Preference and WTP stability for public forest management

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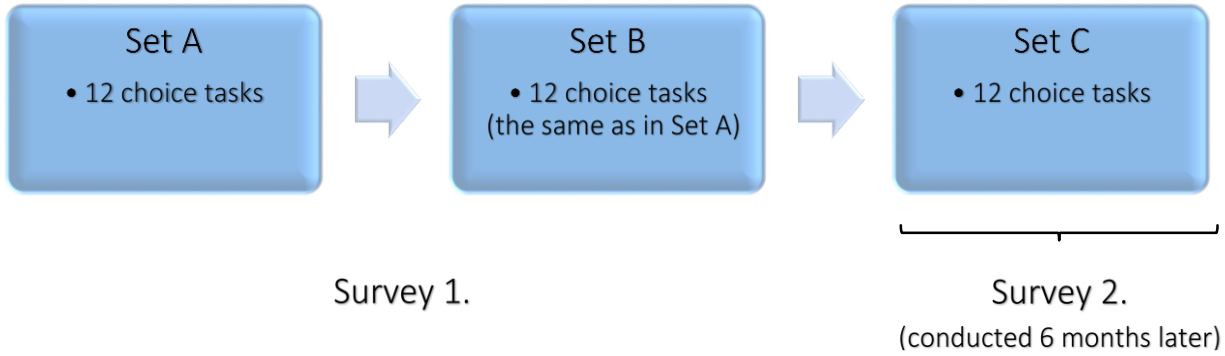
- Preference stability is an important assumption in welfare economics and the economic theory of value.
  - Welfare measures can change as variables which co-determine one's demand for a good change
  - Behavioral sciences suggest that preferences are constantly re-constructed and therefore may vary even in short timespan
  - If this is true then cost-benefit analysis is no longer very informative
- We test this assumption using evidence from a discrete choice experiment study of forest management. We analyze two cases:
  - Preference stability within one survey (preference dynamics)
  - Preference stability over half a year timespan (test-retest approach)

- We conducted Discrete Choice Experiment (DCE) regarding public preferences for changes in management of The Białowieża Forest
- The Białowieża Forest is one of the most recognized and ecologically valuable forests in Poland
- Very high level of naturalness in National Park part of the forest
- Our study provides insights regarding preferences for enlargement of National Park territory (passive protection) to other parts of the forest

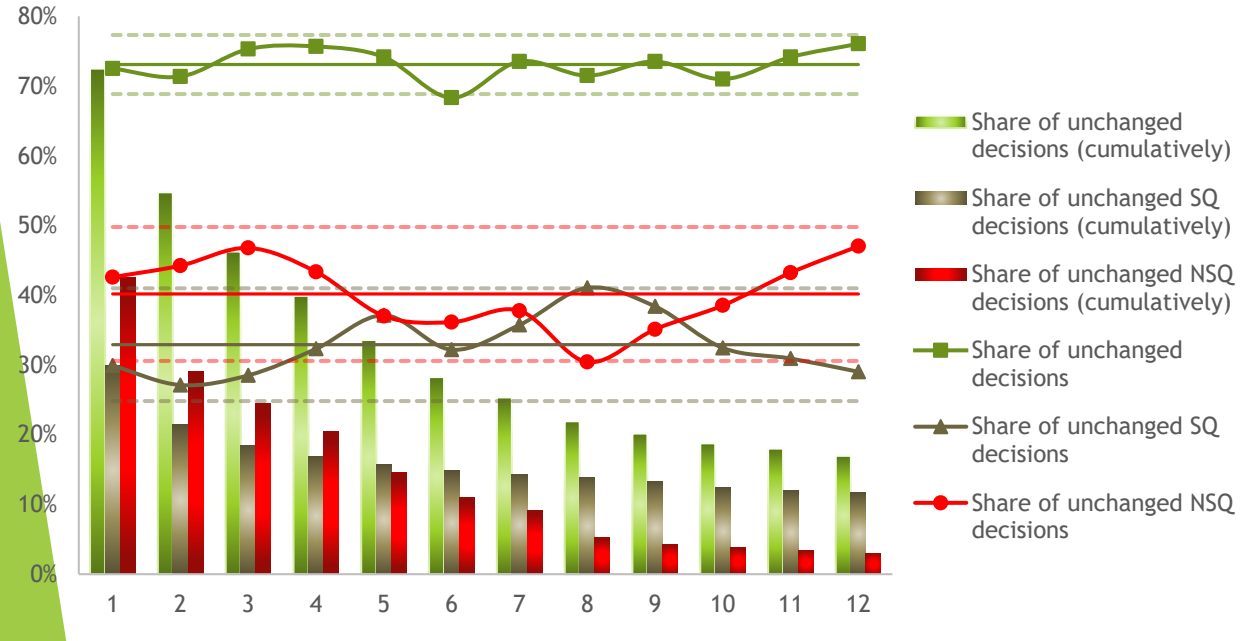
- After consulting with biologists we decided on 4 attributes of Białowieża Forest management
  - Expanding passive protection on commercial forests (high level of naturalness in 250 years)
  - Expanding passive protection on second-growth forests (high level of naturalness in 150 years)
  - Limit for number of visitors (5000, 7500 per day)
  - Cost for household (per year)
- Status quo alternative in every choice task
- Every individual completed 12 choice tasks

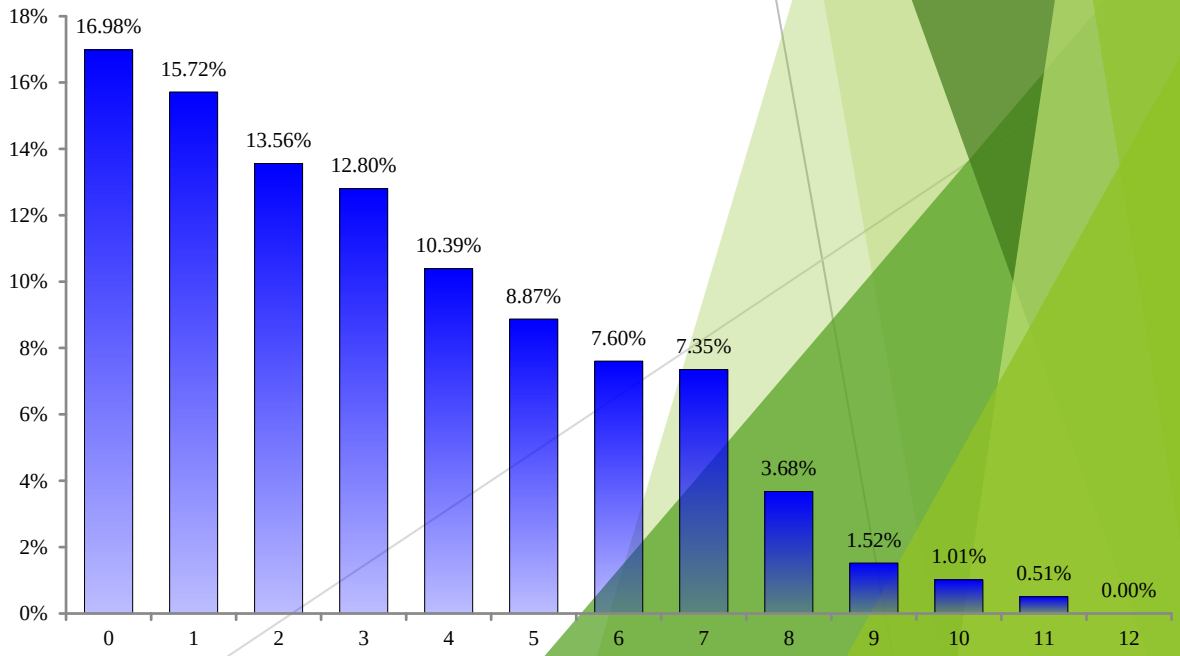
	Program A	Program B	Program C
	Continuation of current management program	Changes in current management program	Changes in current management program
National Park and Natural Reserves (35% of the Białowieża forest)	High level of naturalness	High level of naturalness	High level of naturalness
Commercial forests (50% of the Białowieża forest)	Low level of naturalness	Low level of naturalness	High level of naturalness
Second-growth forests (15% of the Białowieża forest)	Low level of naturalness	High level of naturalness	High level of naturalness
Number of visitors (per day)	No limit	No limit	5,000
Cost for your household (per year)	0 PLN	50 PLN	100 PLN
Your preferred program:	□	□	□

- Two DCE in the first survey (at the beginning and at the end)
- Second survey after half a year
- 789 individuals completed both surveys
- 211 individuals completed first survey but did not complete second

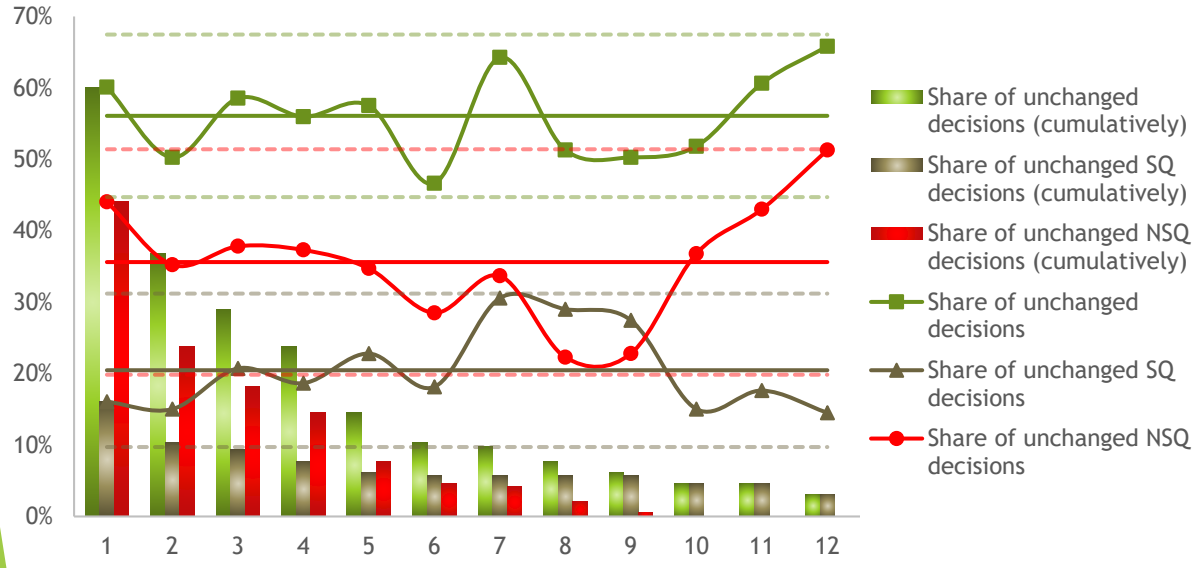


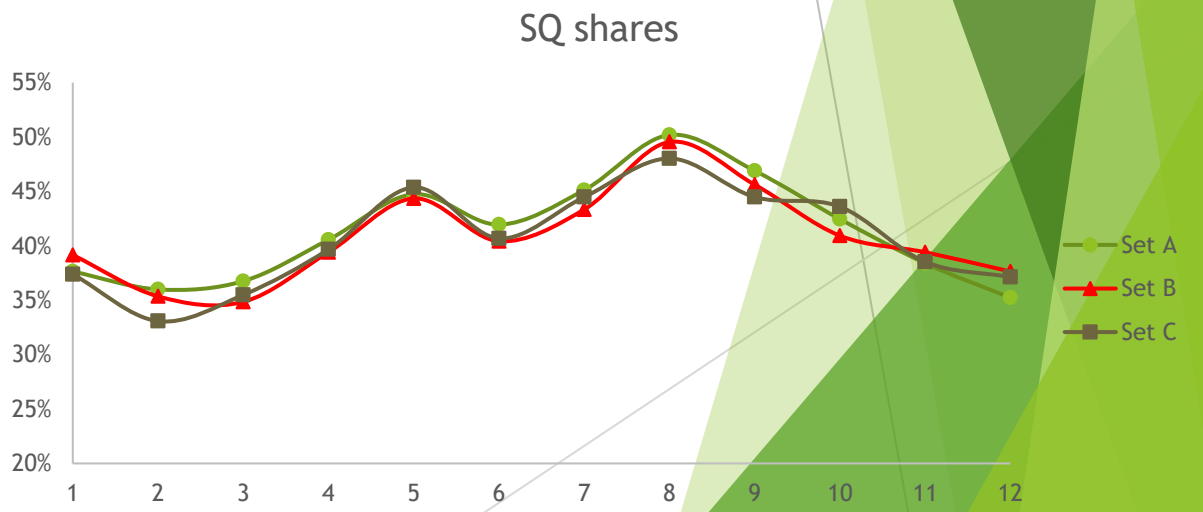
- As Sets A and B consisted of exactly the same choice tasks we were able to see how individuals changed their decisions
- 17% of individuals did not change any decision (Set A vs B), 0.5% changed 11 decisions
- There seems to be no apparent dynamic of decision changes, both for status quo and non-status quo answers.
- Individuals who did not change any of their decisions consist mostly of SQ choosers (70%)





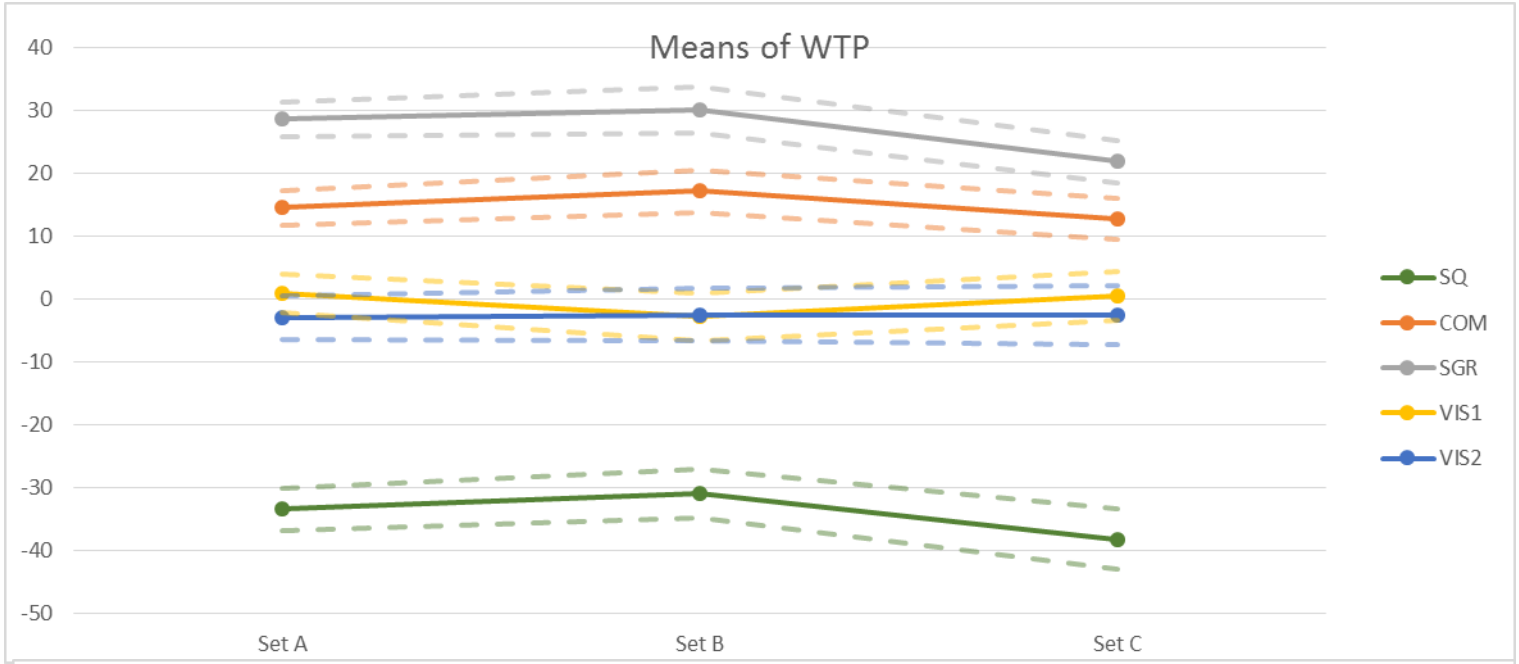
- 193 individuals completed the same choice tasks in second survey, which allowed us to look into changes between sets A and C as well as B and C
- There is also no apparent pattern of decision changes dynamics
- Shares of Status Quo answers are very similar between different sets, there seems to be no visible fatigue/learning effects between them.

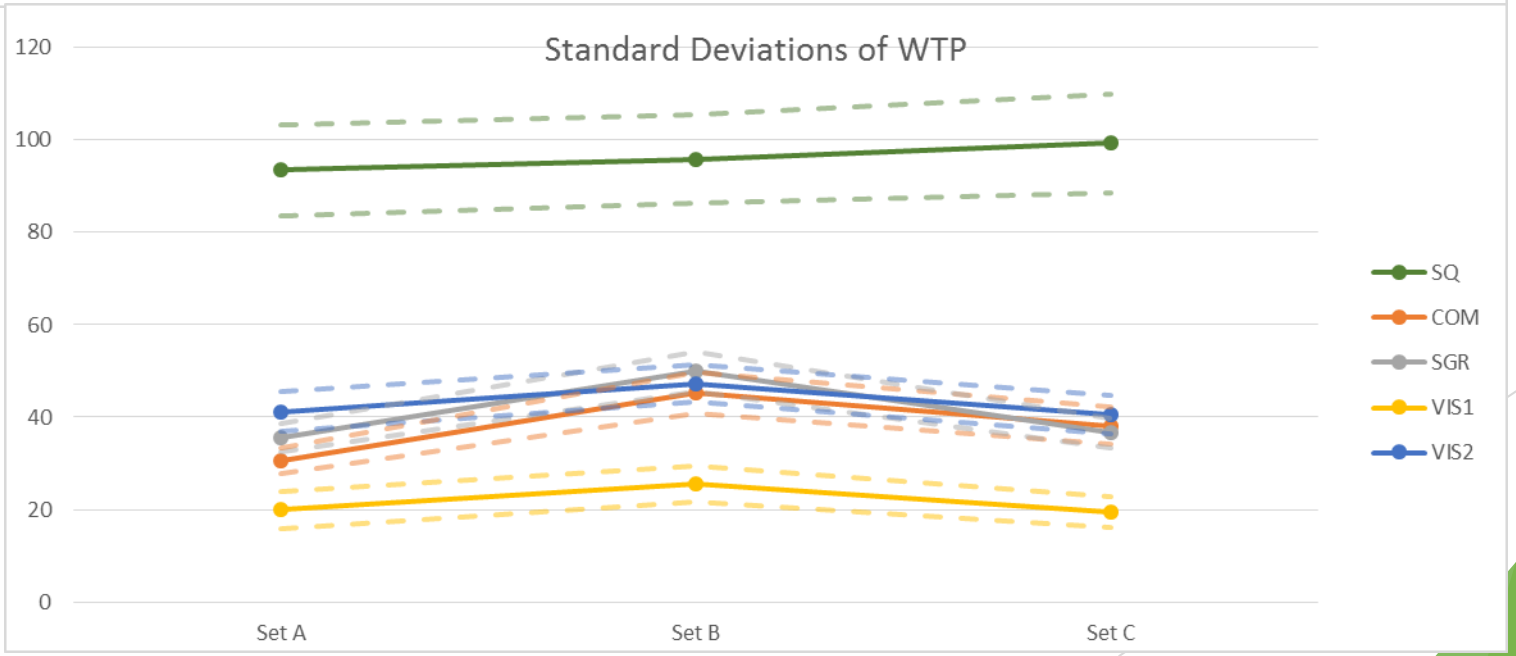




- Mixed Logit model on a sample of 789 individuals
  - WTP-space
- 18 random parameters, one for each attribute in every set
  - Limit for number of visitors was recoded as two dummy variables
  - A constant for Status Quo alternative
  - All parameters normally distributed but cost (log-normal)
  - Full correlation of random parameters
  - A total of 189 parameters to estimate

$$U_{ijn} = \mathbf{X}_{ijn}\mathbf{b}_n - \alpha_n c_{ijn} + \varepsilon_{ijn} = \alpha_n \left(\mathbf{X}_{ijn}\,\mathbf{b}_n / \alpha_n - c_{ijn} \right) + \varepsilon_{ijn} = \alpha_n \left(\mathbf{X}_{ijn}\boldsymbol{\beta}_n - c_{ijn} \right) + \varepsilon_{ijn}$$


Means of WTP
40
30
20
10
0
-10
-20
-30
-40
-50
Set A
Set B
Set C
SQ
COM
SGR
VIS1
VIS2


Standard Deviations of WTP
120
100
80
60
40
20
0
Set A
Set B
Set C
SQ
COM
SGR
VIS1
VIS2

- Means
  - Non significant differences between sets A and B.
  - Significant differences between sets A and C for *SGR* and *SQ*.
  - Significant differences for all attributes except *VIS* between sets B and C
- Variances
  - Significant differences between sets A and B (except *SQ*)
  - Non significant differences between sets A and C (except *COM*)
  - Significant differences between sets B and C (except *SQ*)
- Correlations
  - Very high correlations between sets A and B, almost equal 1
  - Lower but still positive and significant correlations between other pairs of sets

	Set A vs. B	Set A vs. C	Set B vs. C
SQ	0.9963	0.6463	0.6513
COM	0.9804	0.3569	0.3380
SGR	0.9798	0.3894	0.4221
VIS1	0.9231	0.4328	0.4422
VIS2	0.9647	0.5920	0.5024
COST	0.7854	0.4147	0.3722

- The first joint analysis of preference stability within and between two different moments of time
- Non parametric analysis revealed no pattern of decision changes across choice tasks
- Individuals who chose the Status Quo alternative were more likely to be consistent
- Means of WTP seem stable within one survey, although they were not stable between the two analyzed moments of time
- Variances of WTP are characterized by the opposite trend – similar between sets A and C, but significantly different between sets A and B
- Positive and high correlations of WTP (especially within survey)
- Generally, we found that the level of instability is relatively low, in comparison with WTP biases which may occur from different sources