Consumer preferences for organic and welfare labelled meat: A natural field experiment conducted in a high class restaurant

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Abstract

This paper describes a natural field experiment conducted at a high class restaurant. We discuss some of the challenges of incorporating a state of the art choice experiment in the daily running of the restaurant without affecting the customers' restaurant experience. The case we explore is how credence attributes like organic and animal welfare affects real customer choices in the restaurant.

Keywords: animal welfare, choice experiment, consumer preferences, organic meat, restaurant

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Introduction

High class restaurants use niche products like organic calf to attract customers and create an experience the customers' value. The choices faced by restaurant customers are very similar to the choices marketers ask consumers to make in choice experiments. We utilize this similarity to create a natural field experiment in a high class restaurant in one of Oslo's best hotels.

The relationship between action and attitude has been much debated in marketing research. Surveys have been conducted concluding that the product is a doomed success, but when the product is on the market sales is catastrophic. Surveys measure only attitude, not action. Experiments with real economic consequences which seek to imitate the real purchase situation may improve upon the mismatch, but surveys and most of experiments have the common feature that respondents know they are monitored. This may lead them to behave unlike what they would do in a real purchase setting. A natural field experiment where the respondents do not know they are monitored seems ideal.

We have conducted a natural field experiment to explore restaurant customers preferences toward credence attributes associated with the production of meat. By manipulating the menu text and price for an organic veal dish, we seek to elicit how these attributes affect the choices the restaurant customers make in restaurants.

The objective of this paper is two-fold. The main objective is to present how a natural field experiment can be conducted in a high class restaurant without interrupting the daily running of the restaurant. We discuss the challenges we faced when working with a high class restaurant with paying customers, and present how we handled the challenges. The second objective is to present results about how our manipulations about organic, animal welfare, and price affected customers' choices in the restaurant.

Why conduct a restaurant experiment?

Small scale food producers are facing many barriers when they want to sell their products in sales channels that do not involve direct sales. The step from selling at their farm to the grocery store may seem as a giant leap for the producer. What seem as a barrier for these producers are the design of the package and how it should be market. Packages that are not appealing do not sell. Appearance is important when selecting food. An example is from the Norwegian pre-packed fish producer "Lofoten" who experienced a sales increase of 300 percent after redesigning their packages (Norwegian Design Council 2009). More generally Cochoy (2008) shows how packaging starts a process of choosing products. He writes about a shift from tasting of products when they were bought in bulk to testing today's packaged goods which means the customer only can evaluate the product from a distance.

This is only valid in grocery shops though, since then the product is visible before it is bought. In a restaurant, product is only displayed through the menu text; no special wrapping design is needed. Therefore restaurants may be an appropriate sales channel to test out new products because the investments cost are low for the producer. At the same time this will make food experiments easy and cheap to conduct for the researcher. Further we avoid the stockpile effect (customers buy a huge amount of the product for storage when the price is low) (Alfnes and Rickertsen 2011), since the restaurant is probably visited only once, not many times as a grocery shop.

Organic food is usually more expensive than conventional food, so consumers need some reason to buy it. Norwegian consumers say they buy organic because it is better for them and to avoid pesticides. Animal welfare is only the fifth most popular reason to buy organic food (ECO Commerce 2010). In order to study why consumers buy organic food we need to decompose these reasons, an experiment is suitable to do this.

Such an experiment can be conducted in two ways, either by a questionnaire (stated choice) or by a field experiment (revealed preferences). Revealed choice preference means real decisions in real markets, unlike stated choice which are more hypothetical decisions observed (Jaeger and Rose 2008). A field experiment is conducted in the "natural" setting the task preformed is expected to be done. Our experiment is how sales of a main course are influenced by description and price of the specific course in the menu. The natural setting for such an experiment is of course a restaurant.

Conducting experiments in the field means you cannot control everything as you can in the laboratory. I.e. a "sterile" environment is not possible. All kinds of noise can occur, which cannot be monitored. This is especially important in a setting when participants do not know they are monitored since then they are not so focused on the choice task as they would be otherwise. Bell et al. (1994) show that adding an Italian theme to a British restaurant had a significant influence on guests' choice towards more Italian food. Similarly, is context important in stated preference studies as well. Ordering of statements and presentation of alternatives do affect outcome in stated preference (Jaeger and Rose 2008). No method is therefore perfect in order to measure consumers' preferences, but some are better than other.

Literature review

Harrison and List (2004, p. 1012) propose six factors that can be used to determine the field context of an experiment: (1) the nature of the subject pool, (2) the nature of the information that the subjects bring to the task, (3) the nature of the commodity, (4) the nature of the task or trading rules applied, (5) the nature of the stakes, and (6) the nature of the environment that the subjects operate in. Our experiment used a restaurant that was open to the public with participants that were ordinary customers walking in from the street. The participants did not receive any information about the experiment and made their choice from the menu as any other

day they could have visited the restaurant. The products, the descriptions of the products and the price of the products where in line with how the restaurant usually presented its dishes. In Harrison and List's (2004) typology, our experiment is then a *natural field experiment* with a field context in the commodity, task, and information set the participants use.

A natural field experiment has its advantage that the setting is as natural as it gets. Subjects are not told they are part of an experiment and if the experiment is ideal, they will not take any notice either. As a result we expect to see no difference between behaviour in the experiment and in the real world since the experiment is in fact the real world.

A problem with participants in an experiment is that monitoring changes their behaviour. The earliest example of this is from 1927 when factory workers improved their efficiency in spite of worse working conditions. This result was named the Hawthorne effect (Landsberger 1958). Being more specific there is no social desirability bias in a natural field experiment. For ethical issues, such as fair trade products and animal welfare friendly food, there is risk that respondents place themselves in a better light than they actual deserve, i.e. political correctness is present. In a wider scope lab experiments suffer from the facts that subjects' choices are influenced not only by the fact that they are observed (both by the researcher and other subjects), but selection of participants, financial factors and how a decision is embedded (Levitt and List 2007).

The disadvantage with a natural field experiment is the lack of screening of participants. Doty and Silverthone (1975, p. 139) state that volunteers in human research typically have stronger social background and less respect for authorities than non-volunteers. Since it is important not to reveal to subjects in a natural field experiment that an experiment is going on, there is no method to recruit participants without telling them. An option is to reveal the experiments for the subjects after they have made their choices in the experiment and then do the

screenings, but this implies a large sample and sufficient variation in this sample. A priori these two factors cannot be guaranteed.

Another disadvantage with doing experiments in restaurant is the limitations given by the restaurant. People do not come to restaurants in order to be tested; they come in order to get a nice food experience. Therefore we had to minimize the disturbance the customers were exposed for. As a result we were only allowed to do minor changes in the menu and were not allowed to interview guests after they had paid the bill in order to get a glimpse of why they made their choice. We only know what their choices are and can only speculate in why they have chosen as they have.

In a menu there is "sweet spot" where the reader gazes first. One then might expect that moving a course to this spot would increase sales of this course. In fact that do not happen according to a study by Bouwen and Morris (1995) conducted in a causal service restaurant. Either menus are read were well so positioning of the courses have no meaning or that menus are glimpsed in shortly, and where this glimpse is done is uniformly distributed among guests.

The main alternatives to experiments are regular surveys. Such surveys are easy to conduct, but asking more or less hypothetical questions are likely to overestimate willingness to pay (WTP) compared to real life behaviour. This is phenomena is called hypothetical bias (Cummings et al. 1995). This is especially important in studies that measure WTP for abstract goods such as clean air and climate control and when stating their WTP has no real consequences for the respondents. The bias is probably due to signalling a special view or to please the interviewer (Whitehead and Cherry 2006).

As we know it there has not been conducted many field experiments in a high class restaurant. Alfnes and Sharma (2010) is the most recent example. They test optimal price strategy for locally produced food in a restaurant located at university campus. Most similar to our study is one conducted by Ding et al. (2004). In a Chinese dinner restaurant the authors

conducted both a hypothetical stated preference choice and an incentive aligned experiment. In most cases the incentive aligned choice outperformed the hypothetical choice. The authors claim that this is due to low price sensitivity, to much risk taking, to willing to test new things, and to prone suffer for social desirability bias in the hypothetical situation compared to the experiment.

Another study is Unterschultz et al. (1998). They use a stated preference technique to measure South Korean hotel meat buyers WTP for different kinds of meat with different qualities and from different countries. They would prefer a revealed preference technique, but that was not an available technique for them.

We believe that our field experiment is superior to all other measurement methods when it comes to measure interest and WTP for organic food in restaurants because the biases are minimised.

Even though stated preference techniques have made great progress in order to reduce different biases that occurs, revealed preference from experiments are still superior in predicting consumers' action.

Organic food in Norway[1]

Organic food is a niche in Norway. Only 4.2 percent of Norwegian farmland is certified as organic, while the similar share in Denmark and Sweden is respectively 5.3 and ten percent (SCB 2010; Ministry of Food, Agriculture and Fisheries 2010). For consumption the divergence to countries which are natural to draw a comparison with is even greater. Only 1.2 percent of the food eaten in Norway was organic in 2008. In Denmark and Sweden six and 4.3 percent of food consumed was organic. Meat is the food category in which the market share is lowest. Less than one percent of Norwegian meat is organic. In order to catch up the gap the Norwegian

[1] All data in this section is taken from SLF (2010) if other not mentioned.

government has decided that 15 percent of Norwegian food consumption and production should be organic in 2020.

Jacobsen and Borgen (2010) claim Norwegian consumers to view food produced in Norway as "almost organic",[2] so there is no reason to buy more expensive certified organic products. According to these authors organic farming in Norway is not only about market shares, but how the idea of organic farming has penetrated the Norwegian agricultural community, for instance when it comes to quality. Then it is not so important that few Norwegians actually eat organic food. What is important is the fact that there are a few products that make up a difference and trigger quality development.

Description of experiment

The experiment was conducted in "34 Restaurant & Bar" located in 34th floor of Radisson Blu Plaza Hotel in Oslo, Norway, from June 11 to 26 in 2010. This landmark in Oslo is the highest hotel in Northern Europe, the second tallest building in Norway, and the largest hotel in Norway. The restaurant is located at the top of the hotel offering a magnificent view of the city. The restaurant has a French kitchen with an international touch, has a price level that is slightly below the Michelin Guide restaurants in Oslo, and has got good reviews in the newspapers. The restaurant can seat 62 people.

During the experiment 462 main courses were sold (this is our N) and among these 180 (39 percent) veal course were sold. It was very important for the restaurant manager that we did not affect the restaurant experience of the customers. This had several consequences. One of them is that we were not allowed to interview or conduct a survey among the customers. As a result, we do not have any background information on the customers other than the general description of them from the restaurant manager. Around 50 percent of the guests are foreigners

[2] Norway is not a member of the European Union and is allowed to have very strict restrictions on import for most agricultural products.

according to the executive head chef, and most of the guests are guests at the hotel. Weekdays (Mondays-Thursdays) business men constitute most of the clients. In weekends (Friday-Saturday)[3] tourists dominate. Different customers have different budget. For example, it is likely that many of the business men and women are reimbursed for their expenses, and in that sense do not pay the bill themselves.

Table 1 shows an example of the menu pages with the main courses. All other main courses, except for the veal course, on the menu were held constant during the experimental period. For the main course the guests could choose from fish, meat, lobster and a vegetarian alternative, in addition to the veal. All of these courses were constantly priced NOK 275 (€ 34)[4] during the test period.

We have created the combinations of factors presented in Table 2 using the SAS %MktEx macro. This macro creates fractional factorial designs (Kuhfeld 2009). The design is based on a choice set with two alternatives where alternative 1 is kept constant (the rest of the main courses) and alternative 2 (the presentation of the veal dish) which varies based on the design. Alternative 2 is described by four two-level or three-level attributes (Organic, Welfare, Price and Weekend). The involved restaurant required that we only changed the menu every second day, starting on a Friday and ending on a Saturday two weeks later. This gave us seven two day periods with three of them being weekends (Friday and Saturday nights) and four periods being in the work week, in total seven combinations to test.[5] SAS reports a D-efficiency of 94.34 for the design.

The attributes used with corresponding levels were the following:

1. *Organic* (whether the word "organic" was used in the menu or not):
    - 0: Not organic
    - 1: Organic

[3] The restaurant is closed on Sundays.
[4] This is a normal price for a main course at an upper class restaurant in Norway.
[5] The seven combinations are displayed in table 1.

2. *Animal welfare* (whether the living conditions for the calves were described or not):
    - 0: No description of animal welfare
    - 1: A description of animal welfare
3. *Price* (price of the veal course):
    - Low: NOK 245 (€ 30)
    - Medium: NOK 274 (€ 34)
    - High: NOK 310 (€ 38)
4. *Weekend* (type of day the veal course was sold):
    - 0: Weekday (Monday-Thursday)
    - 1: Weekend (Friday-Saturday)

The idea with using both an organic variable and one variable for animal welfare is to figure out whether animal welfare has an independent influence on sales or in combination with organic farming. The official certification agency for organic farming in Norway, Debio, states that animal welfare is important in organic farming (Debio 2010). Animal welfare and organic production is therefore close related on the supply side, but we want to test is if consumers think they also are interlinked.

The prices used may seem high, but Norwegians have a high income. The median household income after taxes was NOK 392 100 (€ 48 186) in 2008 (SSB 2010). The medium price used is quite a normal price for a main course at an upper class restaurant in Norway. The weekend variable was introduced in order to control for the change in clientele between weekdays and weekends.

Table 3 describes the four menu texts used in the experiment. It was important that these descriptions were written in a way that could be seen in a restaurant like the one we used. The texts were decided together with the head chef of the restaurant. Notice that not many changes

were done between the four combinations. This was done because limited typing space in the menu and the fact that the other courses were not detailed described either. It would look suspicious for the guests if one course was explained well, while the other was not explained. Then it could be a risk that the veal course would attract more attention simply because it was better displayed, not because what was written was found tempting.

The waiters played a key role in our experiment since their recommendations are expected to influence sales (Bouwen and Morris 1995). As a result, we instructed the service persons not to say anything more about the courses than what was already written in the menu in order to reduce this bias. Since we changed menu every second day this was probably not so easy to follow from the waiters, but it is not likely that all waiters gave the same wrong recommendations. If errors are present they are likely to rule out each other.

Econometric model

In contrast to most survey-based choice experiments, our participants made only one choice and therefore our 462 participants only gave us 462 choice observations. Because of the relatively low number of choice observations and the lack of panel features, we employ the standard logit model to analyse the choice data. The dependent variable in the logit model is purchase of the veal and the four other attributes as independent variables. Our regression then looks like the following:

$$U_i = \beta_1 + \beta_2 \times \mathrm{PriceLow}_i + \beta_3 \times \mathrm{PriceHigh}_i + \beta_4 \mathrm{Organic}_i + \beta_5 \mathrm{AnimalWelfare}_i + \beta_6 \mathrm{Weekend}_i + \varepsilon_i$$

The reference point for this model, with a utility normalized to zero, is the utility of choosing something else than the veal from the menu. U_i is individual i's utility from choosing the veal alternative on the menu. The constant term β_1 captures the utility of the reference veal dish sold during the weekdays at medium priced without any information about organic or animal welfare. $PriceLow_i$ is a dummy that equals 1 if the veal dish was sold lower than the normal price for veal

on the menu, otherwise zero; $PriceHigh_i$ is a dummy that equals 1 if the veal dish was sold at a higher price than the normal price of the veal on the menu, otherwise zero; $Organic_i$ is a dummy indicating if the description of the veal dish included the word organic; $AnimalWelfare_i$ is a dummy indicating if the description of the veal dish included an animal welfare statement; $Weekend_i$ is a dummy that is equal 1 if respondent i visited the restaurant in the weekend; the βs are the respective parameters indicating how the variables affects the likelihood of choosing the veal over the other alternatives on the menu. And finally, ε_i is an independently and identically extreme value-distributed error term. The model is estimated using STATA 11.

Estimation Results

The results of the estimation are shown in table 4. As we can see have both low and high price negative coefficient indicating that a too low price is indicating a bad course, but customers avoid a course which is too expensive.

From the table we see that the full sample model has very little explainable power, but it passes the X^2 test. With only two percent of the variance explained and no significant coefficients at the five percent level, this model is not much useful.

We therefore turn to table 5 where results are limited for guests coming on weekdays only, are presented. Here the results are much better with an explained variance of five percent. More interestingly we notice a significant effect of animal welfare. A similar effect was not found when we ran the model selecting for weekends only. We may therefore say that business people are more concerned about animal welfare than tourists, which is quite astonishing. Further we see that the coefficient for low price is negative and significant, indicating that compared to the medium price level, low price is not appreciated. Here we probably have a price signalling effect. Low listed price in the menu indicates a bad course, and therefore a bad taste, or that you as guest is not wealthy. This is not something you would dare show in front of your

business partners, so the business men go for a more expensive course. This result is consistent with Alfnes and Sharma (2010) who find that when their local course is priced lower than their regular course, there is no preference for the local course. Contrary when the local course is priced as highest. Then consumers' expectations are fulfilled and this outweighs the negative price effect so a purchase of the local course is implemented.

Our results are also consistent of those to Bernard and Bernard (2009). They find that organic milk had a higher own-price elasticity than milk labelled milk from non-hormone (rBST free) treated cows and non-antibiotics treated cows. That is, price does not seem to be important for organic products.

Discussion

In this paper we investigate consumers' interest in organic and animal friendly produced meat by manipulating the text and price. We argue that such a natural field experiment is superior to all other quantitative methods when it comes to measure interests, perception, and WTP for a restaurant meal.

In spite of this state-of-the art methodology we have trouble explaining anything. Very few of our results are significant. This does not necessary mean bad design; it could be lack of interests in organic and animal friendly products. What we find is that in general has organic, animal welfare and price little or no influence on sales of veal in a high class Norwegian restaurant. When we split the sample between weekdays and weekends we found that in weekdays when business people dominate as guests low price and animal welfare had a significant effect on sales. It may seem to be only that there is a limited marked for organic animal friendly veal in Norway.

The already mentioned article by Bernard and Bernard (2009) also found that beliefs about rBST and antibiotics in conventional milk had a significant influence on WTP for organic

milk. In Norway cows are not allowed to be treated with hormones and the use of antibiotics is very low. Then there is less reason to buy organic food for the consumers since there is little reason to be afraid of fragments of hormones or antibiotics in the conventional Norwegian milk. Their article also shows that elder educated males with high income had the highest WTP for milk labelled rBST-free and non-antibiotic. Such a demographic status is probably quite in line with the business people dominating our restaurant on weekdays. This could enlighten why our model have much higher explorative power when the sample was split between weekdays and weekends.

Still we do not know much about how choices are made in the restaurant, so more research seems essential here. Restaurant experiment is the method to use in order to reveal this, but a more pin-pointed design than ours seems tangible in order to get significant results.

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Table 1: Example of the menu pages with the main courses.

Today's fish	
Arctic char with chorizo lentils and fig sauce	NOK 275 (€34)
Today's meat	
Trio of veal from Grøndalen farm	NOK 275 (€34)
Lobster natural	
½ lobster served on a bed of toast	NOK 275 (€34)
Lobster gratinated	
½ lobster served with aioli on a bed of salad	NOK 275 (€34)
Today's vegetarian	
Potato ravioli filled with mushrooms. Served with spinach and sweet pepper sauce	NOK 275 (€34)

Table 2: Design with combinations of menu texts and prices used in the experiment.

Date June 2010	Organic	Animal welfare	Price level	Weekend
Fri 11-Sat 12	No	No	265	Yes
Mon 14-Tue 15	Yes	No	310	No
Wed 16-Thu 17	No	No	285	No
Fri 18-Sat 19	No	Yes	310	Yes
Mon 21-Tue 22	Yes	Yes	265	No
Wed 23-Thu 24	No	Yes	265	No
Fri 25-Sat 26	Yes	Yes	285	Yes

Table 3: Menu texts used in the experiment for the organic and animal welfare attributes.

Organic	Animal welfare	Menu text
No	No	Trio of veal from Grøndalen farm.
Yes	No	Trio of organic veal from Grøndalen farm.
No	Yes	Trio of veal from Grøndalen farm from happy calves that have received much care and exercise.
Yes	Yes	Trio of organic veal from Grøndalen farm from happy calves that have received much care and exercise.

Table 4: Logit regression for purchase of veal. Full sample.

Variable	Coef	st.err	*p*-value
Constant	-0.34	0.22	0.127
Organic	0.10	0.22	0.65
Animal welfare	0.34	0.21	0.109
Low price	-0.37	0.24	0.116
High price	-0.78	0.28	0.006
Weekend	-0.04	0.21	0.865
N	462		
Log likelihood	-302.280		
P value, X^2	0.022		
Pseudo R^2	0.021		

Table 5: Logit regression for purchase of veal. Weekdays only.

Variable	**Coef**	**st.err**	***p*-value**
Constant	-0.60	0.27	0.024
Organic	-0.92	0.56	0.101
Animal welfare	2.08	0.68	0.002
Low price	-1.78	0.58	0.002
High price	0.57	0.70	0.41
N	262		
Log likelihood	-167.582		
P value, X^2	0.001		
Pseudo R^2	0.054		