The decisions you make in the survey are just like the decisions you would make while shopping. If you have any further questions, please let us know now. If you don't have any questions, proceed to the next page.

In this survey, we define "local potato chips" as chips produced in Pennsylvania and “non-local potato chips” as chips produced outside Pennsylvania. Please use the definitions when answering the following questions.

In this study, we define "local potato chips" as:

- ○ Potato chips produced in your county
- ○ Potato chips produced in Pennsylvania
- ○ Potato chips produced in U.S.
- ○ Potato chips primarily sold in your county
- ○ Potato chips primarily sold in Pennsylvania
- ○ Potato chips primarily sold in U.S.

How much would you pay for a bag, containing 8 ounces, of both local and non-local potato chips?

In Dollars

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

The most I am willing to pay for a bag of local potato chips	
The most I am willing to pay for a bag of non-local potato chips	

In this survey, we define "local potato chips" as chips primarily sold in Pennsylvania, meaning more than 50% of its sales are in Pennsylvania; "non-local potato chips" as chips not primarily sold in Pennsylvania, meaning more than 50% of its sales are outside Pennsylvania. Please use the definitions when answering the following questions.

*

In this study, we define "local potato chips" as:

- ○ Potato chips produced in your county
- ○ Potato chips produced in Pennsylvania
- ○ Potato chips produced in U.S.
- ○ Potato chips primarily sold in your county
- ○ Potato chips primarily sold in Pennsylvania
- ○ Potato chips primarily sold in U.S.

How much would you pay for a bag, containing 8 ounces, of both local and non-local potato chips?

In Dollars

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

The most I am willing to pay for a bag of local potato chips	
The most I am willing to pay for a bag of non-local potato chips	

How frequently do you purchase potato chips?

- ○ Once a week
- ○ Once every two weeks
- ○ Once a month
- ○ Once every three months
- ○ Once every six months
- ○ Once a year
- ○ I have not bought potato chips in the past year

Who typically does the grocery shopping in your household?

- ○ I am the only shopper
- ○ I am the primary shopper
- ○ I am the secondary shopper
- ○ I am rarely the shopper
- ○ I am never the shopper

How frequently do you purchase food directly from farmers or visit farmers' markets?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ Always

Are you personally acquainted with any farmers?

- ○ Yes, I am a farmer myself.
- ○ Yes, at least one of my parents is a farmer.
- ○ Yes, at least one of my family members is a farmer.
- ○ Yes, at least one of my friends is a farmer.
- ○ No, I don't know any farmers.

In our study, we have a definition of "local." How about you? How do you define "local food"? Please answer a few questions about your personal definition.

In your personal definition of "local", which of the following criteria do you think should be considered for food to be classified as "local" ? Please select the option that best reflects your definition.

- ○ Local food is produced within a specific region.
- ○ Local food is primarily sold within a specific region.
- ○ Both options mentioned above should be considered.
- ○ Neither of the options above; I think "local" is: _____

Display This Question:

If In your personal definition of "local", which of the following criteria do you think should be co... = Local food is produced within a specific region.

Or In your personal definition of "local", which of the following criteria do you think should be co... = Local food is primarily sold within a specific region.

Or In your personal definition of "local", which of the following criteria do you think should be co... = Both options mentioned above should be considered.

Compared to the state boundary of Pennsylvania, would you say your definition of "local" is narrower or broader?

- ○ Narrower than the Pennsylvania state boundary
- ○ Same as the Pennsylvania state boundary
- ○ Broader than the Pennsylvania state boundary

Display This Question:

If Compared to the state boundary of Pennsylvania, would you say your definition of "local" is narro... = Narrower than the Pennsylvania state boundary

Since your definition of "local" is narrower than the Pennsylvania state boundary, which of these options best describes the area you consider as "local"?

- ○ Within my county
- ○ Within a specific region, please specify:

_____

Display This Question:

If Compared to the state boundary of Pennsylvania, would you say your definition of "local" is narro... = Broader than the Pennsylvania state boundary

Since your definition of "local" is broader than the Pennsylvania state boundary, which of these options best describes the area you consider as "local"?

- ○ Within Pennsylvania and its neighboring states
- ○ Within the entire United States
- ○ Other, please specify: _____

Local food promotes environmental sustainability by reducing food miles and greenhouse gas emissions compared to non-local food.

- ○ 0
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
- ○ 9
- ○ 10

Local food generally tastes better than non-local food.

- ○ 0
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
- ○ 9
- ○ 10

Local food tends to have higher nutritional value compared to non-local food.

- ○ 0
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
- ○ 9
- ○ 10

Local food is typically fresher than non-local food.

- ○ 0
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
- ○ 9
- ○ 10

Overall, local food is usually less expensive than non-local food.

- ○ 0
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
- ○ 9
- ○ 10

I tend to have a stronger emotional connection to local food than to non-local food.

- ○ 0
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
- ○ 9
- ○ 10

How important is it for you to know where your food comes from?

- ○ 0
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ 8
- ○ 9
- ○ 10

Which brand of eggs did you purchase the last time you bought eggs?

- ○ GIANT or other store brand
- ○ Nature's Promise
- ○ Eggland's Best
- ○ Nellie's
- ○ Pete and Gerry's
- ○ Another brand, such as: _____
- ○ I don't know the brand of eggs I purchased last time
- ○ I do not buy eggs

Display This Question:

If Which brand of eggs did you purchase the last time you bought eggs? != I do not buy eggs

And Which brand of eggs did you purchase the last time you bought eggs? != I don't know the brand of eggs I purchased last time

Based on your definition of local, do you think the eggs you most recently bought are local?

- ○ Yes
- ○ No

What is your gender?

- ○ Female
- ○ Male
- ○ Other

*

How old are you?

_____

Are you of Spanish, Hispanic, or Latino origin?

- Yes
- No
- Prefer not to say

Display This Question:

If Are you of Spanish, Hispanic, or Latino origin? = No

Choose one or more races that you consider yourself to be

- White or Caucasian
- Black or African American
- American Indian/Native American or Alaska Native
- Asian
- Native Hawaiian or Other Pacific Islander
- Other
- Prefer not to say

What is the highest level of education you have completed?

- ○ High school graduate or less
- ○ Some college
- ○ Technical degree (2-year college)
- ○ 4-year college degree
- ○ Postgraduate studies (e.g. MBA, Ph.D.)

How many people live in your household, including yourself?

_____

Please indicate your annual household income in 2022 before taxes. Please give your best guess, if unsure.

- ○ Under $ 10,000
- ○ $10,000 to $11,999
- ○ $12,000 to $14,999
- ○ $15,000 to $19,999
- ○ $20,000 to $24,999
- ○ $25,000 to $34,999
- ○ $35,000 to $44,999
- ○ $45,000 to $49,999
- ○ $50,000 to $59,999
- ○ $60,000 to $69,999
- ○ $70,000 to $99,999
- ○ $100,000 and over

What is your US Zip Code?

_____

What is your postal address?

Street address:

_____

City:

_____

State:

▼ Alabama ... I do not reside in the United States

What do you think about the area you live in? Is it urban, suburban, or rural?

- ○ Urban
- ○ Suburban
- ○ Rural

Thank you so much for your time! You have completed the survey!
Please do not close this window! Pass the device back to our experimenter, and we will assist you with the compensation process. Thank you again!

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