

# Country-of-origin effects on German peaches consumers

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JEL classification: D12, Q11

## 1. Introduction

The intense food market internationalisation process is giving rise to new competitive scenarios. In particular, greater consumer concern with environmental, health and place of origin issues are modifying the structure of demand for fresh products.

Of the credence attributes, Country of Origin Labelling (COOL) is acquiring a new role, partly thanks to the growing importance of traceability as a mandatory element of modern production processes. As a result, there has been greater recourse to various forms of origin certification of the product. In particular, marketing agri-food products by using the name of their region of origin (e.g. Parma ham) is a strategy that exploits the evocative capacity of this name-signal (Aaker, 1991). Indeed, by using Country of Origin Labelling, it is possible to exploit associations of consumers with a region and attribute to the product a perceived image and quality (Kapferer, 1992; Loureiro and McCluskey, 2000; Balestrini and Gamble, 2006; Fandos and Flavian, 2006; Perrouty et al.,

## Abstract

*Germany is an important world-level market for fresh fruit. Spain and Italy are the main suppliers of fresh fruit on the German market while the main imported products are apple, grapes, peaches and oranges. The aim of this paper is to assess the role the country of origin plays in the preferences of German consumers for peaches. Since German legislation requires fresh fruit sold on the market to clearly display the product's country of origin, German consumers usually make their choice with this information at hand. We attempted to investigate such concerns through a choice experiment approach conducted by means of a questionnaire-based survey administered to a representative sample of 300 German households. In the experiment, respondents were asked to choose their favorite peach among four alternatives. Each peach was described as imported from four specific countries (Italy, Spain, Turkey and France) and available at a specific price; some of the peaches were certified as Organic or PDO. The stated choices are analyzed using a latent class choice model to derive estimates of preferences for peaches. Results indicate the presence of three distinct consumer segments in the German peach market. The largest segment (48%) showed a strong preference for Italian peaches as well as for organic and PDO certification. For this segment, price was not an important attribute. The second segment (41%) showed a strong preference for Spanish produce and organic certification. Price was important in this case. The third segment (11%) had a negative preference for Italian and Spanish peaches, with price being the main attribute.*

**Keywords:** German peach market, consumer preferences, latent class choice models

## Résumé

L'Allemagne est un marché important à l'échelle mondiale pour les fruits frais. L'Espagne et l'Italie sont les plus grands fournisseurs de fruits frais sur le marché allemand et les principaux produits importés sont les pommes, les raisins, les pêches, et les oranges. L'objectif de ce travail et d'évaluer le rôle du pays d'origine dans les préférences des consommateurs de pêches allemands. La législation allemande prévoit que les fruits frais vendus sur le marché affichent clairement leur pays d'origine et de ce fait, le consommateur allemand fait normalement son choix en utilisant cette information. Nous avons essayé d'étudier cet aspect en nous appuyant sur une approche expérimentale du choix et en montant une enquête à l'aide d'un questionnaire soumis à un échantillon représentatif de 300 ménages allemands. Dans ce sondage, on a demandé aux interviewés de choisir leur pêche préférée parmi quatre alternatives. Chaque pêche a été décrite comme venant de quatre pays spécifiques (Italie, Espagne, Turquie et France) et disponible à un prix donné ; certaines pêches étaient certifiées bio ou AOP. Les choix exprimés ont été analysés en appliquant un modèle de classes latentes pour estimer les préférences à l'égard des pêches. Les résultats ont révélé la présence de trois différents segments de consommateurs sur le marché des pêches allemand. Le segment le plus grand (48%) a montré une forte préférence pour les pêches italiennes et pour la certification bio ou AOP. Pour ce segment, le prix n'était pas un attribut important. Le deuxième segment (41%) a indiqué une forte préférence pour le produit espagnol et la certification bio. Le prix était important dans ce cas. Le troisième segment (11%) a exprimé une préférence négative pour les pêches italiennes et espagnoles, en considérant le prix comme attribut principal.

**Mots-clé:** Marché des pêches allemand, préférences du consommateur, modèles des classes latentes

2006; Cicia and Colantuoni, 2010; Cicia et al., 2011; Lombardi et al., 2012). The aim of this paper is twofold.

The first objective is to assess the role COOL attribute plays in the preferences of German consumers for peaches.

Peaches are one of the main fruit products Italy exports to Germany. During the first decade of 2000, however, the market share of Italian peaches on the German market has contracted significantly. From about 70,000 tons exported in 2000 to less than 40,000 a decade later. This sharp drop has two causes. On the one hand it must be emphasized that total imports of peaches in Germany have declined by about 30% in the first decade of 2000 (CSO, 2010). On the other hand, in a shrinking market, Spain increased its market share, boosting in the same period of time its exports of peaches to Germany from 20,000 to 30,000 tons. So Italy still holds a leading position in the market for peaches in Germany, but its leadership is gradually eroding. The

second aim of this paper is to suggest, if possible, new and more successful marketing strategies to increase the declining demand for peaches in Germany. Since German legislation requires fresh fruit sold on the market to clearly display the product's country of origin, German consumers can be virtually considered as fully informed on this aspect.

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Our investigation was based on a choice experiment approach conducted by means of a questionnaire-based survey administered to a nationwide representative sample of 300 German households. In the experiment, respondents were asked to choose their favorite peach among four alternatives. Each peach was described as imported from one of the following countries: Italy, Spain, Turkey, and France. Each alternative was at a specific price, while some of them were certified as Organic or PDO. The stated choices were analyzed using a latent class choice model to derive estimates of preferences for peaches.

Results indicate the presence of three consumer segments in the German peach market. The largest one (48%) showed a strong preference for Italian peaches as well as for organic and PDO certification. For this segment, price attribute was not ranked among the most important ones. The second segment (41%) showed a strong preference for Spanish products and organic certification. Price was important in this case. The third segment (11%) showed a negative preference for Italian and Spanish peaches, and the price was the most important attribute.

The structure of preferences in relation to the COOL attribute emerged in this study traces closely the situation of the real market, strengthening the concluding remarks of the paper.

## 2. The survey

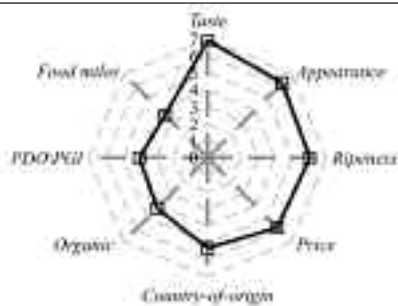
A sample of 300 German peach consumers was recruited by a market research company, in order to outline choice behavior towards, and opinion of, peaches and their country of origin. Participants were randomly recruited at the place of purchase, either store, supermarket or local market.

Face-to-face interviews were conducted in halls and in public venues. Individuals were selected among those who stated they were in charge of grocery shopping and consumers of peaches. The interview was based on a questionnaire structured into four sections. The first section focused on purchase and consumption models for peaches.

According to the survey, German peach consumers can be generally defined as frequent consumers of this fruit. Indeed, more than half of the sample state that they buy peaches at least once a week during summer season.

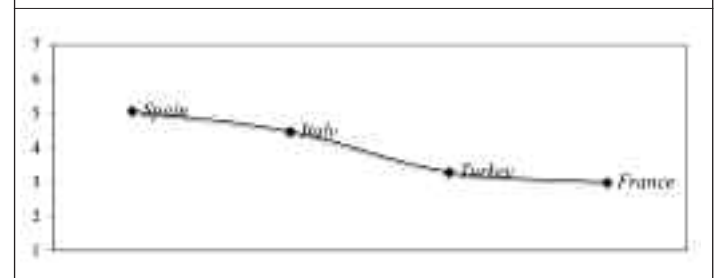
The importance of some real and immaterial product attributes was investigated in a seven-item Likert scale, going from 1 for “not important at all” to 7, “very important”. Taste, appearance and ripeness are the highest ranked attributes (Figure 1).

Figure 1 - Likert scores for peach attributes (n. = 300)



A seven-item Likert scale was also used to investigate which country holds the best reputation for producing high quality peaches. According to German consumers, Spain holds the best reputation for producing high quality peaches, closely followed by Italy. France was indicated as the worst producer for this product (Figure 2).

Figure 2 - Likert scores for peach country-of-origin (n° = 300).



The second section was devoted to the choice experiment. Important insights emerging from four focus groups (2 in Berlin and 2 in Frankfurt) were instrumental in designing the experiment. Four peach attributes were considered:

- Country of Origin Labeling: *France, Spain, Italy, Turkey*; dummy coded using Italy as baseline;
- PDO/PGI: *YES=1, NO=0*;
- Organic certification: *YES=1, NO=0*;
- Price in Euro/kg: 1.0 - 1.5 - 2.0 - 2.5 - 3.0.

An orthogonal design on these attributes and levels produced profiles, then shifted 4 times. Every consumer was interviewed on two sets, with five profiles each.

The hypothetical scenario for the choice experiment was presented as follows:

Imagine you are in the shop where you normally buy fruit and vegetables: the following one-kilogram packages of peaches are available. Would you buy any of them? If yes, which one in particular?.

The four attributes of each package were clearly described but no real product was offered to the consumer: no choice was allowed.

This approach, cognitively simple to manage, highlighted the most preferred profile for each set. Data from consumer responses were analyzed with a latent class choice model as reported in the next section.

The third section is designed to gather information concerning psychographic variables by using Likert scales of 1-7. In particular, consumer lifestyles are investigated, as well as several behavioral aspects and the perception and values associated to the purchase of peaches and product attributes. Of the above, particular attention is laid on analyzing the effect of origin on the purchase process. Finally, the last section of the questionnaire investigated socio-economic characteristics.

## 4. Latent class choice model

Traditional clustering approaches utilize unsupervised classification algorithms that group cases together that are

“near” each other according to some ad hoc definition of “distance”. In the last decade interest has shifted towards model-based approaches which use estimated membership probabilities to classify cases into the appropriate cluster (Scarpa and Thiene, 2005). The most popular model-based approach is known as mixture-model clustering, where each latent class represents a hidden cluster. Within the marketing research field, this method is sometimes referred to as “latent discriminant analysis” (Dillon et al., 1989).

A latent class model allows the analyst to identify groups of people with different preferences, as reflected by their self-reported attitudes. Basically, we expected to identify segments of people according to the choice made by consumers. There are consumers who are very concerned with price or organic certification or country of origin, as well as others who are not particularly bothered by this issue. Each of these groups has other characteristics which tend to vary among groups but not much within the group (Cicia et al., 2010). People with a high probability of being placed in the same group are homogeneous with respect to their attitude scores. As a result, they are expected to have similar underlying preferences.

The assumption of latent class models is that a person belongs to a specific group, but that class membership is unknown or latent. As a consequence, people belonging to different classes will have different preferences and will therefore respond in different ways to attitudinal questions. The interesting thing is that the number of classes is estimated by the model without setting any restriction, hence allowing for a wider range of preference heterogeneity. This means that the researcher does not have to assume a single distribution for the parameters or a specific functional form.

The latent class logit model estimates simultaneously the probability of a consumer choosing an alternative in the context of a choice set and the same consumer belonging to a specific segment with taste homogeneity. If each individual consumer interviewed is subject to a sequence of choice sets equal to  $T_n$ , where in our case  $n = 2$ , then the joint probability of the individual  $n$  making the sequence of choices  $T_n$  is:

$$P_{T_n} = \sum_{j=1}^J P_{T_{1j}} P_{T_{2j}} = \sum_{j=1}^J \left( \frac{e^{\gamma_j X_{1n}}}{\sum_{k=1}^J e^{\gamma_k X_{1n}}} \right) \prod_{t=2}^{T_n} \left( \frac{e^{\beta_t X_{tn}}}{\sum_{k=1}^J e^{\beta_k X_{tn}}} \right) \quad (1)$$

<sup>2</sup> Some authors have used as a guide to choosing the number of groups a variety of information criteria  $C = -2\ln L + J k$ , where  $\ln L$  is the log likelihood of the model at convergence,  $J$  is the number of parameters estimated in the model and  $k$  is a constant that may assume different values according to the criterion used. If  $k=2$ , we obtain Akaike's Information Criterion (AIC); if  $k=3$ , we obtain Akaike's Information Criterion 3 (AIC3); if  $k=\ln(N)$  we obtain the Bayesian Information Criterion. Lastly, if  $k = 2+2(J+1)(J+2)/(N-J-2)$  the corrected AIC (CAIC) (Hurvich and Tsai, 1989) is obtained, which tends to increase the penalty for the numbers of extra parameters estimated.

where  $Z_n$  is a vector that contains information on the psychometric and socio-economic variables for individual  $n$ , with coefficients equal to  $\gamma_s$ ,  $\alpha$  is the parameter scale error which is assumed Gumbel distributed,  $S$  is the number of segments  $s$  comprising the sample,  $X_{in}$  is the vector of individual characteristics and attributes of the products and  $\mu_s$  is the scale parameter. Although the scale parameter  $\mu_s$  may vary between segments, it is usually considered equal to 1 in order to identify the other parameters.

If  $\gamma_s = 0$ ,  $\beta_s = \beta$  and  $\mu_s = \mu$ ,  $\forall s$ , then eqn. (1) is none other than McFadden's classic multinomial logit (1974) in which taste homogeneity is assumed in the population. Hence, the latter consists of a single segment (Scarpa and Thiene, 2005).

## 5. The results

The results obtained by applying the latent model show the existence of three distinct segments of peach consumers. The number of segments was chosen by both taking account of information criteria<sup>2</sup> and ensuring that the various clusters obtained had a width and identifiability which is indispensable in the operative effects of marketing.

As may be seen in table 1, the first segment is characterized both by a clear preference for the Italian product, for certifying source and organic production, and by a lack of price-sensitivity. Indeed, the positive sign of the relative coefficient could indicate that the consumers belonging to this cluster use price as a quality indicator. According to estimates made, this first segment holds 48% of consumers. By contrast, the other two segments differ from the first in the presence of a clear, growing sensitivity to price. In both cases, the coefficient, in line with economic theory, has a negative sign. Moreover, cluster 2 seems to prefer the Spanish product, cluster 3 Turkish peaches in particular. The preference for certification remains constant in the three groups, albeit to different degrees.

As regards the two behavioral variables detected in the third section of the questionnaire and included in the model (*Relevance of COOL attribute* and *Buys Italian peaches*), these help characterize the segments more clearly. *Relevance of COOL attribute* is a Likert variable ranging from 1 to 7, while *Buys Italian peaches* is a dichotomous variable.

Indeed, cluster 1 shows positive coefficients for both variables, the opposite of cluster 3, while cluster 2 shows a positive effect of the variable *Relevance of COOL attribute* and a negative coefficient for the use of Italian peaches. In terms of cluster size, estimates of the probabilities of cluster membership indicated that 41% of the population belongs to segment 2, only 11% to segment 3.

Table 1 also reports the relative importance attached by consumers to the various attributes in making product choice. Given the signs of the coefficients of the various attributes, it appears even more evident that the first segment is looking first and foremost for a product whose country of



Table 1 - Latent class model estimate (3-class cluster model).

Variables	Class 1	p-value	Relative importance	Class 2	p-value	Relative importance	Class 3	p-value	Relative importance
Spain	-3,40	0,000	41,5	1,77	0,000	30,0	-0,91	0,000	3,5
Turkey	-1,37	0,000	16,7	-0,28	0,000	5,0	5,98	0,000	23,0
France	-0,15	0,000	1,8	-0,08	0,000	1,0	4,00	0,000	15,5
Organic	1,57	0,000	19,0	1,74	0,000	28,0	3,90	0,000	15,0
PDO/PGI	0,49	0,000	6,0	0,53	0,000	9,0	2,00	0,000	7,8
Price	0,40	0,000	15,0	-0,53	0,000	27,0	-3,01	0,000	35,2
Relevance of COOL attribute	1,49	0,009		0,54	0,000		-0,29	0,009	
Buys Italian peaches	3,95	0,001		-0,14	0,000		-0,43	0,001	
Class n.	144			123			33		
Cluster membership probabilities	48%			41%			11%		

n. = 300  
 Loglik = - 1089  
 BIC = 23315; AIC = 2227  
 AIC3 = 2251; CAIC = 2338

origin is clear, which is organic and whose price provides the assurance of high quality. The second segment, by contrast, seeks a healthy product (Organic) but at a moderate price. By contrast, segment 3 uses price as the main driver of purchase.

## 6. Conclusion

Competitive markets are the contexts where product development and promotion strategies are best implemented. The agri-food sector has a diversified and continuously evolving framework. For some product types, such as fruit and vegetables, product differentiation on worldwide markets has been left to generic and immaterial attributes often related to country of origin.

The results obtained in our survey appear to indicate in the German peach market the existence of three distinct consumer segments, differentiated by two elements. The first is the importance of the product's COOL has on choice. The second is related to the role of the *Price* attribute in the purchase process.

Also on the basis of the relative importance estimated for the different attributes in the various clusters, it would seem that the first segment consists of consumers mainly attentive to COOL attribute and who strongly prefer Italian peaches. This perception is borne out by the fact that, on comparing the relative importance attributed to *Organic* and *PDO/PGI* in the various segments, the latter are either comparable or, in some cases, greater in segments 2 and 3. Moreover, consumers in segments 2 and 3 are also more price-sensitive.

In other words, for segment 1 which represents about 50% of consumers, Italian provenance is, very probably, the most credible guarantee of quality.

If we bracket segments 1 and 2 together, our results indicate that about 90% of consumers use COOL attribute as a major attribute in the choice process. This evidence suggests the advisability of a strategy to develop fresh fruit and vegetables based on origin.

However, comparing the results obtained by this research with the evolution of the peach market in Germany during the last decade, it seems clear that although the image of Italy with respect to this product continues to be quite strong, Spain is gradually improving its image in terms of COOL. This also emerges quite clearly when German consumers were asked to indicate the best country for peach production. Our survey suggests Spain is a little bit on Italy according to German consumers (Figure 2). Reading this result in the light of the characteristics of cluster 2, characterized by a clear preference for the Spanish product, it is perhaps more accurate to say that according to a relevant segment of German consumers (41%), Spain offers the best value for money peaches on market. Unlike the market segment that shows a strong preference for Italian products (cluster 1), the segment that harbors a strong preference for the Spanish product places great attention to price.

So pushing the lever only on COOL does not seem a winning strategy for the Italian production on German peach market.

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