

An hourglass with red sand is the central background element. The sand is falling from the top bulb into the bottom bulb. The background is a soft, out-of-focus light color.

# **T I M E P R E F E R E N C E S**

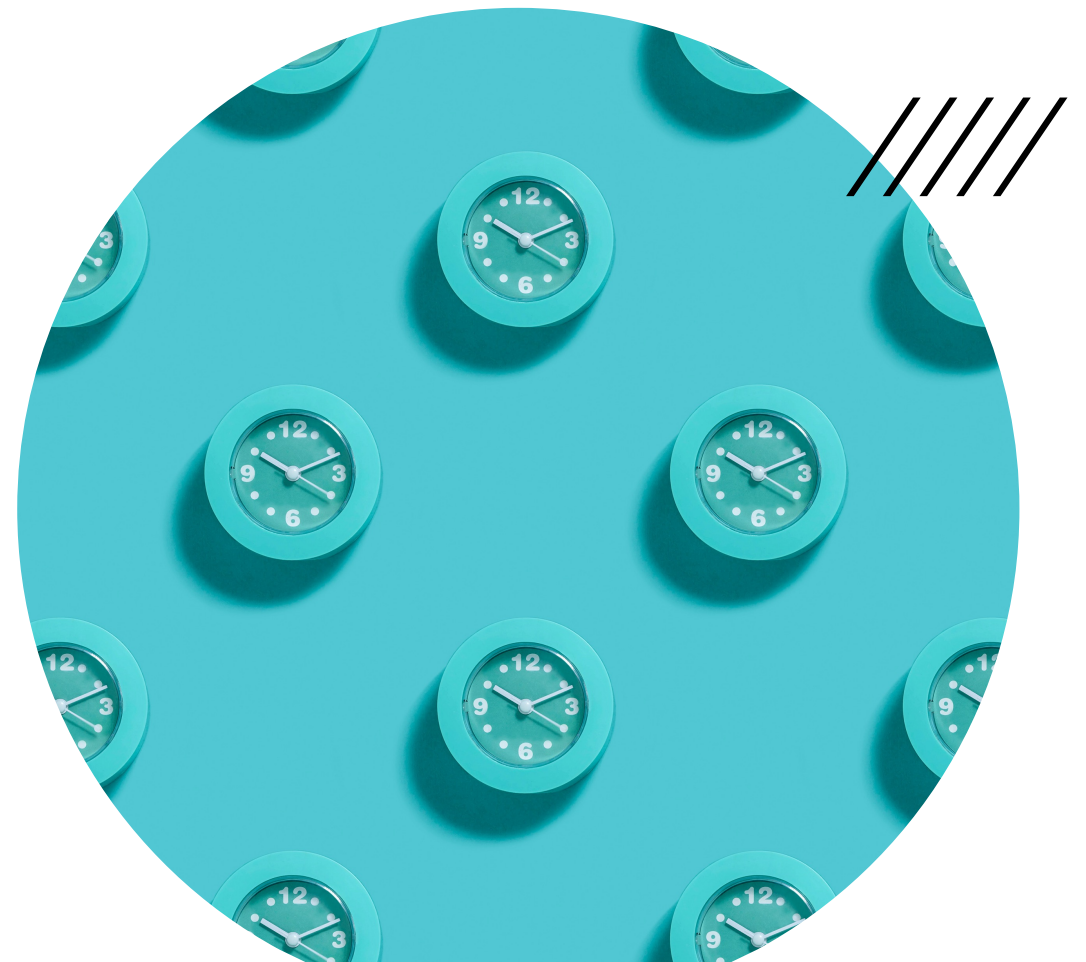
## **MOTIVATIONS FOR PRESENT-BIASED P R E F E R E N C E S**

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**EXPERIMENTAL  
EVIDENCE ON  
DISCOUNTING**





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Suppose you had a choice between getting \$50 in cash one month from today, or getting less than \$50 today. Would you take less than \$50 to get the money today?

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The respondents who answered affirmatively yes were then asked:

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What is the smallest amount of cash you would take today rather than getting the \$50 one month from today?

# ○ Eliciting discount factor

- Typical procedure elicits indifference points of the form:

$$A \text{ at date } x \sim B \text{ at date } x + y$$

- Then inferences about discounting reflected in these indifference points are made, typically assuming:
  - amounts treated as increments to consumption in period received
  - linear utility



- There are two strands of research that differ in how results are framed.



# ○ One strand: hyperbolic discounting is a better fit.

- Comparing between two functional forms: Exponential Discounting vs. Hyperbolic Discounting, hyperbolic discounting is virtually always a better fit.

- Exponential Discounting:  $D(x) = e^{-kx}$

- Hyperbolic Discounting:  $D(x) = \frac{1}{1+kx}$



# ○ Second strand: evidence of declining discount rates.

- Average discount rates are lower for longer delays. That is, subjects are more impatient over short delays than over long delays.
- In Thaler (1981)'s "Some empirical evidence on dynamic inconsistency", people were indifferent between:

Indifference condition	Discount rates
$(\$15, \textit{now}) \sim (\$30, \textit{in 3 months})$	277%
$(\$15, \textit{now}) \sim (\$60, \textit{in 1 year})$	139%
$(\$15, \textit{now}) \sim (\$100, \textit{in 3 years})$	63%





**SHORT-TERM VS. LONG-TERM  
PATIENCE**

# ○ Short-Term vs. Long-Term Patience

- Q: Can I have a 1% preference for today over tomorrow?
- A: Usually, people say yes.



# ○ Short-Term vs. Long-Term Patience

Suppose I have a daily discount factor of 0.99

$$\delta = 0.99, t = \text{one day}$$

- I discount tomorrow's consumption by: 0.99
- Assuming exponential discounting,
  - I discount consumption in a year by:  $0.99^{365} = .026$
  - I discount consumption in 5 year by:  $0.99^{365 \times 5} = .000000011$



# ○ Short-Term vs. Long-Term Patience

Suppose I have a daily discount factor of 0.98

$$\delta = 0.98, t = \text{one day}$$

- I discount tomorrow's consumption by: 0.98
- Assuming exponential discounting,
  - I discount consumption in a year by:  $0.98^{365} = .0006$
  - I discount consumption in 5 year by:  $0.98^{365 \times 5} = 9.7 \times 10^{-17}$



# ○ Short-Term vs. Long-Term Patience

- Exponential discounting implies almost perfect day-to-day patience ( $\delta \approx 1$ ). That is, exponential discounting implies virtually no discounting, over daily or even weekly decisions.
- This seems counterfactual.
- If we see a daily discount factor that is much less than one, exponential discounting is probably a bad model.



# ○ Reference

- O'Donoghue, Ted. 2019. "Intertemporal choices: Introduction"  
Lecture Note for ECON 7580, Cornell University
- Tripp, Brandon. 2018. Overheads for ECON 3670, Cornell University

