Discussion: Conjoint Controversy

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What Is the Controversy All About?

- Average Marginal Component Effect (AMCE)

$$\mathbb{E}\{Y_i([1BC],[A'B'C']) - Y_i([0BC],[A'B'C'])\}$$

  Average difference in the probability of choosing candidate ABC over candidate $A'B'C'$ when changing A from 0 to 1

- Abramson, Kocak, and Magazinnik (AKM)
  1. AMCE does not reflect majority preferences
  2. AMCE combines direction and intensity of preferences

Rank	V1	V2	V3	V4	V5
1.	MR	MR	MR	FD	FD
2.	FR	FR	FR	FR	FR
3.	MD	MD	MD	MD	MD
4.	FD	FD	FD	MR	MR

Table 2—Preferences over candidate profiles

- majority prefers Male over Female regardless of party (Democrat and Republican)
- AMCE (Male vs. Female) < 0
  - $V1 - V3$ care more about party
  - $V4 - V5$ care more about gender

Bansak, Hainmueller, Hopkins, and Yamamoto (BHHY)

- Two interpretations of the AMCE
  1. AMCE as an average rank = Borda rule (AKM)
  2. AMCE as an average difference in voteshare $\rightsquigarrow$ original interpretation

- All of these claims are true:
  - No disagreement on what AMCE is and is not
  - Disagreement is about whether AMCE is useful for electoral studies

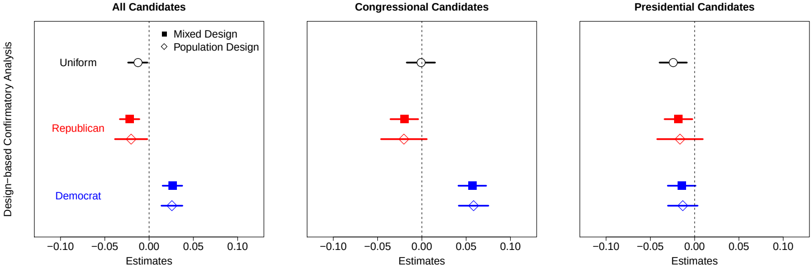
AMCE is Based on Averages

- Three averages define the AMCE

$$\mathbb{E}\{Y_i([1BC],[A'B'C']) - Y_i([0BC],[A'B'C'])\}$$

1. other attributes of one's own BC
2. attributes of one's opponent $A'B'C'$
3. respondents $Y_i([abc],[a'b'c'])$

- Choice of profile distributions matter (de la Cuesta, Egami & Imai, in-press)



- Do not use uniform distributions without justification!

Interactions, Interactions, Interactions

- Conjoint is all about interactions
  - no interaction $\rightsquigarrow$ "Do you prefer male or female candidates?"
  - taste-based vs. statistical discrimination
- Two kinds of interactions may interact: attributes and respondent characteristics
- If there is no interaction,
  - ACME is invariant to the profile distributions
  - No disagreement between AKM and BHHY
- BHHK: "Beyond AMCEs"
  1. Probability of winning for a candidate with $A = a$: $\mathbb{E}[1_{\{\mathbb{E}_Y[Y_i([aBC],[A'B'C'])]>0.5\}}]$
  2. Fraction of voters preferring a candidate with $A = a$: $\mathbb{E}_Y[1_{\{\mathbb{E}[Y_i([aBC],[A'B'C'])]>0.5\}}] \neq \mathbb{E}_Y[1_{\{\mathbb{E}[Y_i([aBC],[ABC])]>0.5\}}]$
- AKM+S estimates the 2nd quantity (AFCP) using machine learning
- Both of these quantities require modeling of preferences

Modeling Multidimensional Preferences

- (Saturated) Random utility model: $U_i(abc) \sim a * b * c$
- With a typical sample size, three-way or higher order interactions can be ignored
- ANOVA with sum-to-zero constraints

$$\begin{aligned} U_i(ABC) \;=\; & \mu + \sum_a \beta_a \mathbf{1}_{\{A=a\}} + \sum_b \beta_b \mathbf{1}_{\{B=b\}} + \sum_c \beta_c \mathbf{1}_{\{C=c\}} + \\ & \sum_{ab} \beta_{ab} \mathbf{1}_{\{A=a,B=b\}} + \sum_{bc} \beta_{bc} \mathbf{1}_{\{B=b,C=c\}} + \sum_{ca} \beta_{ca} \mathbf{1}_{\{A=a,C=c\}} + \epsilon_i(ABC) \end{aligned}$$

where, for example, β_a is AMCE and β_{ab} is AMIE

- Forced choice:

$$\begin{aligned} & Y_i([ABC],[A'B'C']) \\ = \; & \mathbf{1}_{\{U_i(ABC) > U_i(A'B'C')\}} \\ = \; & \mathbf{1}_{\left\{\sum_a \beta_a [\mathbf{1}_{\{A=a\}} - \mathbf{1}_{\{A'=a\}}] + \cdots + \sum_{ab} \beta_{ab} [\mathbf{1}_{\{A=a,B=b\}} - \mathbf{1}_{\{A'=a,B'=b\}}] + \cdots + \epsilon_i^* > 0\right\}} \end{aligned}$$

- Linear probability, logistic regression models with regularization

Concluding Remarks

- The debate between AKM and BHHY has clarified:
  1. What AMCE is and is not
  2. Importance of profile distributions and interactions
  3. Potential roles of alternative quantities of interest
  4. Use of machine learning for modeling multidimensional preferences

- The only disagreement is NOT methodological:
  - Which quantity of interest is more appropriate?
  - Must be judged for a given application

- Future research of interest
  - Estimation of heterogeneous preferences (initiated by AMK+S)
  - Hypothesis testing using machine learning