Preference for Commitment

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- In order to discuss preference for commitment we need to be able to discuss people's **preferences over menus**
- Interpretation: choosing a set of alternatives from which you will make a choice at a later date.
- You can think of this as literally choosing a menu
  - When you choose between two restaurants each has a different menu
  - This means that you will have different things to choose from when you actually sat down to dinner
- For example:
  - Restaurant A had a menu of f(ish) or b(urger): $\{f, b\}$
  - Restaurant B has a menu of b(urger) or s(alad) $\{b, s\}$
- If you prefer the first menu or the second menu we would write

$$A \succeq B$$

- Forget (for a minute) about temptation and self control
- What would be the standard way of assessing a menu of options $A = \{f, b\}$ and $B = \{b, s\}$?
    - If you like fish best, you should prefer A
    - If you like salad best you should prefer B
    - If you like burgers best you should be indifferent between A and B

- More generally, assume that you will choose the best option from the menu at the later date
- Then a menu A is preferred to menu B if the best option in A is better than the best option in B
- i.e.

$$\begin{aligned} A &\succeq B \text{ if and only if} \\ \max_{a\in A} u(a) &\geq \max_{b\in B} u(b) \end{aligned}$$

- Is it always better to have more options?
- From the point of view of the standard model, yes!
  - Or at least it will be not worse
- Add alternative a to a choice set A
  - Either a is preferred to all the options already in A
    - a will be chosen from the expanded choice set
    - $\{a\} \cup A$ is better than A
  - Or there is some b in A which is preferred to a
    - a will not be chosen from the expanded choice set
    - $\{a\} \cup A$ is no better, and no worse than A

- From the point of view of the standard model, bigger is always better
- DM will always prefer to have a bigger menu to choose from

$$\begin{aligned} B &\subset A \\ &\Rightarrow \max_{a \in A} u(a) \geq \max_{b \in B} u(b) \\ &\Rightarrow A \succeq B \end{aligned}$$

- This may not be the case if the DM suffers from problems of temptation:
- Classic example: A dieter might prefer to a restaurant with the menu

fish
salad

rather than one with the menu

fish
burger
salad

- Why?
- (At least) two possible reasons
  1. Would prefer to not eat the burger, but worries they will succumb to temptation if the burger is available
  2. Thinks they will be able to overcome the temptation to eat the burger, but it will be costly to do so

- Key point: No temptation when choosing **between** menus, only when choosing **from** menus
- We are going to discuss a model of menu preferences and choice that captures both these forces
- Based on the classic work of Gul and Pesendorfer [2001]
- Updated (and better explained) by Lipman and Pesendorfer [2013]

- Preference over menus given by

$$U(A) = \max_{p \in A} [u(p) + v(p)] - \max_{q \in A} v(q)$$

- u : 'long run' utility
- v : 'temptation' utility
- Interpretation:
    - Choose p to maximize $u(p) + v(p)$
    - Suffer temptation cost $v(p) - v(q)$
- Unlike the standard model, the Gul Pesendorfer model can lead to strict preference for smaller choice sets

$$A \supset B \text{ but } A \prec B$$

Object	u	v
Salad	4	0
Fish	2	1
Burger	1	4

- Which menu would the DM prefer? $\{s\}$ or $\{s, b\}$?

$$
\begin{aligned}
U(\{s\}) &= \max_{x \in \{s\}} (u(x) + v(x)) - \max_{y \in \{s\}} v(y) \\
&= 4 + 0 - 0 \\
&= 4
\end{aligned}
$$

$$
\begin{aligned}
U(\{s, b\}) &= \max_{x \in \{s,b\}} (u(x) + v(x)) - \max_{y \in \{s,b\}} v(y) \\
&= 1 + 4 - 4 \\
&= 1
\end{aligned}
$$

Object	u	v
Salad	4	0
Fish	2	1
Burger	1	4

- Menu $\{s\}$ preferred to $\{s.b\}$
- Interpretation: b would be chosen from the latter menu
  - $u(b) + v(b) > u(s) + v(s)$
- But s has higher long run utility
  - $u(s) > u(b)$
- The DM would rather not have b in their menu, because if it is available they will choose it.

- More generally, consider p, q, such that

$$\begin{aligned} u(p) &> u(q) \\ u(q)+v(q) &> u(p)+v(p) \end{aligned}$$

- Then

$$\begin{aligned} U(\{p\}) &= u(p) \\ U(\{p,q\}) &= u(q)+v(q)-v(q)=u(q) \\ U(\{q\}\} &= u(q) \end{aligned}$$

- Interpretation: give in to temptation and choose q
- Leads to the pattern

$$\{p\} \succ \{p,q\} \sim \{q\}$$

Object	u	v
Salad	4	0
Fish	2	1
Burger	1	4

- Which menu would the DM prefer? $\{s\}$ or $\{s, f\}$?

$$\begin{aligned} U(\{s\}) &= \max_{x \in \{s\}} (u(x) + v(x)) - \max_{y \in \{s\}} v(y) \\ &= 4 + 0 - 0 \\ &= 4 \end{aligned}$$

$$\begin{aligned} U(\{s, f\}) &= \max_{x \in \{s,f\}} (u(x) + v(x)) - \max_{y \in \{s,f\}} v(y) \\ &= 4 + 0 - 1 \\ &= 3 \end{aligned}$$

Why Preference for Smaller Choice Sets?

Case 2: Avoid 'Willpower Costs'

Object	u	v
Salad	4	0
Fish	2	1
Burger	1	4

- Menu $\{s\}$ is preferred to menu $\{s, f\}$
- However, this time, s would be chosen from both menus, as

$$u(s) + v(s) > u(f) + v(f)$$

- The DM still prefers to have f removed from the menu because it is more tempting: $v(f) > v(s)$
- The DM is able to exert self control if both options are on the menu, but it is costly to do so

- More generally, consider p, q, such that

$$\begin{aligned} u(p) &> u(q) \\ v(q) &> v(p) \\ u(p)+v(p) &> u(q)+v(q) \end{aligned}$$

- Then

$$\begin{aligned} U(\{p\}) &= u(p) \\ U(\{p,q\}) &= u(p)+v(p)-v(q) \\ U(\{q\}\} &= u(q) \end{aligned}$$

- Interpretation: fight temptation, but this is costly
- Leads to the pattern

$$\{p\} \succ \{p,q\} \succ \{q\}$$

- We say that q **tempts** p if $\{p\} \succ \{p, q\}$
- We say that a decision maker exhibits **self control** at A if there exists B, D such that $B \cup D = A$ and

$$\{B\} \succ \{A\} \succ \{D\}$$

- $\{B\} \succ \{A\}$ implies there exists something in A which is tempting relative to items in B
- $\{A\} \succ \{D\}$ implies tempting item not chosen
- If it were then

$$\begin{aligned}
\max_{p \in A} u(p) + v(p) &= \max_{p \in D} u(p) + v(p) \Rightarrow \\
U(A) &= \max_{p \in A} (u(p) + v(p)) - \max_{q \in A} v(q) \\
&\leq \max_{p \in D} (u(p) + v(p)) - \max_{q \in D} v(q) \\
&= U(D)
\end{aligned}$$

Why 'Long Run' and 'Temptation' Utilities?

- So far we have described u as 'long run' utility and v as 'temptation' utility
- Why is this a behaviorally appropriate description?
- u describes choices over singleton menus:

$$U(\{p\}) = u(p) + v(p) - v(p) = u(p)$$

  and so describes preferences when the DM is not tempted
- i.e.

$$u(p) \geq u(q) \Longleftrightarrow \{p\} \succeq \{q\}$$

Why 'Long Run' and 'Temptation' Utilities?

- v leads to temptation: q tempts p only if $v(q) > v(p)$
- Remember we said that q temps p if $\{p\} \succ \{p, q\}$
- Need to show that this only happens if $v(q) > v(p)$

Why 'Long Run' and 'Temptation' Utilities?

- Case 1: $u(p) + v(p) \geq u(q) + v(q)$
- Means that p will be chosen from p, q

$$
\begin{aligned}
\{p\} &\succ \{p,q\} \\
U(\{p\}) &> U(\{p,q\}) \\
&\Rightarrow u(p) > u(p) + v(p) - \max_{r \in \{p,q\}} v(r) \\
&\Rightarrow \max_{r \in \{p,q\}} v(r) > v(p) \\
&\Rightarrow v(q) = \max_{r \in \{p,q\}} v(r) > v(p)
\end{aligned}
$$

Why 'Long Run' and 'Temptation' Utilities?

- Case 2: $u(q) + v(q) > u(p) + v(p)$
- Means that q will be chosen from p, q

$$
\begin{array}{rcl}
\{p\} & \succ & \{p,q\} \\
U(\{p\}) & > & U(\{p,q\}) \\
 & \Rightarrow & u(p) > u(q) + v(q) - \max_{r \in \{p,q\}} v(r) \\
 & \Rightarrow & u(p) + \max_{r \in \{p,q\}} v(r) > u(q) + v(q) \\
 & \Rightarrow & \max_{r \in \{p,q\}} v(r) = v(q) > v(p)
\end{array}
$$

- Last line follows from assumption $u(q) + v(q) > u(p) + v(p)$

Axiomatic Characterization of GP Model

- Notice we have once again introduced a model with unobservable elements
  - u and v
- We would like to know how to test it
  - i.e. can we find an equivalent of conditions α and β
- We won't go through the complete characterization
- But will discuss the key axiom
  - Set betweenness

Axiomatic Characterization of GP Model

- Set Betweenness: for any A, B s.t $A \succeq B$

$$A \succeq A \cup B \succeq B$$

- Notice the difference to the 'standard' model

$$A \succeq B \Rightarrow A \cup B \sim A$$

- Smaller sets can be strictly preferred

Axiomatic Characterization of GP Model

- Set Betweenness: for any A, B s.t $A \succeq B$

$$A \succeq A \cup B \succeq B$$

- Necessity:
  - $A \succeq B$ implies that

$$u(p^A) + v(p^A) - v(q^A) \geq u(p^B) + v(p^B) - v(q^B)$$

where

$$p^i = \arg\max_{p \in i} u(p) + v(p)$$

and

$$q^i = \arg\max_{q \in i} v(q)$$

  - NTS $A \succeq A \cup B$

- Two cases:
- Case 1: $u(p^A) + v(p^A) \geq u(p^B) + v(p^B)$

$$\begin{aligned} u(p^A) + v(p^A) &\geq u(p^B) + v(p^B) \Rightarrow \\ u(p^A) + v(p^A) &= u(p^{A \cup B}) + v(p^{A \cup B}) \Rightarrow \\ u(p^A) + v(p^A) - v(q^A) &\geq u(p^{A \cup B}) + v(p^{A \cup B}) - v(q^{A \cup B}) \end{aligned}$$

- Case 2: $u(p^A) + v(p^A) \leq u(p^B) + v(p^B)$
  - implies $v(q^A) \leq v(q^B)$ as A is preferred to B

$$\begin{aligned} u(p^B) + v(p^B) &= u(p^{A \cup B}) + v(p^{A \cup B}) \\ v(q^{A \cup B}) &= v(q^B) \Rightarrow \\ u(p^{A \cup B}) + v(p^{A \cup B}) - v(q^{A \cup B}) &= u(p^B) + v(p^B) - v(q^B) \\ &\leq u(p^A) + v(p^A) - v(q^A) \end{aligned}$$

Discussion: Linearity

- Imagine that
  - The burger is tempting relative to the fish, but you can overcome that temptation
  - The fish is tempting relative to the salad, but you can overcome that temptation
- Does it follow that you should be able to overcome temptation when faced with a choice between the burger and the salad

- Imagine

$$\{s\} \succ \{s, f\} \succ \{f\} \succ \{f, b\} \succ \{b\}$$

- Under the GP model, the above implies

$$\begin{aligned} u(s) &> u(f) > u(b) \\ v(b) &> v(f) > v(s) \\ u(s) + v(s) &> u(f) + v(f) > u(b) + v(b) \end{aligned}$$

- Which in turn implies

$$\{s\} \succ \{s, b\} \succ \{b\}$$

Discussion: What is Willpower?

- It seems that the following statement is meaningful:
  - Person A has the same long run preferences as person B
  - Person A has the same temptation as person B
  - Person A has more willpower than person B
- Yet this is not possible in the GP model
- Alternative: Masatlioglu, Nakajima and Ozdenoren [2013]

$$\begin{aligned} U(z) &= \max_{p \in z} u(p) \\ \text{subject to } \max_{q \in z} v(q) - v(p) &\leq w \end{aligned}$$

Discussion: Sophistication

- So far, we have assumed that we have implicitly assumed that a DM is sophisticated
  - They understand the temptations they face
  - They understand what it is they will choose from any given menu

Discussion: Sophistication

- Technically, if we let preference $\trianglerighteq$ descibe choices **from** menus, sophistication means

$$\begin{aligned} x \rhd y \text{ for all } y &\in A \text{ if and only if} \\ A \cup \{x\} &\succ A \end{aligned}$$

  - Adding x to a menu makes it better only if x would be chosen over every alternative in A
- This is enough to guarantee that $u + v$ represents $\trianglerighteq$
  - i.e. $x \trianglerighteq y$ if and only if

$$u(x) + v(x) \geq u(y) + v(y)$$

- People who are not sophisticated are often referred to as 'naive'

Discussion: Sophistication

- Example 1: A DM who ignores temptation

Object	u	v
Salad	4	0
Fish	2	1
Burger	1	4

- Assume these preferences represent choices that the DM will make from the menu
- But they believe that their choices will be governed by u
- Such a DM will prefer $\{s, b\}$ to $\{b\}$, but when faced with the choice from $\{s, b\}$ will choose b
- Such a DM will violate sophistication
  - Never exhibit a preference for commitment

Discussion: Sophistication

- Example 2: A DM who underestimates temptation

Object	u	v	v'
Salad	5	0	0
Fish	2	1	1
Burger	1	9	5

- Assume that a DM has temptation driven by v, but believes that they have temptation driven by v'
- They are offered the chance to buy a 'commitment contract' where they have to pay $2 if they eat the burger
- Assume that $u(2) = 2$, $v(2) = 2$ the u of money is additive with u of consumption and the v of money is additive with the v of consumption
- Let $b + c$ be the burger with the commitment contract

- Example 2: A DM who underestimates temptation

Object	u	v	v'
Salad	5	0	0
Fish	2	1	1
Burger	1	9	5
b+c	-1	7	3

- The DM will have preferences

$$\{b+c, s\} \succ \{b, s\}$$

as

$$\begin{aligned} U(\{b+c, s\}) &= u(s) + v'(s) - v'(b+c) = 2 \\ &> 1 = u(b) = U(\{b, s\}) \end{aligned}$$

- But the DM will actually choose $b+c$ over s at the second stage as

$$u(b+c) + v(b+c) = 6 > 5 = u(s) + v(s)$$

- Example 2: A DM who underestimates temptation

Object	u	v	v'
Salad	5	0	0
Fish	2	1	1
Burger	1	9	5
b+c	-1	7	3

- End up with lower 'long run' utility
- Also a violation of sophistication as

$$\{b + c, s\} \succ \{b + c\}$$

but $b + c$ will be chosen from the former menu

Discussion: Sophistication

- This highlights an important point which we will come back to when we look at the evidence
- Commitment can be bad if people are naive!

Preference for Flexibility

- So far we have the 'Temptation' model, which leads to preference for commitment
  - $A \succeq B$ implies
$$A \succeq A \cup B$$
- And the standard model, which tells us
  - $A \succeq B$ implies
$$A \sim A \cup B$$
- Are these the only two options?

Preference for Flexibility

- Consider choice between menus of drinks cocoa or lemonade
- Must choose between menus now, but your choice from those menus will occur on October 1st
- Which would you prefer?

$$\{c\}, \{l\} \text{ or } \{c, l\}?$$

- Choice of $\{c, l\}$ over both $\{c\}$ and $\{l\}$ is a violation of set betweenness and standard model

Discussion: Preference for Flexibility

- What is going on?
- You are being asked to choose a menu today
- But you will choose from the menu in 6 months time
- You are likely to get more information in that time
  - e.g. temperature on that day
- Can lead to a **preference for flexibility**

Discussion: Preference for Flexibility

- Formally, we can imagine that there are two state of the world s(unny) and w(indy)
- Your utility will depend on both what you end up with, and the state of the world

$$\begin{aligned} u(c|w) &= 3,\ u(c|s) = 1 \\ u(l|w) &= 1,\ u(l|s) = 2 \end{aligned}$$

- When you are choosing the menu, each state is equally likely,
- When you choose **from** the menu you know whether it is sunny or windy

- What is the utility of each menu?
- For lemonade only

$$U(\{l\}) = \frac{1}{2}u(l|w) + \frac{1}{2}u(l|s) = 1.5$$

- For cocoa only

$$U(\{l\}) = \frac{1}{2}u(c|w) + \frac{1}{2}u(c|s) = 2$$

- For lemonade and cocoa

$$U(\{l, c\}) = \frac{1}{2}u(c|w) + \frac{1}{2}u(l|s) = 2.5$$

Discussion: Preference for Flexibility

- So we have
$$\{c, l\} \succ \{c\} \succ \{l\}$$
- Key point: uncertainty about the future can lead to preference for bigger menus

Discussion: Preference for Flexibility

- The 'preference uncertainty' model implies a (potentially strict) preference for larger choice sets

$$A \succeq B \Rightarrow A \cup B \succeq A$$

- Compare to 'standard' model

$$A \succeq B \Rightarrow A \cup B \sim A$$

- And Set Betweenness

$$A \succeq B \Rightarrow A \cup B \preceq A$$

- Preference uncertainty can provide a powerful force that works against a preference for commitment
  - See Amador, Werning and Angeletos [2006]