ARE PREFERENCES FOR RED WINE IN SPECIAL OCCASION HETEROGENEOUS?: FORCED VERSUS NON FORCED APPROACH

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2. OBJECTIVES

- The objective of this research is twofold:
  - To use the Dual Response choice design as an alternative to the traditional CE design usually used to compare both approaches.
  - To assess consumer preferences and willingness to pay of red wine consumed in a special occasion in Catalonia obtained from forced and non-forced choice.
3. CASE STUDY

- The wine sector in Catalonia, as in overall Spain, represents an important fraction of its agriculture and food industry.

- In Catalonia there are 12 Designations of Origin (DO), including the DO Cava.

- They represent more than 90% of the grape growing surface in Catalonia → wine production is specialised in quality wine (DO)
3. CASE STUDY

- Wine household consumption in Catalonia has diminished from 21.1 litres per capita in 1999 to 13.2 in 2009.
- Nevertheless, for the same period, quality wine consumption has risen 14.2%.
- Consumers are experiencing a change of habits, diminishing wine consumption frequencies, but demanding higher quality wines.
3. CASE STUDY

- The market share of Catalan DO wines in retailer channels and in the HORECA sector in Catalonia is low, concentrating all together the 27.1% in the rolling year ended in September 2007.

- Under this environment, it is of our interest to determine consumers’ wine preferences in Catalonia.
The traditional and common approach is to analyze forced versus non-forced choices is to realize two studies simultaneously.

### 4. METHODOLOGY:
#### 4.1. The Experimental Design

#### Sample 1

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Attribute 1  ($A_1$)</td>
<td>Level 1 ($L_{1,1}$)</td>
<td>Level 2 ($L_{1,2}$)</td>
<td>No-Choice</td>
</tr>
<tr>
<td>Attribute n ($A_n$)</td>
<td>Level 3 ($L_{4,3}$)</td>
<td>Level 1 ($L_{4,1}$)</td>
<td></td>
</tr>
</tbody>
</table>

1. Considering these available products “A” and “B”, which product would you choose? “A” □ “B” □ Neither “C” □

#### Sample 2

<table>
<thead>
<tr>
<th>Choice set #1</th>
<th>Alt. “A”</th>
<th>Alt. “B”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attribute 1  ($A_1$)</td>
<td>Level 1 ($L_{1,1}$)</td>
<td>Level 2 ($L_{1,2}$)</td>
</tr>
<tr>
<td>Attribute n ($A_n$)</td>
<td>Level 3 ($L_{4,3}$)</td>
<td>Level 1 ($L_{4,1}$)</td>
</tr>
</tbody>
</table>

1. Considering that “A” and “B” are the only available products, which product would you choose? “A” □ “B” □
4. METHODOLOGY:
4.1. The Experimental Design

The alternative approach is the Dual Response Choice Experiment design that we propose in our work.

<table>
<thead>
<tr>
<th>Choice set #1</th>
<th>Alt. “A”</th>
<th>Alt. “B”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attribute 1 (A₁)</td>
<td>Level 1 (L₁₁)</td>
<td>Level 2 (L₁₂)</td>
</tr>
<tr>
<td></td>
<td>Level 3 (L₄₃)</td>
<td>Level 1 (L₄₁)</td>
</tr>
<tr>
<td>Attribute n (Aₙ)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Considering that “A” and “B” are the only available products, which product would you choose? “A” □  “B” □
2. Would you purchase your chosen product?  Yes □  No □
Independent of the decision to include or exclude an “opt-out option”, the usually applied model fall within the standard Multinomial Logit. The main assumption that underlie the formulation of this model is the IIA (Independence of Irrelevant Alternatives) constraint.

Several models are defined to overcome this limitations. The HEV model relaxes the restrictive IIA property of the MNL model by allowing different scale parameters across alternatives.
4. METHODOLOGY:
4.2. The Econometric modeling

- Probability that an individual will choose alternative $i$ from the set $C$

$$P_i = \Pr (U_i > U_j) = \Pr (\varepsilon_j \leq V_i - V_j + \varepsilon_i) = \int_{\varepsilon_j = -\infty}^{\varepsilon_j = +\infty} \prod_{j \in C, j \neq i} \Lambda \left[ \frac{V_i - V_j + \varepsilon_i}{\theta_j} \right] \frac{1}{\theta_i} \lambda \left( \frac{\varepsilon_i}{\theta_i} \right) d\varepsilon_i$$

- The above probability expression collapses to the MNL

$$P_{in} = \frac{e^{\mu V_{in}}}{\sum_{i=1}^{I_i} e^{\mu V_{in}}}$$

- Are different in the HEV

- The Utility function:

$$V_{in} = ASC_{no\ choice} + \sum_k \beta_k X_{ki}$$
4. METHODOLOGY:
4.2. The Econometric modeling

The Utility function to analyze consumers’ heterogeneity:

\[ V_{in} = ASC_0 + \sum_k \beta_k X_{ki} + \sum_k \sum_p \alpha_{kp} (X_{ki} \times S_{pn}) \]

The relationship between the valuations of attributes and respondents particular characteristics (social, demographic and behavioral variables) are included.
5. EMPIRICAL APPLICATION:

5.1. Attributes and levels

- Wine is a difficult and confusing product for consumers to choose (Lockshin et al., 2006) → immense number of cues

- Attributes and levels:
  - Type: Red, White, Rosé, Sparkling, Liquored
  - COO
  - DO
  - BRAND
  - PRICE
  - PACKAGING
  - AWARDS
  - TASTE
  - GRAPE
  - ALCOHOL CONTENT
When consumers do not have information about the product, it generally performs as a proxy to infer the quality of the product when:

1. The product cannot be evaluated
2. The risk of making a wrong choice is high

It will depend on the consumption occasion

Christmas
5. EMPIRICAL APPLICATION:

5.1. Attributes and levels

- Plays a key role in the consumers’ decision making process

- In Spain, DO have been claimed as main determinant of wine prices and significant for consumers choices.

- Nevertheless, studies in Catalonia had not been yet performed
5. EMPIRICAL APPLICATION:

5.1. Attributes and levels

- For some authors, the key unit of decision is the brand.
- In our super communicated societies, consumers’ minds reject to store some information, meaning the amount of information that consumers use to make a decision is small.
- Or, we could consider generic types.
- In Spain, mixed results have been found.

In our experiment, we added two French varieties, and a typical traditional Spanish variety. We aim to determine if the preference is for French varieties in general.
Prior tasting experience and recommendations have been determined as consumers’ main selection cues when buying wine in retail stores.

By the third level we try to ascertain the effect of a known brand name in front of the other two alternatives.
5. EMPIRICAL APPLICATION:

5.2. Experimental design

<table>
<thead>
<tr>
<th>Attributes</th>
<th>symbols</th>
<th>Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origin</td>
<td>A&lt;sub&gt;1&lt;/sub&gt;</td>
<td>Catalonia (regional), Spain (national), Imported (international)</td>
</tr>
<tr>
<td>Knowledge</td>
<td>A&lt;sub&gt;2&lt;/sub&gt;</td>
<td>Own Experience, Recommendation, Prestige</td>
</tr>
<tr>
<td>Variety</td>
<td>A&lt;sub&gt;3&lt;/sub&gt;</td>
<td>Cabernet Sauvignon, Grenache, Merlot</td>
</tr>
<tr>
<td>Price</td>
<td>A&lt;sub&gt;4&lt;/sub&gt;</td>
<td>€6 , €10, €14</td>
</tr>
</tbody>
</table>

- A full orthogonal factorial design → 81 hypothetical products can be generated from \(3^4 \times 3^4\) (6,561) possible combinations.
- Orthogonal fractional factorial design → 9 choice sets
## 5. EMPIRICAL APPLICATION:

### 5.2. Experimental design

<table>
<thead>
<tr>
<th>ELECTION #1</th>
<th>Alternative “A”</th>
<th>Alternative “B”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origin</td>
<td>Foreign</td>
<td>Catalonia</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Prestigious</td>
<td>Personal experience</td>
</tr>
<tr>
<td>Variety</td>
<td>Grenache</td>
<td>Merlot</td>
</tr>
<tr>
<td>Price</td>
<td>€6</td>
<td>€14</td>
</tr>
</tbody>
</table>

1. Considering that “A” and “B” are the only available products, which product would you choose?  
   - “A” □  
   - “B” □  

2. Would you purchase your chosen product?  
   - Yes □  
   - No □
5. EMPIRICAL APPLICATION:

5.3. Heterogeneity analysis

- Included variables to analyze consumers’ heterogeneity:
  - Social and economic variables:
    - Gender
    - Age
    - Household social class
    - Place of birth
  - Behavioral variables related to wine involvement:
    - Wine purchase frequency
    - Reading the information about wine published on the press
  - Variables related to attitude towards Catalan wines:
    - Catalan wines have good flavor, texture and palate
    - Catalan wines possess well known brands and have public prestige and,
    - Catalan wines are reasonably priced

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5. EMPIRICAL APPLICATION:
5.3. Heterogeneity analysis

As an example, the utility function for the gender variable:

$$V_{jn} = ASC_{OPT-OUT} + \beta_{ORIG_1} \cdot ORIG_{1j} + \beta_{ORIG_2} \cdot ORIG_{2j}$$
$$+ \beta_{KNOW_1} \cdot KNOW_{1j} + \beta_{KNOW_2} \cdot KNOW_{2j}$$
$$+ \beta_{VAR_1} \cdot VAR_{1j} + \beta_{VAR_2} \cdot VAR_{2j}$$
$$+ \beta_{Price} \cdot PRICE_j$$
$$+ \beta_{ORIG_1 \times GEN} \cdot ORIG_{1 \times GEN} + \beta_{ORIG_2 \times GEN} \cdot ORIG_{2 \times GEN}$$
$$+ \beta_{KNOW_1 \times GEN} \cdot KNOW_{1 \times GEN} + \beta_{KNOW_2 \times GEN} \cdot KNOW_{2 \times GEN}$$
$$+ \beta_{VAR_1 \times GEN} \cdot VAR_{1 \times GEN} + \beta_{VAR_2 \times GEN} \cdot VAR_{2 \times GEN}$$
$$+ \beta_{PRICE_1 \times GEN} \cdot PRICE \times GEN$$
Data used in this analysis was obtained from a face-to-face questionnaire with 400 consumers that were qualified by having purchased a bottle of wine in the last 3 months.

<table>
<thead>
<tr>
<th>Population</th>
<th>Consumers over 20 years who purchase regularly food and are residents in the metropolitan area of Barcelona.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Design</td>
<td>Stratified sample by age and postal districts using proportional affixation to the number of persons by stratum.</td>
</tr>
<tr>
<td>Field</td>
<td>Metropolitan area of Barcelona</td>
</tr>
<tr>
<td>Sample Size</td>
<td>400</td>
</tr>
<tr>
<td>Confidence interval</td>
<td>± 4.9</td>
</tr>
<tr>
<td>Confidence level</td>
<td>95.5% (k=2)</td>
</tr>
<tr>
<td>Control measure</td>
<td>Pilot survey (25 questionnaires)</td>
</tr>
</tbody>
</table>
6. RESULTS

6.3. Heterogeneity of consumers’ preferences

- All obtained models are significant and show a good fit with highly significant likelihood ratios.

- Consumers’ red wine preferences for a special occasion in Catalonia are highly heterogeneous. Nevertheless, a general TREND might be elicited from all estimated models.
  - CATALAN origin and the CABERNET SAUVIGNON variety are the most preferred attribute levels.
  - PREVIOUSLY EXPERIENCED wines are preferred over recommended or prestigious wines in most cases.
6. RESULTS

- The willingness to pay for the overall preferred ORIGIN (Catalonia) is higher when the opt-out option is included.
- The exceptions are the OLDEST SEGMENT of consumers (from 60 to 70 years old) and FOREIGN consumers.
- For a SPANISH origin, IPs are lower when the opt-out option is taken into consideration, although they REMAINED POSITIVE in all cases.
- The exceptions are the YOUNGEST SEGMENT of consumers (from 20 to 34 years old), the Spanish consumers that were BORN OUT OF CATALONIA and the UPPER SOCIAL CLASSES.
- A FOREIGN wine origin DIMINISHES the willingness to pay when the opt-out option was included, thus heightening its negative utility.
6. RESULTS

6.3. Heterogeneity of consumers’ preferences. The Implicit Price-IP

- The willingness to pay for the preferred GRAPE VARIETY (Cabernet Sauvignon) is higher when the opt-out option is included.
- The exceptions are HIGH FREQUENCY wine buyers and those AGREEING with the aspects related to CATALAN WINES (good taste, known and prestigious brands and reasonable prices).
- For GRENACHE, there is not such a defined trend in the willingness to pay when comparing forced and non-forced choices.
- For MERLOT, the willingness to pay generally DIMINISHES when the opt-out option was included, except for those agreeing with CATALAN WINES having known and PRESTIGIOUS BRANDS.
6. RESULTS

- For the generally preferred level (a PREVIOUSLY TASTED WINE) the willingness to pay tends to be higher when the opt-out option is included.
- The exceptions are MEN, the MIDDLE SOCIAL CLASS and those DISAGREEING with the aspects related to CATALAN WINES (good taste, known and prestigious brands, and reasonable prices).

- For RECOMMENDED wines, the willingness to pay generally decreases, although a great variability is also found.

- PRESTIGIOUS wines also DECREASE the willingness to pay when the opt-out option is included.
- The exceptions are the YOUNGEST segment of consumers (from 20 to 34 years old), consumers that seek wine INFORMATION on the press and those AGREEING with Catalan wines having GOOD TASTE and REASONABLE PRICES.
7. CONCLUSIONS

7.1. Methodological results

- The DRCE design has showed its capacity to analyze in one experiment forced and non forced choice.
- Non-forced choices heighten preferred levels by increasing their welfare estimates (and vice versa).
- This tendency is more clearly shown in the most valued attribute (origin).
- The HEV model is shown to be a good alternative to the standard MNL by relaxing the IIA restriction.
- More empirical studies need to be done comparing the DRCE design with the traditional CE design.
7. CONCLUSIONS

7.2. Empirical results

- Consumers have a high preference for the local (CATALAN) origin of the wine.

- The second highest preference refers to the “Cabernet Sauvignon” Variety.

- Wines that have been previously tasted by the consumer seem to be preferred over recommended or prestigious wines.
¡MUCHAS GRACIAS POR SU ATENCIÓN!