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**Value elicitation for multiple quantities of new differentiated products
using non-hypothetical open-ended choice experiments**

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*Selected Poster prepared for presentation at the
2015 Agricultural & Applied Economics Association and Western Agricultural Economics Association
Joint Annual Meeting, San Francisco, CA, July 26-28*

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Background

- Italian consumer awareness of food safety and environmental issues has been increasing
- Industry operators producing wheat-derived products are interested in adopting an environmentally friendly post-harvest technique based on high temperature, so called, "High Heat-Treated" (HHT)
- Identifying potential consumers' WTP for HHT products prior to investing is crucial, only few studies are available
- Consumers' WTP has been generally based on single unit, but for such products consumers usually buy more than one unit per time

Objectives

- To estimate consumers' WTP and demand schedule for wheat-derived products produced by HHT post-harvest technique, by using
 - a non-hypothetical open-ended choice experiment (OECE)
 - a multiple unit elicitation format

Experimental Design and Survey

Products: HHT and Conventional flour, pasta, packed bread

Subjects: 270 consumers in Bologna, Catania, Palermo (Italy)

Methods: Field experiment
Non-hypothetical OECE (Corrigan et al., 2009)



Mechanism:

- Participant is presented with several different price combinations (HHT & conventional) and is asked to indicate units she would like to purchase at each price
- A binding product is selected randomly
- Participant chooses her preferred price combination for the binding product, while a binding price is selected randomly
- Price of HHT product from selected combination is compared with a randomly drawn market price.
 - If it is higher than the market price, she is expected to purchase the amount she indicated, paying the market price
 - If it is lower than the market price, she does not purchase any product.
- All participants receive a gadget gift for participating

Empirical Methods

- Individuals' maximum WTP for a single unit of HHT products was estimated as the highest price at which they indicate a positive quantity they would purchase
- To aggregate consumer demand across participants, we sum individual demand at each price level
- Factors influencing participant demand for HHT products were analyzed using regression of reported quantities on price levels
- Double Hurdle models
 - Probit model describing participation decision
 - Poisson regression truncated at zero for the units purchased

Results

Table 1. Socio-demographic characteristics of the sample.

Characteristics	Percent of total (%)			
	Bologna (N = 90)	Catania (N = 90)	Palermo (N = 90)	Pooled Sample (N = 270)
Gender				
Female	60%	56.70%	60%	58.90%
Male	40%	43.30%	40%	41.10%
Age (Mean , St.dev.)	37.50 (14.851)	45.53 (15.656)	45.56(14.271)	42.86(15.358)
Youth = 18-34 years	55.60%	32.20%	32.20%	40%
Middle Age = 35-54 years	23.34%	35.60%	34.40%	31.10%
Elder = More than 54 years	21.11%	32.20%	33.30%	28.90%
Educational level (Median)	University	High school	High school	High school
	Degree			
No UDegree = without University degree	47.80%	53.90%	65.20%	55.60%
UDegree = University degree	52.20%	46.10%	34.80%	44.40%
Average household income	1,000-1,999	1,000-1,999	1,000-1,999	1,000-1,999
LO4K < 4,000 euro/month	26.10%	13.80%	22.40%	20.90%
4K = 4,000 euro/month or more	27.30%	41.30%	43.50%	37.20%
Household size (persons)	3	3	3	3
Frequency of buying flour (Median)	1/month per month or less	Once per month or less	Once per month or less	Once per month or less
Frequency of buying bread (Median)	Once per week	2 or more times per week	2 or more times per week	2 or more times per week
Frequency of buying pasta (Median)	2-3 times per month	2-3 times per month	2-3 times per month	2-3 times per month

Table 2. Participants' maximum WTP for HHT products.

Products	Bologna		Catania		Palermo	
	Median	Mean	Median	Mean	Median	Mean
HHT flour	1.7	1.73 (0.477)	1.4	1.33 (0.473)	1.4	1.41 (0.397)
HHT bread	2.0	2.02 (0.762)	1.4	1.32 (0.497)	1.4	1.58 (0.556)
HHT pasta	1.0	1.02 (0.262)	0.9	0.9 (0.312)	1.1	0.99 (0.301)

Data were analyzed from consumers who are in the market. Standard deviation is in parentheses.

Results

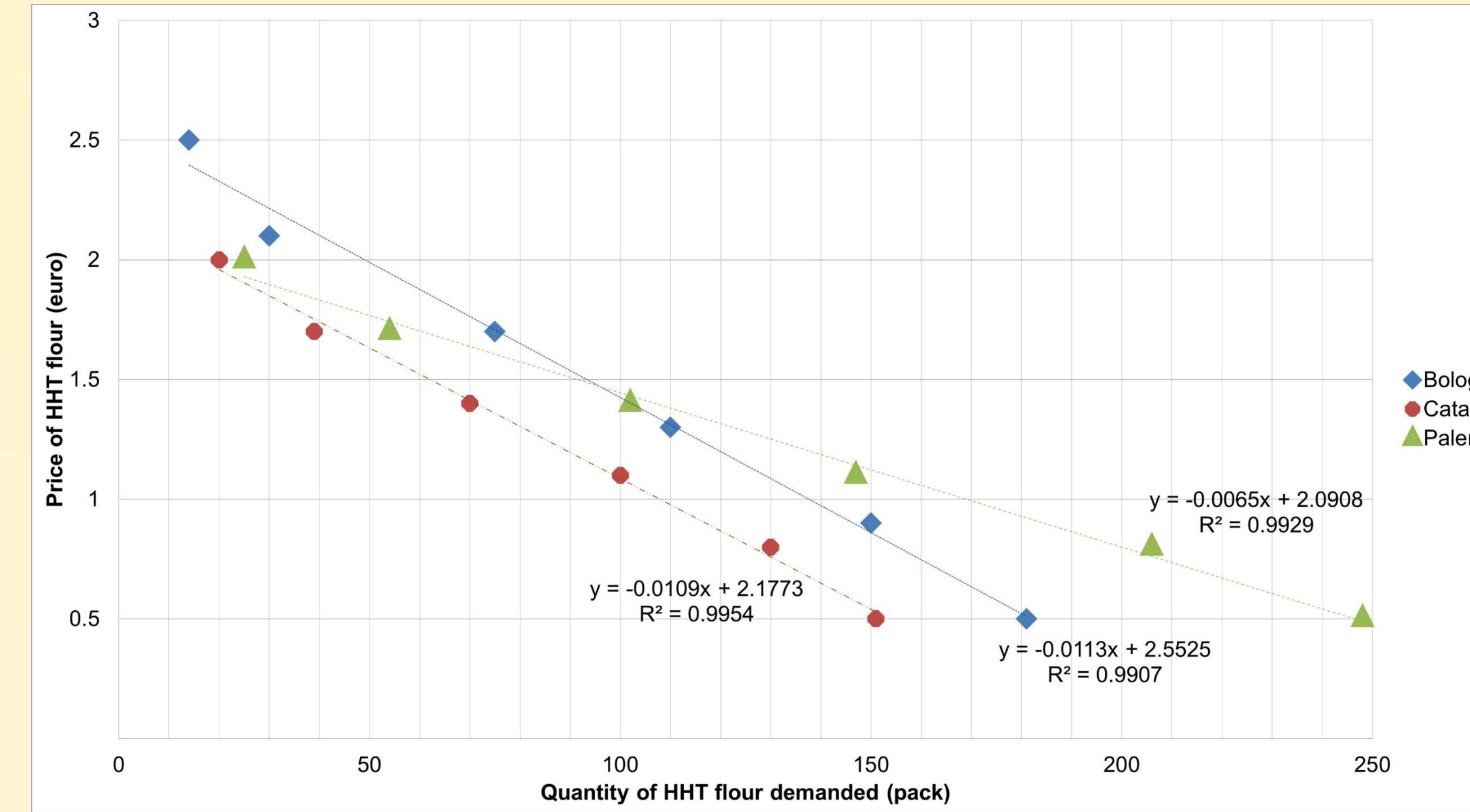


Fig. 1. Observed demand of HHT flour from participants.

Table 3. Double-hurdle estimation results for HHT flour, bread, pasta.

Variable	HHT Flour		HHT Bread		HHT Pasta	
	Participation	Consumption	Participation	Consumption	Participation	Consumption
Intercept	5.390*** (0.355)	0.038 (0.156)	4.0135*** (0.349)	0.202 (0.296)	5.670*** (0.379)	1.792*** (0.091)
Price	-3.028*** (0.152)	-0.926*** (0.081)	-2.097*** (0.105)	-0.870*** (0.122)	-4.050*** (0.234)	-1.304*** (0.071)
Information (yes =1, no = 0)	-0.073 (0.134)	0.030 (0.066)	-0.037 (0.132)	-0.087 (0.112)	-0.248 (0.133)	-0.086** (0.039)
Catania (yes =1, no = 0)	-1.503*** (0.185)	-0.095 (0.095)	-2.199*** (0.196)	-0.623*** (0.192)	-0.707*** (0.167)	0.251*** (0.055)
Palermo (yes =1, no = 0)	-0.763*** (0.182)	0.361*** (0.083)	-0.880*** (0.181)	0.172 (0.146)	0.199 (0.173)	0.587*** (0.050)
Middle Age (yes =1, no = 0)	-0.246 (0.163)	0.243*** (0.085)	0.053 (0.160)	-0.015 (0.136)	-0.465*** (0.161)	-0.125*** (0.048)
Elder (yes =1, no = 0)	0.111 (0.166)	0.445*** (0.081)	0.032 (0.163)	-0.097 (0.140)	-0.205 (0.166)	0.003 (0.045)
U Degree (yes =1, no = 0)	0.001 (0.001)	0.001*** (0.0002)	-0.001 (0.001)	-0.037 (0.116)	-0.001 (0.001)	0.0003 (0.0002)
Income LO4K (yes =1, no = 0)	0.062 (0.115)	0.018 (0.054)	-0.103 (0.113)	0.061 (0.095)	0.120 (0.113)	0.0617 (0.035)
Income 4K (yes =1, no = 0)	-0.063 (0.115)	-0.018 (0.054)	0.103 (0.113)	-0.061 (0.095)	-0.121 (0.113)	-0.062 (0.035)
Household size (from 1 to 6)	-0.039 (0.056)	0.197*** (0.030)	0.011 (0.055)	0.121*** (0.047)	-0.058 (0.055)	0.067*** (0.016)
Frequency of purchasing (from 0 to 4)	0.387*** (0.097)	0.091** (0.042)	0.138** (0.065)	0.063 (0.061)	-0.246 (0.071)	-0.196*** (0.021)
Perception on Green Consumption (from 1 to 5)	0.323*** (0.070)	0.126*** (0.036)	0.199*** (0.069)	-0.017 (0.060)	0.293*** (0.068)	-0.088*** (0.021)

Standard errors in parentheses. *, ** and *** denote significant difference at the 0.1, 0.05, and 0.01 level, respectively. Information: participants received/did not receive information regarding conventional post-harvest technique Location: Bologna is a reference level, Catania = participants in Catania; Palermo = participants in Palermo Education: No University degree is a reference level; U Degree = having University degree Age (year): Age < 35 years old is a reference level; Middle Age = 35-54 years old; Elder = more than 54 years Income (euro/month): Income < 1,000 is a reference level; Income LO4K = 1,000-3,999; Income 4K = 4,000 or more

Results



- The sampled consumers are willing to pay a premium price of around 30% for HHT flour and HHT pasta, while they are available to pay about the same price or less for HHT packed bread compared to conventional packed bread
- Demand for HHT pasta is more elastic than demand for HHT flour and HHT packed bread
- Providing information about the conventional post-harvest protection practices had no significant effect on consumers' WTP
- Price, location, perception of green consumption and frequency of consumption significantly affect consumers' decision to buy or not to buy HHT products (participation)
- Price, location, perception of green consumption, frequency of consumption and household size significantly affect consumers' consumption (how many units) decisions

Conclusions

- Consumer preferences and WTP for eco-friendly food products depend on the types of products
- For flour and pasta, the HHT eco-friendly attribute seems to be relevant, while this attribute does not trigger a premium price for the more unfamiliar HHT packed bread
- There is a potential market share for flour and pasta bearing the HHT eco-friendly labels
- Price and how eco-friendly products are presented, are highly relevant factors

References

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