Behavioral Economics - 1820

Suggested solutions: Midterm[1]

Question 1

		Price			
		1	2	3	4
Observation	1	$5+2\alpha$	7	3	5
	2	$10+\alpha$	11	3	4
	3	$1+2\alpha$	3	7	9
	4	$1+\alpha$	2	6	7

1.1

$2R^D1$, $2R^D3$, $2R^D4$, $3R^D1$, $3R^D2$, $3R^D4$, $4R^D1$, $4R^D2$, $1R^D3$, $1R^D4$, and if $\alpha \geq 5$: $1R^D2$

and also, $4R3$, and if $\alpha < 5$, $1R2$.

Also, all of the R^D are strict (unless $\alpha = 5$).

1.2

No, this data is not rationalizable by a strictly monotonic utility function. This data violates GARP, so by Afriat's theorem, it cannot be rationalized. For example, $2S3$ and $3S2$; no utility function's going to give that result.

1.3

We know that Trip 1 saw {O, E}, Trip 2 saw {O, E}, Trip 3 saw {E, M}, Trip 4 saw {E, M}.

So, from this we know that $2R^D1$, $3R^D4$. Also, if $\alpha \geq 5$, then $1R^D2$.

1.4

For $\alpha < 5$ this data has no violations, and can be rationalized by any sort of utility function such that $u_2 > u_1$ and $u_3 > u_4$, and $N_1 = N_2 = \{M\}$, $N_3 = N_4 = \{O\}$

1.5

Here, something along the lines of "No violations of GARP for those bundles where the same set of items are known to be observed".

Question 2

2.1

For example, let $\theta = 1$, p(x)=10 , d(x)=2 , p(y)=2, and d(y)=8. Then U({x,y})=12+(10-10)+(2-8)=6, U({x})=12+(10-10)+(2-2)=12, and U({y})=10+(2-2)+(8-8)=10.

More generally, for an arbitrary θ, U({x,y})=12-6θ. So, larger menus are always weakly preferred if and only if $\theta = 0$.

[1] If you find any typos, please let me know at john_mcneill@brown.edu.

2.2

No. See 2.1; both smaller menus are strictly preferred, in violation of set betweenness.

2.3

Yes, they will satisfy sophistication. Heuristically: adding an element can only increase the utility of a menu if it increases the [max p(x)+d(x)] term; otherwise it can only lower the utility of the menu. From the description in the problem, we know that they choose the max (p(x)+d(x)) elements, so if they prefer the larger menu then they must choose the additional element. More formally, can show this through the contrapositive: if x is not preferred to the other elements of $A \cup \{x\}$, then there exists some $w \in A \cup \{x\}$ s.t. $p(w)+d(w) \geq p(x)+d(x)$, and $w \neq x$. Thus, $U(A \cup x) = p(w)+d(w)+\theta[p(w)-max_{y \in A \cup \{x\}} p(y)]+\theta[d(w)-max_{z \in A \cup \{x\}} d(z)] \leq U(A) = p(w)+d(w)+\theta[p(w)-max_{y \in A} p(y)]+\theta[d(w)-max_{z \in A} p(z)]$, so $A \cup \{x\} \preceq A$.

2.4

Lots of things could work here. For example, although we can have violations of set betweenness, we cannot see $A \cup B \succ A$ and $A \cup B \succ B$. The best answers will be most closely tied to the specific features of the model - for example, although the utility function representation means that preferences over menus will be transitive, that claim is not particular to this model, so is less helpful than something that describes an essential characteristic of the model, which in this case is the possibility of regret.

Question 3

3.1

Using the formula from the lecture notes, we know that $\%correct = \frac{exp(\frac{c}{\lambda})}{1+exp(\frac{c}{\lambda})}$.

So, $\frac{2}{3} = \frac{exp(\frac{ln(2)}{\lambda})}{1+exp(\frac{ln(2)}{\lambda})} \implies \lambda = 1$.

3.2

Baseline utility: $\frac{2}{3}ln(2) - 1(0.5(\frac{2}{3}ln(\frac{2}{3}) + \frac{1}{3}ln(\frac{1}{3}) + 0.5(\frac{2}{3}ln(\frac{2}{3}) + \frac{1}{3}ln(\frac{1}{3}))) = ln(3)$

Under the new arrangement, they always win with the same probability p. So, they want the least costly information structure possible. Accordingly, alternative utility is:

$pln(2) - 1[0.5(0.5ln(0.5) + 0.5ln(0.5)) + 0.5(0.5ln(0.5) + 0.5ln(0.5))] + (1+p)ln(2)$

So, for the new utility to be greater, it has to be that $p \geq \frac{ln(3)}{ln(2)} - 1 = 0.585$