"Consumers' Valuation for Generic Food Miles Labeling Programs: Implications for Local Foods"

2010 NAREA Workshop: "The Economics Of Local Food Markets"
June 15-16

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Presentation outline

- Introduction
  - ✓Baseline scenario
  - ✓Local food
  - ✓Food miles
- Objective of our study
- Methodology: Choice experiment modeling
  - ✓Product, attributes, and levels attribute
  - ✓Experimental design
- Sample selection
- Estimation data
  - ✓MNL
  - ✓RPL
  - ✓EC
- Results
- Conclusion and Implications

Baseline Scenario:

(i) Expansion of international food trade has significantly increased the transportation of food products around the world with negative impacts on the environment.

(ii) The globalization of food market led to the situation where information on where the food comes from and information about the social and environmental impacts associated with production and transportation of food are less visible to consumers.

(iii) This trend has prompted many consumers to question the environmental and social sustainability of their food choice.

- Food safety and environmental issues as well as ethical motivations related to food production and processing are some of the reasons that concern consumers (Umberger *et al.* 2008).

(iv) As a consequence, demand for alternative foods, such as local food, is increasing dramatically in both the US and Europe.

Local Food…

The current issues related to the local food movement are based on two important questions:

(i) what does the term local food mean

(ii) how do consumers perceive and qualify local products.

(i) The definition of local food is controversial since this notion means many things to many people, even if it is usually associated with a geographical area (Grown within a county, grown within a State, etc)

(ii) Consumers' perceptions of local food is commonly linked with quality aspects of food products.

- Consumers perceive local food as more natural, fresh, healthy and safer than global food (Hein *et al*. 2006; Winter, 2003; Murdoch *et al*. 2000) as well as a way to support the economy of local farming (Lockie, 2001);

- From an environmental point of view, local foods can be seen as a more sustainable product (Seyfang, 2003), especially in relation to reducing *"food miles"*, which is the distance food travels from the time it was produced until it reaches the consumers (Paxton, 1994).

“Food Miles” concept…

Food miles is now becoming a concept of interest to consumers, producers, retailers, and policy makers.

(ii) Several studies focused on *food miles* have been undertaken in recent years in an attempt to calculate the distance travelled by selected food products or the environmental impacts in term of greenhouse emission of food transportation (Smith et al., 2005; Pretty et al., 2005; Weber and Mattehews, 2008). A number of studies have also compared the different environmental costs between imported and locally grown products (Pirog et al., 2001; Jones, 2002).

(iii) There is also increasing discussion about the use of food miles as a quality cue of food products, in both the global and local markets (Pirog, 2005; Aoki, 2009)

Food miles as a quality cue of a food product...

(i) The introduction of food miles as an eco-label might be an instrument to inform consumers about the environmental impact and the distance of the food they eat travelled.

(ii) A labeling scheme on food miles could separately provide two types of information: one refers to the amount of CO2 emission from the transportation, providing consumers information that can reflect the energy and ecological costs of food transportation, and the other one is related to the distance and time the food travelled, informing consumers about the amount of travel the products have made.

Based on this scenario, we investigated if American consumers are interesting to receive information on food miles, by using two different type of food miles labels.

OBJECTIVES of our study

H1: the presence of food miles labelling influences consumers choice;

H2: this influence differs with regard to the different type of food miles labels presented;

H3: Consumers are willing to pay a price premium for food miles labels;

H4: consumers WTP differs with regard to the different type of food miles label used;

METODOLOGY: Choice Experiment Approach

As Conjoint Valuation , CE is a Stated Preference method based on a household survey.

1. **It is consistent with random utility theory (McFadden, 1974) and Lancaster theory of consumer demand (Lancaster, 1966), which assume that:**

- ✓ Utility of a good can be segregate in utilities of different attributes of product;
- ✓ Individuals make choices that maximize their utility;

2. During the CE survey individuals are asked to choose their preferred alternative amongst hypothetical scenarios:

- Each scenario is a function of different attributes of product (including price);
- Each attribute varies at different levels.

Advantages and Limitation of CE

Advantages :

- Allowing to value different types of attributes of the products simultaneously;
- Trade-off among different attributes that often have to be evaluate in actual purchasing decision;
- In CE is easier to add additional quality attributes than in Conjoint Valuation (CV) or Experimental Action (EA) approaches;

Limitation:

- Potential presence of Hypothetical bias

Cheap Talk

Is an ex – ante alternative method to reduce hypothetical bias. “Cheap talk” script explains the problem of hypothetical bias to study participants prior to administration of a hypothetical question. The premise behind this technique is that one might be able to reduce or eliminate by simply making respondents aware of it regardless of its underlying cause.

(I)The first step of setting up a choice experiment: Definition of product, attributes, and levels attributes

Fresh Tomato Attributes	Levels
Price	
	1.10$
	2.10$
	3.10$
	4.10$
Production Method	Organic
	Conventional
Food miles label	Nmiles
	CO2
	No food miles label
Type of fresh tomato	Cherry
	Plum
	Brief

(II)Second step of setting up a choice experiment:
Generating experimental designs: fractional Orthogonal design "Main effect" (see Louviere et al. 2000)

Given: number of alternatives, attributes, and attribute levels the full factorial is equal to all possible choice situation

2 attributes /3 levels
1 attribute/4 levels
1 attribute/2 levels

Full =(2^3X4x2=104) possible choice

Fractional factorial design Select choice situations from the possible choice of Full Design (by using a appropriate software - SPSS or SAS)

32 combinations divided in 4 blocking: 8 for each block

(I)Third step of setting up a choice experiment: Construct of survey instrument

- Creating shopping scenario with the choice cards ; (7 cards per person)

- Including in the questionnaire basic demographic information and a cheap talk script;

- Doing a Pre – Test to a small sample of individuals (20 – 40).

Example of Shopping Scenario:

Option A	Option B	Option C
_ Price level _ Food miles information: CO_2 emitted -Organic -Cherry Tomato	_ Price level _ Food miles information: Number of miles food travelled -Conventional -Plum tomato	None

Estimation data

$$U_{ij} = -\beta_0 + \beta_1 \text{Price}_j + \beta_2 Cherry_{ijt} + \beta_3 Plum_{ijt} + \beta_4 method_{ijt} + \beta_5 nmiles_{ijt} + \beta_5 CO2_{ijt} + \varepsilon_{ijt}$$

We tested three different hypostasis using three different econometric models:

Multinomial logit (MNL)= preference homogeneous across consumers;

Random Parameter Logit (RPL= preference heterogeneous across consumers;

Error Component Logit (EC)= correlation across utilities and attributes.

Table 1. Samples Characteristics

Socio-demographic characteristic	% of total
Gender	
Male	27.5%
Female	**72.5%**
Age Group%	
18 -24	18.0%
25 – 40	22.0%
41 – 54	**37.5%**
55-64	13.5%
Over 64	9.0%
Marital status	
Single	28.0%
Married	**59.5%**
Widowed	10.0%
Other	2.5%

Educational level	
No formal education	6.0%
High school degree (1-12 years)	**39.0%**
More than 12 years and less than 16 years	32.5%
Graduate from college (16 years)	19.5%
More than 16 years (PhD, Masters)	3.0%
Annual Income%	
$/Euro 19,999 or less	7.5%
$/Euro 20,000 – 39,999	**29.0%**
$/Euro 40,000 – 59,000	19.0%
$/Euro 60,000 – 79,000	12.5%
$/Euro 80,000 – 99,000	12.5%
More than $/Euro 100,000	4.0%
Missing data	15.5%

Main household food buyer | Random sample | Outside food outlets

Table 2. Estimates of MNL, RPL, and EC models :Utility Function

Utility function	MNL	RPL	EC
B_o	-2.94*	-3.44*	-3.77*
	(0.16)	(0.21)	(0.23)
Price	-0.70*	-0.89*	-0.94*
	(0.05)	(0.07)	(0.07)
CO2	0.51*	0.66*	0.67*
	(0.10)	(0.14)	(0.15)
Nmiles	0.48*	0.61*	0.63*
	(0.05)	(0.16)	(0.17)
Organic	0.47*	0.59*	0.62*
	(0.12)	(0.06)	(0.07)
Cherry	0.43*	0.57*	0.58*
	(0.11)	(0.16)	(0.17)
Plum	0.37*	0.48*	0.52*
	(0.10)	(0.13)	(0.13)

H1: the presence of food miles labelling influence consumers choice;

H2: this influence varies with regard to the different type of food miles labels presented and the different samples;

Table 2. Estimates of RPL and EC models : Standard deviation and error component

Standard deviations of parameter distributions	**MNL**	**RPL**	**EC**
CO2		0.91*	0.93*
		(0.22)	(0.23)
Nmiles		0.94*	0.98*
		(0.26)	(0.22)
Organic		1.17*	0.67*
		(0.23)	(0.12)
Cherry		0.77*	1.24*
		(0.16)	(0.23)
Plum		0.25*	0.24**
		(0.13)	(0.25)
Standard deviation of the latent random effect			
σ			0.86*
			(0.07)
N	1400	1400	1400
Log likelihood	-1076.44	-1056.67	-1048.97
BIC	1.574	1.572	1.571
AIC	1.548	1.526	1.518

✓H= Heterogeneity preferences across consumers

✓Correlation across utilities;

✓ RPL and EC models fitting better the data than MNL. The EC model is the best one.

Table 4. Mean and standard deviation of WTP estimates of the EC model ($/pound)

Attribute	WTP_{EC}
CO2	0.73*
	(0.15)
Nmiles	0.67*
	(0.17)
Organic	0.66*
	(0.17)
Cherry	0.63*
	(0.14)
Plum	0.55*
	(0.07)

H3: Consumers are willing to pay a price premium for food miles labels;

H4: consumers WTP differs with regard to the different type of food miles label used;

Main findings

✓ **Most robust results**

- Information on food miles labels carry a positive premium for American consumers;
- American consumers showed a greater WTP for “CO2” label followed by nmiles label;
- These findings are robust across the three econometric models (MNL, RPL, and EC).

Implications:

Consumers:

✓The introduction of the food miles label reduces the asymmetry of information between consumer and producers;

✓Food miles labeling increases the utility of consuming the specific products that bare such labels especially for the consumers with higher sustainability concerns.

Local producers

✓There is a need for higher traceability in the food chain.

✓There is a potential market share for products baring food miles labels;

✓Local producers could use food miles as a tool to differentiate their local food products not only when selling these products directly to consumers but also when approaching retailers to carry their products in the retail stores.

Police maker:

✓Food miles should be included in the label scheme like organic, COOL, animal welfar;

✓A mandatory labeling of food miles will be beneficial for consumers;

✓Food miles label can be used as an incentive to promote the sustainable production/consumption in accordance to the international trend.

Future Research:

✓Use different levels of CO2 and nmiles to test if consumers are WTP more for food that travelled short distance or with a low amount of CO2 emitted

✓Identification of homogenous groups using latent class modelling, to know the clusters of consumers in terms of FM labelling;

✓Identification of the relation between FM labelling and others labels types (e.g organic, COOL etc.);

✓Testing the WTP using non-Hypothetical methods (e.g experimental auction).

Thank you for your attention.

Questions?