**PROBLEM SET**

**CONJOINT ANALYSIS**

**AEM 6700**

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1. Results of the estimation process:

Table 1: Results of the estimation process for the choice of TV based on the given attributes.

|  |  |  |
| --- | --- | --- |
| **Choice** | **Coefficient** | **Standard error** |
| **Samsung** | **.4325852 \*\*\*** | **.1023103** |
| **Threed** | **.4545707 \*\*\*** | **.106483** |
| **S40** | **.8765847 \*\*\*** | **.1408419** |
| **S50** | **2.271936 \*\*\*** | **.1371057** |
| **P500** | **-1.144556 \*\*\*** | **.1195636** |
| **P600** | **-1.86852 \*\*\*** | **.1276758** |
| **Constant** | **-1.473095 \*\*\*** | **.1520537** |
| **Observations** | **2520** |  |
| **Groups** | **70** |  |

**Note: \*\*\* p-value < 0.01, \*\* p-value < 0.05, \* p-value < 0.1**

1. The data manipulation of the code is concerned with the construction of a dataset that shows the choices (in a form of panel) for the 70 respondents when they were comparing the three different profiles for each of the 12 choice sets. After organize the database with this structure a random effects logit model is estimated. This model estimates:

Where is the choice of the respondent in the question , is a vector of characteristics of the that explain the choice, in this example, the brand of the TV, the screen size, price and whether support 3D technology. is the Cumulative Distribution Function for the Logistic Distribution. is a measure of heterogeneity.

1. The results shown in question 1 are the marginal effects, given that all our all explanatory variables are categorical, the coefficients represent changes in percentage points of be chosen compared to the omitted category, for instance:

* The probability to be chosen is 43 percentage points (pp.) greater for a Samsung TV compared with a Sony TV.
* The probability to be chosen is 45 pp. greater for a TV with 3D support compare with another without 3D support.
* The probability to be chosen is 87 pp. for a TV of 40 inches compared with the rest of TV’S. Besides, the probability to be chosen is 227 pp. greater for a TV of 50 inches compared with the rest of TVS.
* The probability to be chosen is 114 pp. lower for a TV that costs 500 USD compared with the others. Also, the probability to be chosen is 186 pp. lower for a TV that costs 600 USD compared with the other options.

1. Initially we are going to show the results for the part-worth functions for each attribute:

Table 1:

|  |  |  |
| --- | --- | --- |
| Attributes | | Value utility |
| Utility Brand | Samsung | 0.4325852 |
| Sony | 0 |
| Utility 3D | 3D | 0.4545707 |
| Not 3D | 0 |
| Utility Screen | 30’ | 0 |
| 40’ | 0.8765847 |
| 50’ | 2.271936 |
| Utility Price | 400 USD | 0 |
| 500 USD | -1.144556 |
| 600 USD | -1.86852 |

Then, we can measure attribute importance (AI) by taking the difference in highest and lowest utility for an attribute, and then divided by the sum of the differences in highest and lowest utility over all attributes:

The table summarize and define the calculation for the importance of each attribute in the TV choices example:

Table 1:

|  |  |
| --- | --- |
| Attribute importance for: | Calculation: |
| Brand |  |
| 3D |  |
| Screen |  |
| Price |  |

i.) The total utility for a TV Samsung, with 3D technology, 40’ screen size and a price of 500 USD is:

On the other hand, the total utility for the same TV with a 50’ screen size is:

The difference in utility between the options is 1.3953513, which means that consumer would expect a decrease in the utility of prices of 1.3953513, to be just as happy as before. That change in utility of prices is relate with an increase in prices from 500 USD to 600 USD.

Then, the amount that the consumers are willing to pay for the increase of the screen size to 50’ is:

Then we can see that the consumers are willing to pay 192.73 USD to increase the size of the TV to 50’ keeping all the other characteristics at the same level. This results means that for the average consumer a TV Samsung, with 3D technology, 40’ screen size and a price of 500 USD, yields the same utility that a TV Samsung, with 3D technology, 50’ screen size and a price of 692.73 USD.

ii.) The total utility for a TV Samsung, with 3D technology, 40’ screen size and a price of 500 USD is:

On the other hand, the total utility for the same TV without 3D technology is:

The difference between the options is -0.4545707, which means that consumer would expect an increase in the utility of prices of 0.4545, to be just as happy as before. That change in utility of prices is relate with a reduction in price from 500 USD to 400 USD.

Then, if the TV does not have 3D, the consumer would expect in average a reduction of the price of:

Under the baseline, for a TV without 3D technology, the consumer would expect in average a reduction of the price of 39.7 USD. This results means that for the average consumer a TV Samsung, with 3D technology, 40’ screen size and a price of 500 USD, yields the same utility that a TV Samsung, without 3D technology, 40’ screen size and a price of 460.28 USD.

1. To estimate the market share for a TV Sony, 40’, 400 USD and without 3D technology, first we need to calculate its utility level, and the utility level of another possible options that that customer is considering:

Option 1: Utility for a TV Sony, 40’, 400 USD and without 3D technology = 0.8765847

Option 2: Utility for a TV Samsung, 50’, 600 USD and with 3D technology = 1.2905719

Option 3: Utility for a TV Samsung, 30’, 400 USD and without 3D technology = 0.4325852

Option 4: Utility for a TV Sony, 50’, 500 USD and without 3D technology = 1.12738

Then we can estimate the market share for our option of interest (option1) as follows:

The market share for option of interest is 22.5%.

1. The conjoint analysis is related with the discrete/random utility theory in the sense that the latter is the base in which the former can analysis of stated or revealed choice data. All the options that offer the conjoin analysis to make trade off calculations, calculate importance of the attributes of a product and predict market shares for certain products with define attributes is based in the capacity of the consumer to choose the products based on the attributes that yields higher utility levels. If the random utility theory would not contribute with the explanation and modelling of consumer’s choices, it is possible that the conjoint analysis would not be as powerful as it seems to make managerial decisions.