Week 10 and 11 : Conjoint Analysis.

1. Conjoint Analysis.

1. Define a product as collection of attributes.
2. consumer react to number of alternatives (options)
3. we come to know
   - importance of each attribute
   - most desired level for a consumer — "IDEAL PRODUCT"

2. forms of conjoint analysis.

1. Choice-Based conjoint analysis.
   - chooses their most preferred product from set of options provided.
   - example : pair-wise options given.

2. Adaptive conjoint analysis
   - each consumer is asked different set of questions which are dynamically decided based on their responses.

3. Full-Profile conjoint analysis.
   - full suite of options are presented to the consumer and their preference is soughted.

4. Menu base conjoint analysis.
   - consumer is shown list of attributes with prices. Then consumer chooses what they want. They need to pay attention on prices while making decisions.

3. Applications of conjoint Analysis.

1. Marketing - Highlight most preferred attribute.
2. Product development - Refine attributes most preferred.
3. Pricing - conjoint Analysis reveals customer's WTP*
4. Competitive Analysis. - competitors product attributes.

WTP* - willingness to pay.

4. Standard format for collecting data

- mathematical approach
  - Optimization method
    - pair-wise preference
      - choice-based
- Statistical approach
  - linear regression
    - ranking / rating
      - full-profile.

5. same as 1.

6. no. of pair wise preferences possible. $= \frac{n(n-1)}{2}$ where n = no. of products

$= \frac{4 \times (4-1)}{2}$

$= 6$

7. Objective function

$$\min \quad \sum z_{jk}$$

where z_{jk} = function of poorness of fit.

the poorness of fit is because of violation with regards to wrong preferences made due to poor cognitive skills.

8. Function of poorness of fit = function of squared distance between ideal product point and preferred product point.

9. options for rate/rank for performing the conjoint analysis = no. of options of attribute 1 × no. of options of attribute 2 × ⋯ × no. of options of k^m attribute

(in our case) = no. of options in brands × no. of options in engine × no. of options in gearbox

$= 3 \times 2 \times 3$

$= 18$

10. In statistical approach → Linear Regression → Ranking / Rating

↓

[value of attributes are categorical] : full profile

11. For consumer to prefer O_1, O_1 should be closer to ideal product point x than O_2

$\therefore d_1 < d_2$ for preference of lover 2

12. pair-wise preferences data based on consumer's evaluation is going to be collected.

$\therefore$ Choice-Based conjoint analysis.

13. no. of pair $= \frac{n(n-1)}{2}$ n = no. of product variants.

$= \frac{5(5-1)}{2}$

$= 10.$

14. The customer is shown all possible combinations available.

$\therefore$ full-profile conjoint analysis.

15. Statistical approach $\longrightarrow$ Linear Regression (MRL)

$\downarrow$

attributes level (explanatory variable) $\longleftarrow$ Ratings / Ranking (response variable) $\longleftarrow$ (categorical)

$\downarrow$

Estimated (β) Betas (part worth) $\longrightarrow$ R^2 characterizes the consistency of respondent (consumer)