

How to use estimated demand

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1 A new measure

Let \hat{x}_{1c} estimated collective choice using individual 1's estimated utility function. Likewise, \hat{x}_{2c} , \hat{x}_{12} , \hat{x}_{21} are available. In addition, original choice data x_c , x_1 , x_2 are also in our hand.

Abusing the notation, let's denote $x_{cj} \in \hat{x}_1$ if MSE after adding group choice in j round to individual 1's data is not bigger than MSE_1 , MSE only with 1's original choice data. Like above, we have $x_{cj} \in \hat{x}_2$, $x_{1j} \in \hat{x}_2$, $x_{2j} \in \hat{x}_1$.

We can construct a couple of measures using these raw materials.

1. Pareto Efficiency

- There is no other collective choice which Pareto improves original collective choice if $x_c \in [\hat{x}_{1c}, \hat{x}_{2c}]$.
- Define an indicator on $x_c \in [\hat{x}_{1c}, \hat{x}_{2c}]$ and average that of 18 group choices.

2. Choice Similarity between Individuals

- $d(\hat{x}_{12}, x_2)$, $d(\hat{x}_{21}, x_1)$
- $\sum 1(x_{1j} \in \hat{x}_2)$, $\sum 1(x_{2j} \in \hat{x}_1)$
- In fact, this definition contains both similarity of risk preference and rationality.
- Can be another RP similarity measure if we confine pairs with both rational individuals?

3. Choice Similarity between Individual and Pair

- $d(\hat{x}_{1c}, x_c)$, $d(\hat{x}_{2c}, x_c)$
- $\sum 1(x_{cj} \in \hat{x}_1)$, $\sum 1(x_{cj} \in \hat{x}_2)$

2 Utilization

1. Individual-individual choice similarity and Pareto efficiency/collective rationality
2. Plot (collective round, $(d(\hat{x}_{1c}, x_c), d(\hat{x}_{2c}, x_c))$), (collective round, $(d(d(\hat{x}_{1c}, x_c), d(\hat{x}_{2c}, x_c)))$)
 - Similarly, plot (collective round, $(1(x_{cj} \in \hat{x}_1), 1(x_{cj} \in \hat{x}_2))$)
 - We can study heterogenous ways in group decision
 - For example, whether "taking turns" is generally observed or not
 - Are patterns different according to friendship status of two individuals?
3. Can we interpret $\sum 1(x_{cj} \in \hat{x}_1), \sum 1(x_{cj} \in \hat{x}_2)$ as hegemony of each individual in pair decision? Then,
 - Relationship between hegemony and individual rationality
 - Relationship between hegemony and other variables from survey(network characteristics, academic performance, gender etc)