Behavioral Economics

Topic 2: Intertemporal Choice
Lecture 16: Projection Bias — Mispredicting Future Tastes

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Taking Stock

Last class:

- Anticipatory Utility

Taking Stock

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Today's class:

- Wrap up discussion of anticipatory
- Projection Bias

Logistics:

- Problem Set 4 was due before class today
- Exam 2 is Tuesday, November 17
- Problem Set 5 is due Thursday, November 12

Projection Bias

“Projection Bias”

Introduced by Loewenstein, O’Donoghue, & Rabin (*QJE* 2003)

“Projection Bias”:

- People understand qualitatively the directions in which their tastes change, but they systematically underappreciate the magnitudes of these changes.

A Model of Projection Bias

Step 1: A Model of Changing Tastes

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- u(coat,cold) $>$ u(coat,warm)

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A Model of Projection Bias

Step 3: A Simple Formulation

A person has "simple projection bias" if

$$\tilde{u}\left(c, s|s'\right) \;=\; (1-\alpha) * u\left(c, s\right) \;+\; \alpha * u\left(c, s'\right).$$

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- $\alpha \in (0,1) \iff$ Projection Bias

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Two other issues:

- The person is not aware of the bias (otherwise she could just correct for it).

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- The person is not aware of the bias (otherwise she could just correct for it).
- Except for these mispredictions, the person's intertemporal preferences are as in discounted utility model (for ease, think δ^x.)

Evidence of Projection Bias

A first type of evidence: underappreciation of the endowment effect.

Loewenstein & Adler (*EJ* 1995)

Subjects: 27 CMU undergrads & 39 Pittsburgh MBA's.

Procedure:

- All subjects shown a mug, told they'll get one and have the opportunity to sell it for money.

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- After a delay, all subjects are given a mug and an opportunity to sell

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Results:

		Prediction	Actual
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Pittsburgh:	Prediction	$3.27	$4.56
	Control	——	$4.98

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Study 2: Subjects were 43 Cornell undergraduates.

19 subjects randomly chosen to be “sellers”.
24 subjects randomly chosen to be “buyers”.

Each seller given a coffee mug.
Each buyer shown a coffee mug.

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Two tasks:

- Elicit people’s reservation prices.
- Ask buyers to predict average reservation price of sellers, and ask sellers to predict average reservation price of buyers.

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	Reservation Price	Prediction for Other Group
Sellers:	$6.37	$3.93

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Buyers:	$1.85	$4.39

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- Each subject asked to choose between a healthy vs. unhealthy snack to be received in one week.
- They varied subjects' expected future hunger and their current hunger.

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		Future Hunger: Hungry	Future Hunger: Satiated
Current Hunger	Hungry	78%	42%
	Satiated	56%	26%

Application: Projection Bias and Durable Goods

Underlying environment:

- A durable good — e.g., a winter coat — yields a utility stream

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- A durable good — e.g., a winter coat — yields a utility stream

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- These μ's typically vary from day to day in a somewhat random way — for simplicity, let's assume that for all days the expected value of μ_t is $\bar{\mu}$.

Application: Projection Bias and Durable Goods

On Day 1, when a person knows μ_1 but not the future μ_t's, how much is the person willing to pay for this durable good (assuming no discounting)?

- Optimal:

$$WTP = \mu_1 + (T-1)\bar{\mu}$$

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$$\begin{aligned} WTP &= \mu_1 + (T-1)[(1-\alpha)\bar{\mu} + \alpha\mu_1] \\ &= \mu_1 + (T-1)[\bar{\mu} + \alpha(\mu_1 - \bar{\mu})] \end{aligned}$$

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Hence: If $\mu_1 > \bar{\mu}$ then over-prone to buy. If $\mu_1 < \bar{\mu}$ then under-prone to buy.

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- Again, you end up buying it as long as $\mu_t \geq \bar{\mu}$ on at least one occasion, which is quite likely $\Longrightarrow$ Over-buying is very LIKELY.

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Conlin, O'Donoghue & Vogelsang (*AER* 2007)

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Our answer: look at orders of winter-clothing items as a function of the weather.

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- If order on a cold day, it's likely a high-valuation day.

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- If order on a cold day, it's likely a high-valuation day.
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Authors conduct precisely this test, and indeed find that the colder the temperature on the day a person orders a winter-clothing item, the more likely the person is to return that item.

Application: Projection Bias & The Endowment Effec

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- (Total Utility) = $u(c, r)$ + m

Mug utility is $u(c, r) = w(c) + v(c - r)$, where

$$w(c) = \mu * c \qquad \text{and} \qquad v(x) = \begin{cases} \varphi x & \text{if } x \geq 0 \\ \lambda\varphi x & \text{if } x \leq 0. \end{cases}$$

To simplify matters: say $\mu = 10$ and $\varphi = 1$

Application: Projection Bias & The Endowment Effec

Suppose buy/sell the mug in period 1, and (possibly) consume the mug in periods 1 & 2.

Consumption is:

- $c_1 = c_2 = 1$ if buy or keep.
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Assume $r_2 = c_1$

Application: Projection Bias & The Endowment Effec

One can show:

- Sellers should sell iff $p \geq p_S^* \equiv$
- Sellers actually sell iff $p \geq p_S^A \equiv$
- Buyers should buy iff $p \leq p_B^* \equiv$
- Buyers actually buy iff $p \leq p_B^A \equiv$

Application: Projection Bias & The Endowment Effec

Some Results:

(1) $p_S^A > p_S^*$ & $p_B^A > p_B^*$.

- People are over-prone to consume goods to which they become accustomed because they underappreciate how they'll adapt — and more generally can lead to incorrect intertemporal utility maximization.

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(2) $p_S^A - p_B^A > p_S^* - p_B^*$.

- Projection bias magnifies the endowment effect — and more generally can magnify features of true tastes.

Application: Projection Bias & The Endowment Effec

(3) $\hat{p}_S^A < p_S^A$ & $\hat{p}_B^A > p_B^A$, where

$$\begin{aligned} \hat{p}_S^A &\equiv \text{unendowed person's predicted selling price} \\ \hat{p}_B^A &\equiv \text{endowed person's predicted buying price} \end{aligned}$$

Application: Projection Bias & The Endowment Effec

(3) $\hat{p}_S^A < p_S^A$ & $\hat{p}_B^A > p_B^A$, where

$$\begin{aligned} \hat{p}_S^A &\equiv \text{unendowed person's predicted selling price} \\ \hat{p}_B^A &\equiv \text{endowed person's predicted buying price} \end{aligned}$$

- Consistent with the evidence on underappreciation of the endowment effect — and more generally can lead people to make plans that they don't carry out.

Next Class

Today: anticipatory utility and projection bias

Next class: finish projection bias, then discuss policy interventions

Remember:

- Problem Set 5 due Thursday, November 12
- Exam 2 Tuesday, November 17