Lecture 2e Part 2: Choice over Time
Applications of Present Bias

EC 404: Behavioral Economics
Professor: Ben Bushong

March 17, 2022

Warm Up

Hiro is a sophisticated hyperbolic discounter who faces a simple three-period consumption-saving model in which the interest rate on all assets is 0%. Given lifetime wealth of 1700, the following facts are true:

- Hiro's period-1 desired behavior is $c_1^* = 700, c_2^* = 500$, and $c_3^* = 500$.
- For the case in which there is only a liquid asset, Hiro's actual behavior is $c_1 = 700$, $c_2 = 600$, and $c_3 = 400$.

Now suppose there is an illiquid asset of the form we discussed in class: If in period 1 Hiro invests z in this asset, then in period 3 Hiro receives z, but cannot touch these funds in period 2. Suppose further that Hiro cannot borrow against future income.
For each of the following income flows, describe what Hiro's actual consumption path is likely to look like, and how Hiro might implement that consumption path.
(i) $Y_1 = 1000$, $Y_2 = 350$, and $Y_3 = 350$.
(ii) $Y_1 = 1000, Y_2 = 525$, and $Y_3 = 175$.

Application 2: Present Bias & Procrastination

Ariely & Wertenbroch (*Psychological Science* 2002)

Experiment 1:

- Subjects were 99 professionals in an MIT executive-education course.
- Two sections, and the treatment was done by section.
- 3 short papers required for the course.
- Deadline for each paper (1% penalty per day late).
- Two treatments:
  - *No Choice*: Evenly spaced deadlines imposed.
  - *Free Choice*: Each student chose own deadlines.
- Note: A deadline had the same implications for both groups.

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Results

In the free-choice group, people imposed deadlines on themselves. On average:

- Deadline for paper 1 about 42 days before end of term.
- Deadline for paper 2 about 26 days before end of term.
- Deadline for paper 3 about 10 days before end of term.

$\Longrightarrow$ People chose to make costly commitments, which is consistent with present bias and sophistication (or at least some degree of sophistication).

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But was it optimal commitment?

To answer, compare outcomes (grades) across treatments:

- The free-choice group had lower grades than the no-choice group, in both their overall grades and especially their grades on a final project that was due on the last day of class.

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DellaVigna & Malmendier (*AER* 2006)

They analyze evidence from health clubs — in particular, a panel data set that tracks members' usage over time.

Three contracts available:

- (1) \$10 per visit.
- (2) A monthly fee $\$F_M$.
- (3) A yearly fee $\$F_Y$.

During the first 6 months of membership:

- Group 2 ended up paying \$17/visit.
- Group 3 ended up paying \$15/visit.

$\Longrightarrow$ They interpret as present bias with partial naivete.

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Further evidence of naivete:

- The monthly contract has automatic renewals, and they see what looks like procrastination in cancelling (a duration between last usage and cancellation). Moreover, this duration is positively correlated with overpayment in the initial months.

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DellaVigna & Paserman (*J. of Labor Econ*, 2005)

Setting:

- Each period, an unemployed person chooses how much effort to put into searching for a job.
- Search effort requires an immediate cost, but also determines the probability of receiving job offer that period.
- If the person receives a job offer, a proposed wage is "randomly" chosen by the firm, and the person must decide whether to accept that offer — in which case the job search ends — or to decline that offer and search again next period.

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Formally:

Job searcher chooses search effort e:

- incur immediate cost $c(e)$, where $\uparrow e \Longrightarrow \uparrow c(e)$.
- receive offer with probability $p(e)$, where $\uparrow e \Longrightarrow \uparrow p(e)$.

If the person receives a job offer:

- A wage w is drawn from some distribution F, where $F(\bar{w}) \equiv \Pr(w \geq \bar{w})$.
- The person must decide whether to accept the job offer.

In this environment, a "strategy" for the job searcher is an effort level e^* and a cutoff wage $\bar{w}^*$ such that put in effort e^* each period and accept the first wage offer $w \geq \bar{w}^*$.

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Recall: In this environment, a "strategy" for the job searcher is an effort level e^* and a cutoff wage $\bar{w}^*$ such that put in effort e^* each period and accept the first wage offer $w \geq \bar{w}^*$.

They study the exit rate from unemployment:

- Exit Rate from Unemployment $= p(e^*)\ F(\bar{w}^*)$.

Note:

- $\uparrow e^* \Longrightarrow \uparrow p(e^*) \Longrightarrow \uparrow$ Exit Rate from Unemployment
- $\uparrow \bar{w}^* \Longrightarrow \downarrow F(\bar{w}^*) \Longrightarrow \downarrow$ Exit Rate from Unemployment

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Goal: What is the effect of impatience in this environment?

$\downarrow \delta \Longrightarrow \downarrow e^*$ & $\downarrow \bar{w}^* \Longrightarrow$?? Exit Rate

For plausible parameters, wage-effect dominates:

$$\downarrow \delta \Longrightarrow \uparrow \text{Exit Rate}$$

For naifs: $\downarrow \beta \Longrightarrow \downarrow e^*$ & no change $\bar{w}^* \Longrightarrow \downarrow$ Exit Rate

For sophisticates: $\downarrow \beta \Longrightarrow \downarrow e^*$ & $\downarrow \bar{w}^* \Longrightarrow$?? Exit Rate

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Goal: What is the effect of impatience in this environment?

^^^

$\downarrow \delta \Longrightarrow \downarrow e^* \text{ \& } \downarrow \bar{w}^* \Longrightarrow$?? Exit Rate

For plausible parameters, wage-effect dominates:

$$\downarrow \delta \Longrightarrow \uparrow \text{Exit Rate}$$

^^^

For naifs: $\downarrow \beta \Longrightarrow \downarrow e^*$ & no change $\bar{w}^* \Longrightarrow \downarrow$ Exit Rate

^^^

For sophisticates: $\downarrow \beta \Longrightarrow \downarrow e^* \text{ \& } \downarrow \bar{w}^* \Longrightarrow$?? Exit Rate

For plausible parameters, effort-effect dominates:

$$\downarrow \beta \Longrightarrow \downarrow \text{Exit Rate}$$

Application 4: Present Bias & Job Search

Theoretical conclusion:

According to standard exponential discounting:

$$\uparrow \text{impatience } (\downarrow \delta) \Longrightarrow \uparrow \text{exit rate}$$

According to β, δ discounting:

$$\uparrow \text{long-run impatience } (\downarrow \delta) \Longrightarrow \uparrow \text{exit rate}$$

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Application 4: Present Bias & Job Search

Empirical test:

- They use data from the National Longitudinal Survey of Youth (NLSY) and from the Panel Study of Income Dynamics (PSID) on unemployment spells among male heads of households.
- They use a variety of proxies for impatience, and for most proxies, increased impatience is correlated with lower exit rates from unemployment — which is consistent with changes in short-run impatience (β)!
- Some specific proxies: Doesn't have bank account, had unprotected sex, did not have life insurance, smoked, more hangovers in past 30 days.

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Application 5: Present Bias & Cigarette Taxes

Gruber & Mullainathan (*BE Policy*, 2005)

Starting point: models of present bias predict that people might smoke despite preferring not to smoke, and hence might be made better off by cigarette taxes.

Hypothesis to Test:

$$\uparrow \text{Cigarette Taxes} \Longrightarrow \uparrow \text{Happiness for Potential Smokers}$$

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Data

From the US General Social Survey (GSS), they have data on:

- Happiness: "Taken all together, how would you say things are these days — would you say that you are very happy, pretty happy, or not too happy?"
- Smoker vs. Non-Smoker
- Demographic variables: age, gender, income, education, parents' education, race, marital status, employment status, and more.

They match this data to state cigarette taxes.

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Two preliminary results:

- Smokers are less happy than non-smokers.
- Higher cigarette taxes don't seem to make smokers happier.

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BUT we want to study impact of cigarette taxes on "potential smokers" — how to define a potential smoker:

- Step 1: Investigate how actual smoking behavior depends on demographic variables.
- Step 2: Use results from Step 1 to assign to each person a propensity to smoke — e.g., because increased education is associated with being less likely to actually be a smoker, someone with more education will be assigned a lower propensity to smoke.

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They divide people into two groups: high propensity to be smoker, and low propensity to be smoker.

- Among the low propensity group, increased cigarette taxes have no impact on happiness.
- Among the high propensity group, increased cigarette taxes are associated with increased happiness — as predicted!

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