Do we discount money and the environment differently? Evidence from stated willingness to pay data

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1

Starting point

Discounting is necessary when cost today offers benefits in the future, and how we discount have a huge impact on policy.

We estimate :

- discount factors for future monetary rewards (using the same time frames) common in experimental literature
- '*domain-specific*' discount factors (and rates) for future environmental benefits

Compare and assess if discount rates inferred from monetary choices can be applied to environmental goods—external validity.

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Motivation: Policy Guidance

White House Social discount rate recommendation (2024):

2% (not domain-specific)

European Commission (period 2014-2020) Social discount rate recommendation:

5 % is used for major projects in Cohesion countries, and

3 % for the other Member States

(not domain-specific)

Motivation: Literature

Kolstad (Environmental Economics):

"But there are many social investments in addition to environmental protection that may be considered worthy – education, poverty alleviation, or disease eradication, just to name a few. **One should be consistent in the choice of a discount rate across the many actions that have intergenerational implications***."*

Motivation: Literature

Ecosystem scarcity motivates lower discount rates in environmental CBA (Sterner and Persson (2008), Drupp et. al. (2024), Krutilla-Fisher)

Some empirical evidence suggests that discount rates are domain-specific, e.g.:

      - higher discount rates in health decisions than in monetary choices

Relative few papers, however, have compared the two.

Empirical strategy

Use a contingent-valuation survey (with hypothetical scenarios) to elicit todays WTP for improving future biodiversity.

Three scenarios: Benefits utilized

- After 18 years

- After 10 years

- After 2 years

From WTP data, estimate discount factors for future environmental benefits

A brief background on the environmental good and the Survey

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Eelgrass in Malmö harbour

- **Hundred years ago:** Shallow coastal bay with eelgrass and high fish abundance

- Today: From a biologically productive eelgrass bay to an industrial harbour with polluted, lifeless sediments

- We lost biodiversity

Main questions

Scenario	Intervention	Time to successful restoration
1	Rewilding (natural recovery after restoring the seabed)	18 years
2	Planting seeds	10 years
4	Planting seedlings	2 years

Ålgräsutveckling (Zostera marina)

Ask for WTP for each of these scenarios.

Sample:

N=1850 responses from Skåne

Internet panel, representative wrt age, education, gender.

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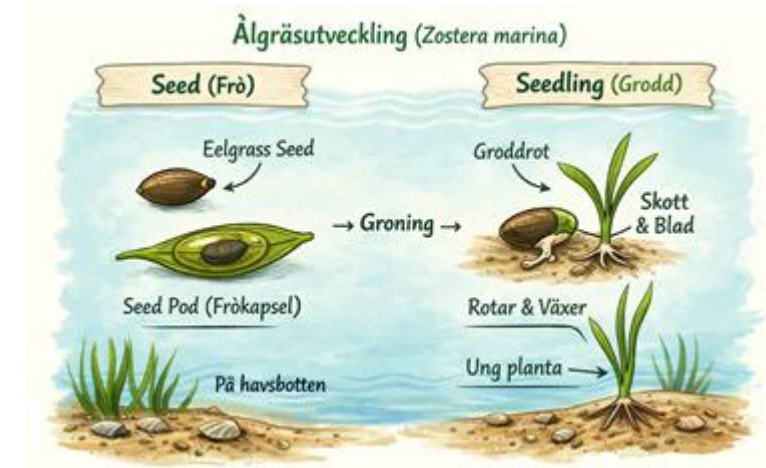
Estimating discount factors from WTP data

Discounting models

- If the discount factor is known, the present value of a future stream of known benefits can be calculated directly.

- If we know the present value of the future stream of benefits, and future stream of benefits, we can estimate the discount factor

- The future stream of benefits are unknown, **but we solve for the discount factor by observing the ratio of present value of the future stream of benefits, at two different point of time.**

Illustration with single future benefit

$$\frac{WTP(B_{18})}{WTP(B_{10})} = \frac{\frac{\delta^{18}\,W(B_{18})}{\lambda}}{\frac{\delta^{10}\,W(B_{10})}{\lambda}} = \frac{\frac{\frac{1}{(1+r)^{18}}\,W(B_{18})}{\lambda}}{\frac{1}{(1+r)^{10}}\,\frac{W(B_{10})}{\lambda}} = 1/(1+r)^8$$

Discounting models

Qualitative predictions for the **exponential** and the **hyperbolic model**

Exponential Model: Constant discount rate (and factor) between different time periods

Hyperbolic Model: Reduction over time in discount rate (increase over time in discount factor)

Results and Conclusions

Funded by
the European Union

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Raw results annual discount factor (exp disc)

	Environment		Money	
	2 – 10 years	10 – 18 years	2 – 10 years	10 – 18 years
	Full sample			
Mean (s.d.)	**0.949**	**0.884**	**0.927**	**0.916**
	(0.109)	(0.172)	(0.183)	(0.207)
Exp. r:	r=0,05	r=0,13	r=0,08	r=0,09
Median	0.965	0.917	0.977	0.977
N	1600	1582	1600	1582

Higher discount rate in future periods:
Neither consistent with exponential nor hyperbolig discounting

Constant discount rate across time periods:
Consistent with exponential discounting

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So far

- People discount money and environment differently

- In particular:
    - Money discounting: consistent with exponential
    - Env discounting: neither consistent with exponential nor hyperbolic discounting
        - People are more impatient with the environment for the more distant time-frame.

- We have explored individual differences, and have a hard time explaining the individual variation in discount factors

Thank You!

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