



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*



## BACKGROUND

Food choice behavior is affected by a variety of stimuli and attributes, making food choice a complex process. More importance is usually given to factors that have little or no relevance while ignoring those that in reality pose a substantial threat to safety.

Though consumers value safer food, most are unaware of proper practices to avoid foodborne illnesses. Millions of people around the globe are hospitalized and even die every year from foodborne diseases and illnesses caused by the consumption of contaminated food. The limited public authority or ministerial oversight over food handling practices and hygiene in some countries in the MENA Region exacerbates the issue.

Consumer preferences for healthy food products can grow with the presence of proper information provision coupled with third-party food certification schemes. If such schemes are to affect consumers' choice of food, it is essential to optimize the information provision process be it in the form of awareness campaigns, advertising or labeling, in order to maximize consumer surplus extraction. An in-depth understanding of the potential influences of information provision on consumers' food purchasing decisions becomes of paramount importance.

*The stated preference and nonmarket valuation literature is replete with studies examining the impact of varying degrees of information provision on preferences and willingness-to-pay. However, literature on food safety has rarely addressed the influence of food safety information provision on consumers' food purchasing decisions.*

Existing literature focused on the effects of information provision on preference means; that is, on systematic shifts in average preferences upon exposure to information.

*However, to the best of our knowledge, there is virtually no investigation of the determinants of differential responses to such information, and much less on its impacts on safety and non-safety attribute variances where mixed logit analysis is employed to recover preference heterogeneity.*

## OBJECTIVES

1. Examine determinants of preferences and purchasing behavior governing food safety certification among Shawarma consumers in Beirut, Lebanon, using a choice experiment.
2. Explore the systematic shifts in average preferences for food safety certification upon exposure to information about safety certification schemes.
3. Explore the differential and distributional impact on individual attributes' variances.

## METHODOLOGY




A choice experiment was designed to study the influence of quality management and safety certification on consumers' choice of shawarma sandwiches.

In the survey, respondents were presented with meal or portion attributes and a price attribute and were asked to choose their most preferred product from a set of options differing in terms of their attribute levels as described in choice cards or sets presented to them.

Repeated choices by consumers from a set number of choice cards revealed the trade-offs customers are willing to make between the attributes. Preference parameters of the various attributes were then estimated.

The survey questionnaire was composed of three sections:

- 1<sup>st</sup> section aimed at screening out respondents who do not eat shawarma and gauging food safety attitudes, perceptions and knowledge as well as food purchasing habits.
- 2<sup>nd</sup> section contained the core choice exercise centered on the twelve choice sets generated by an  $D_0$ -optimal experimental design.
- 3<sup>rd</sup> section socio-demographic data on both respondents and their households were collected.

CHOICE CARD 5			
	Option 1	Option 2	Option 3
<b>Location and convenience</b>	Round the corner (less than 5 minutes walk)	Within walking distance (more than 5 minutes walk)	Delivery order
<b>Certification</b>			
<b>Portion size</b>	Medium-sized sandwich (approx. 25cm)	Typical small-sized sandwich (approx. 15 cm)	Typical small-sized sandwich (approx. 15 cm)
<b>Price Increase</b>	3000 L.L.	3000 L.L.	2000 L.L.

Please choose the ONE option you prefer most

Two identical versions of the survey were developed except for the fact that in the second section of Version 2, the choice exercise preamble included, in addition to an explanation of how the choice exercise worked, an extra narrative briefly describing each type of certification that Version 1 did not.

One quality management certification (ISO 9001) and two safety related certifications (ISO 22000 and ServSafe) all of which represent mutually exclusive areas of management and food safety were included in the choice experiment. Moreover, the inclusion of a no certification option provided a realistic anchor that reflects the actual status of virtually all food vendors in Lebanon. Against this anchor preferences for the various certificates under consideration could be estimated.

A Mixed Logit model with correlation across preferences was used since it captures taste heterogeneity and helps establish systematic and differential effects.

Attribute	Description of levels
<b>Location/ convenience</b>	1. Round the corner (less than 5 minutes walk) 2. Within walking distance (more than 5 minutes walk) 3. Need to go there by car 4. Delivery order
<b>Certification</b>	1. None 2. ISO 9001 3. ISO 22000 4. ServSafe
<b>Portion size</b>	1. Typical small-sized sandwich (approx. 15 cm) 2. Medium-sized sandwich (approx. 25 cm)
<b>Price increase</b>	1. LBP0 2. LBP500 3. LBP1,000 4. LBP2,000 5. LBP3,000 6. LBP4,000

**SECTION 2: CHOICE EXERCISE**

In the next few questions, we will present a series of possible shawarma products. Each listed product will be described in terms of the following 4 attributes:

- ✓ Certification: ISO 9001, ISO 22000 or ServSafe certified vs. non-certified restaurants.
- ✓ Portion Size: Small size sandwich (15cm) vs. Medium size sandwich (25cm)
- ✓ Location/Convenience: Walking distance, car drive away or delivery option
- ✓ Price Increase

As the attributes change, the price of shawarma might increase.

Restaurant certification is an important element in ensuring customer satisfaction and food safety. Here below are some typical certificates you might come across in restaurants throughout Lebanon.

**Types of Certifications**

**ISO 9001** is the most general type of certificate that could be obtained by any type of organization, e.g. printing press, construction, manufacturing industry as well as restaurants. It aims to guarantee good management practices to ensure customer satisfaction. This certification is reviewed every two years by a third party to ensure compliance.

**ISO 22000** guarantees good management practices as with ISO 9001. In addition, it sets standard management requirements for food safety decreasing the likelihood of you getting food poisoned. ISO 22000 is strictly given to organizations involved in any aspect of the food chain including restaurants. This certification is reviewed every two years by a third party to ensure compliance.

**ServSafe** is a basic food safety training and certification program for restaurants. It trains food handlers (cooks, chefs, waiters etc.) to understand the concepts of hygiene, cleanliness and food safety to ensure that the food served is safe. The personnel who are ServSafe certified will have to take the training once every 5 years.

In order to capture the variance heterogeneity effect, the Heteroscedastic Mixed Logit model was used as it accounts for the effect of information on both heterogeneity and means of certification schemes and prices.

## RESULTS

5 sequentially nested choice models were estimated which allowed to conduct likelihood ratio specification tests of adjacent models.

Minimum Akaike (AIC) and minimum Bayesian information criteria (BIC) were used to assess model specifications.

Price was treated as continuous while dummy variables for remaining attributes' levels were created, leaving out 'round the corner', 'none' and 'typical small-sized sandwich' as reference levels for the location/convenience, certification and portion size attributes, respectively.

The best Model was the hierarchical Bayes Mixed Logit model with interaction terms and correlation (model 5) as it accounts for:

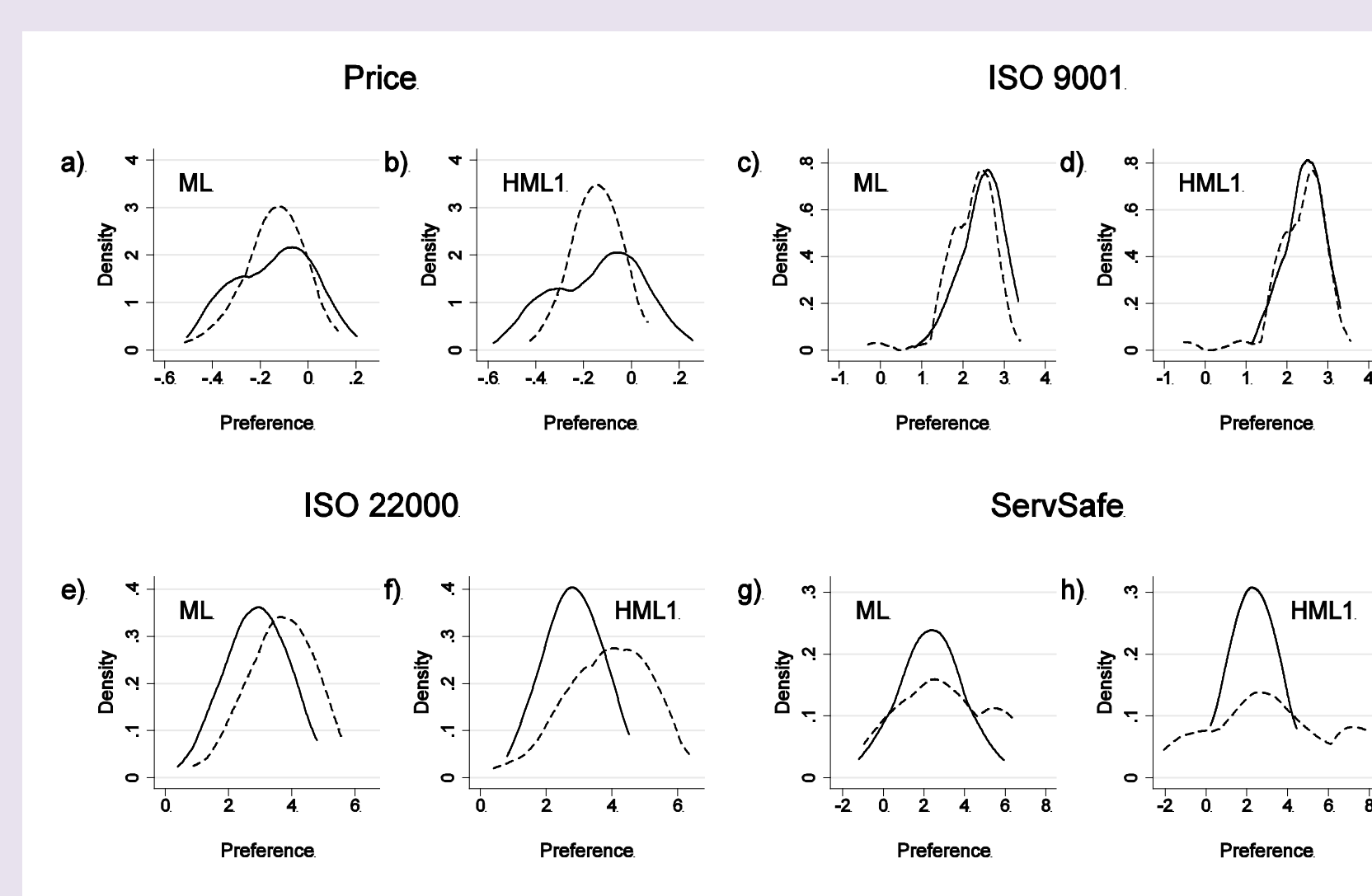
1. Price and attributes preferences
2. Mean effects of information on food safety certification preferences
3. Heterogeneity of attributes and interaction terms
4. Correlation across price, attributes and interaction terms

### SYSTEMATIC EFFECTS

Attribute	MXLP_inf_cor
Random parameters – mean <sup>a</sup>	
Price (LBP500s) <sup>b</sup>	-0.218 (-7.22)
Walking distance	-0.194 (-1.68)
By car	-1.823 (-10.45)
Delivery Order	-0.440 (-3.24)
ISO 9001	4.481 (12.38)
ISO 22000	4.999 (12.48)
ServSafe	4.522 (10.44)
Large s size	0.731 (6.96)
Information* ISO 9002	0.606 (1.75)
Information* ISO 22000	1.854 (4.62)
Information* ServSafe	1.742 (3.71)

<sup>a</sup> Parameters are non-random in the CL model. <sup>b</sup> Price non-random in all models except MXLP\_inf\_cor. <sup>c</sup> Standard deviations constructed from estimated Choleski matrix in

### DISTRIBUTIONAL EFFECTS



### DIFFERENTIAL EFFECTS

Variables	Levels	ISO 9001		ISO 22000		ServSafe					
		N	Mean(g.i.)	t-ratio	N	Mean(g.i.)	t-ratio	N	Mean(g.i.)	t-ratio	
<b>Sociodemographics</b>											
Gender	Male	71	0.621	0.05	1.083	-2.17**	1.477	-2.16**			
	Female	72	0.616		2.323		2.342				
Age	≤ 30 years	66	0.678	0.95	2.189	1.72*	2.162	1.15			
	> 30 years	79	0.569		1.753		1.693				
Education	Other	37	0.558		1.977		1.596				
	University degree	108	0.640	0.60	1.942	-0.12	2.013	0.87			
Work status	Other	110	0.638	-0.65	1.907	0.65	1.647	2.22**			
	Full or part-time employed	55	0.560		2.060		2.721				
Primary or joint income earner	No	67	0.526	-1.56	1.980	0.21	2.665	3.25***			
	Yes	78	0.609		1.926		1.307				
Household income	≤ \$1,500/month	69	0.740		1.803		1.415				
	> \$1,500/month	83	0.552	1.60	2.085	-1.11	2.268	-2.17**			
<b>Attribute importance to choice</b>											
Location/convenience	Not important/Don't know	76	0.663		2.315	3.12***	2.236	1.74*			
	Very important/Vital	69	0.570	0.82	1.551		1.543				
Food Certification	Not important/Don't know	27	0.096		0.517	-4.68***	0.143	-4.49***			
	Very important/Vital	118	0.739	-3.91***	2.279		2.310				
Portion Size	Not important/Don't know	103	0.667	1.35	2.229	3.59***	2.322	3.88***			
	Very important/Vital	42	0.500		1.270		0.887				
Price	Not important/Don't know	111	0.609		2.123		2.217				
	Very important/Vital	34	0.653	-0.37	1.389	2.85***	0.893	3.31***			
<b>Food safety perceptions and knowledge</b>											
Food safety knowledge index (10 questions: +1 pt. if right answer; -1 pt. if wrong; 0 pt. if don't know)	< 4 pts.	65	0.677	0.90	1.605		0.884				
	≥ 4 pts.	80	0.571		2.232	-2.49**	2.737	-5.03***			
Do you consider more expensive food safer?	No/Don't know	113	0.595	-0.85	2.064	1.87*	2.118				
	Yes	22	0.704		1.551		1.161				
Food poisoning is not a big threat to my health	Disagree/Neutral/Don't know	124	0.639		2.088	3.01***	2.070	2.68**			
	Agree	21	0.502	0.78	1.140		0.943				
<b>Food safety attitudes and preventive behavior</b>											
I don't mind getting food poisoned as long as I enjoy my meal	Disagree/Neutral/Don't know	130	0.656	1.38	2.129	3.75***	2.134	4.92***			
	Agree	15	0.295		0.406		-0.066				
I am concerned about food poisoning but I'm not taking any preventive measures	Disagree/Neutral/Don't know	98	0.640		2.168	2.53**	2.280	2.98**			
	Agree	47	0.575	0.51	1.498		1.128				
I am concerned about food poisoning, and I'm acting in ways to avoid it	Disagree/Neutral/Don't know	14	0.082	-3.01***	0.589	-3.54***	0.423	-2.58**			
	Agree	131	0.676		2.097		2.065				
<b>Purchasing habits</b>											
How often do you purchase shawarma	Less than once per month	65	0.515	-1.65	2.100	1.06	2.384	2.10**			
	Once per month or more	80	0.703		1.830		1.518				
What kind of shawarma do you usually purchase?	Beef/Lamb	49	0.641	0.28	1.509		1.097	-3.06***			
	Chicken or all three kinds	96	0.608		2.177	-2.56**	2.320				
How much do you usually pay for a shawarma sandwich?	< LBP5,000	128	0.590		2.025		2.111				
	≥ LBP5,000	17	0.834	-1.46	1.398	2.16**	0.364	4.89***			

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Results are based on two-sample t-tests with unequal variances.

## CONCLUSIONS

This study aims to open up new avenues in food safety marketing research in the MENA Region and other less developed countries where food safety considerations are seldom implemented and consumers are rarely aware of them, let alone have established and well informed market demand for them.

The socio-demographically heterogeneous sample of respondents, and idiosyncratic consumer characteristics, have demonstrated how food safety demand would shift in the presence of information provision that mimics in certain ways the impact of awareness campaigns and advertising.

Food safety information provision has influenced the directly relevant attributes by increasing their variances, while causing the opposite to happen in price.

Results offer some useful leads to the behavioral underpinnings of consumer food safety attitudes and purchasing decisions.

While preference formation is problematic in the context of stated preference survey design forming preferences is a central aim for advertising and publicity campaigns.

## REFERENCES

- Aoki, K., Shen, J., & Saijo, T. (2010). Consumer reaction to information on food additives: evidence from an eating experiment and a field survey. *Journal of Economic Behavior and Organization*, 73(3), 433-438.
- Greene, W. H., Hensher, D. A., & Rose, J. (2006). Accounting for heterogeneity in the variance of unobserved effects in mixed logit models. *Transportation Research Part B: Methodological*, 40(1), 75-92.
- Train, K. (2009). *Discrete Choice Methods with Simulation* (2<sup>nd</sup> ed.). New York: Cambridge University Press.
- Verbeke, W., Scholderer, J., & Frewer, L. (2006). Consumer perception of safety in the agri-food chain. In P. A. Luning, F. Devlieghere & R. Verhé (Eds.), *Safety in the Agri-Food Chain* (pp. 619-646). Wageningen, The Netherlands: Wageningen Academic Publishers.

## ACKNOWLEDGEMENTS

This study was funded by the University Research Board (URB) at the American University of Beirut. The authors thank Statistics Lebanon for their appreciated assistance in data collection. Dr. Lilian Ghandour for her valuable insight and feedback and Ms. Alexandra Irani for her help in preparing the poster.

## FURTHER INFORMATION

Please contact ac22@aub.edu.lb for more information.