WHEN DO RESPONDENTS STATE THEIR PREFERENCES TRUTHFULLY?

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Stated preference methods

- Used to determine public's preferences, especially towards non-market goods
- Survey-based – in specially designed surveys respondents state what they would do
- Important for cost-benefit analysis – allow to estimate the benefits
- Flexible – enable valuation of hypothetical states
- BUT much scepticism whether survey responses reflect actual preferences

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When do people answer truthfully in stated preference surveys?

Conditions for incentive compatibility

Carson and Groves 2007, Vossler et al. 2012, Carson et al. 2014)

Incentive compatibility = Revealing true preferences is the respondent's optimal strategy.

1. Respondents understand and answer the question being asked.
2. The survey is seen as a take-it-or-leave-it offer.
3. The survey involves a yes-no answer on a single project.
   (the Gibbard-Satterthwaite theorem)
4. The authority can enforce the payment (coercive payment).
5. The survey is perceived as consequential:
   - Respondents care about the good being valued.
   - Respondents believe that their responses affect the finally introduced policy.

Should we care about the conditions for incentive compatibility?

- Are they important in practice?
- The vast majority of field stated preference surveys do not satisfy the conditions.
- The conditions place important limitations on the survey design.
- Trade-off between incentive compatibility and statistical efficiency.
- BUT our literature review of validity tests of the stated preference methods (Zawojska and Czajkowski, 2015) suggests that:
  - when the conditions are fulfilled, no divergence between stated preferences and true preferences is observed;
  - when they are not fulfilled, many studies report divergence.

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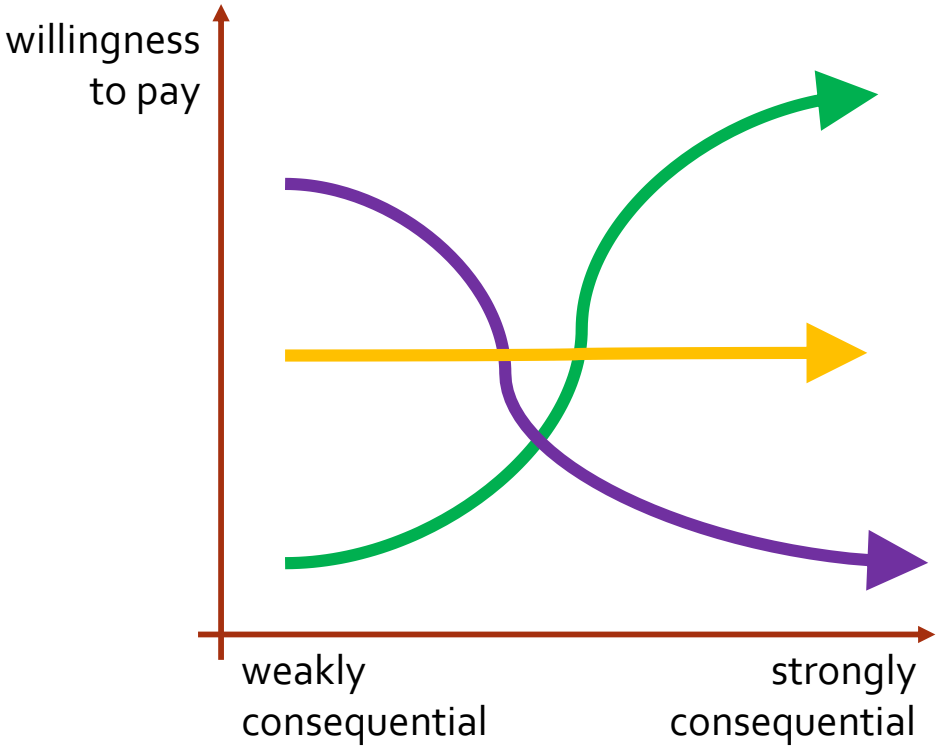
Impact of consequentiality on stated preferences

Mixed empirical evidence



Czajkowski et al. (2015), Groothuis et al. (2015), Herriges et al. (2010), Li et al. (2015), Vossler and Watson (2013)

Broadbent (2012), Broadbent et al. (2010), Drichoutis et al. (2015)

Cummings and Taylor (1998), Vossler et al. (2012)

A (too?) general concept of consequentiality

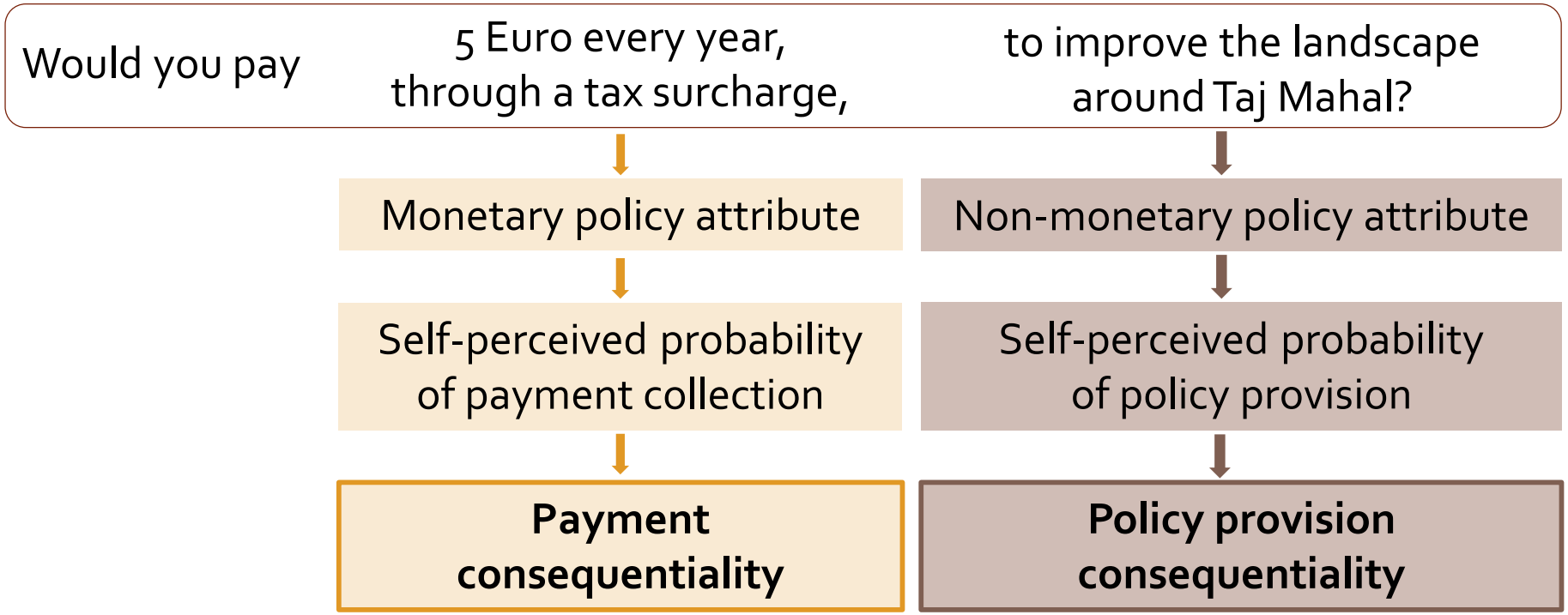
- Individuals' perceptions over consequentiality are usually assessed on the basis of such questions as this one:

  How likely do you think it is that the results of this survey will affect final policy decisions?

- But… is it not a too general question?

A (too?) general concept of consequentiality

- Stated preference questions have two important components, which may be related to two components of consequentiality.



- Another component of consequentiality: a respondent's view of the potential impact of his response on the survey outcome (**own vote's consequentiality**).

A (too?) general concept of consequentiality

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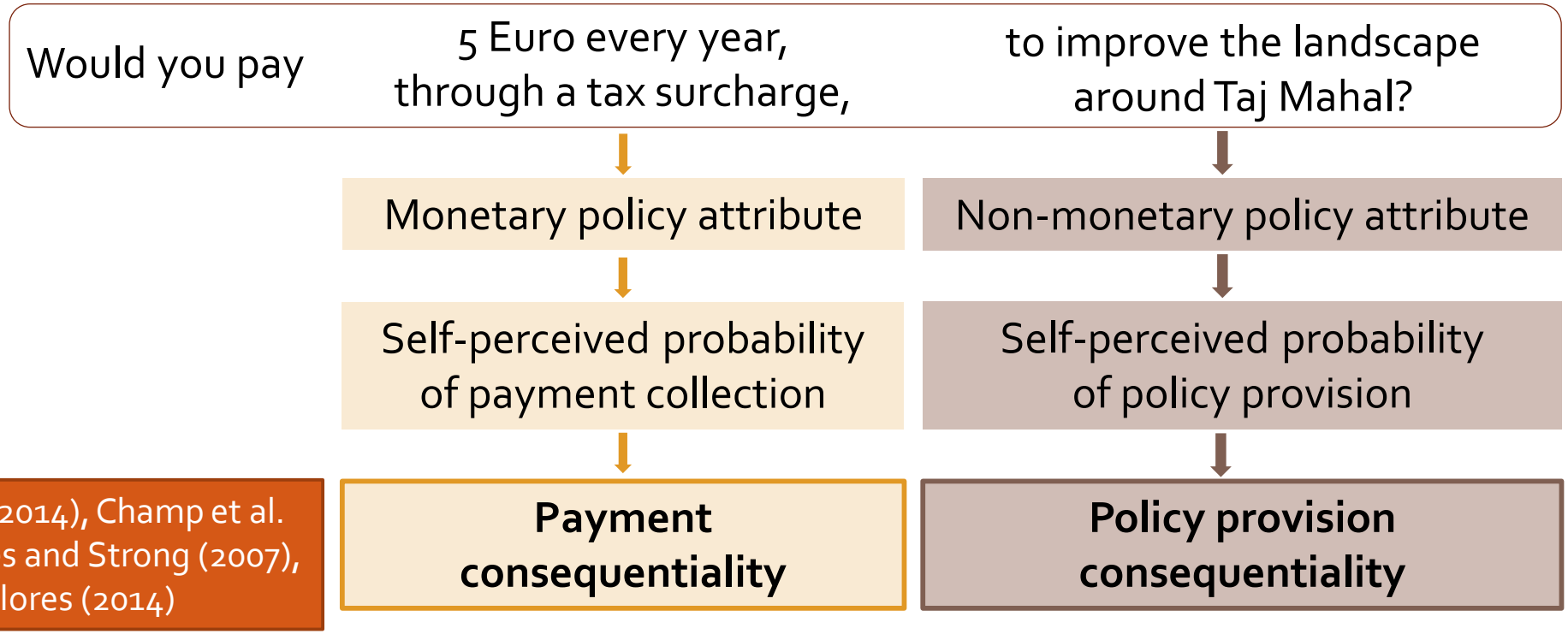

Brent et al. (2014), Champ et al. (2002), Flores and Strong (2007), Mitani and Flores (2014)

- Another component of consequentiality: a respondent's view of the potential impact of his response on the survey outcome (**own vote's consequentiality**).

As a consequence…

- How can we control for survey consequentiality if we do not know how to measure it?
- Perceptions over separate consequentiality components could / should be assessed.

What we do

- Model how subjective perceptions of consequentiality affect incentive properties of stated preference surveys.
- Different components of consequentiality incorporated together in a single model.
- A coercive payment mechanism – an advisory referendum.
- Endogeneity of consequentiality perceptions – respondents who attach a high value to a project may (be willing to) believe in high consequentiality of the survey because of the importance of the project to them (Herriges et al. 2010, Hwang et al. 2014).

Modelling framework

- A stated preference survey
- A single-shot referendum:
  Would you pay cost ***c***, through a tax surcharge, to have a public good *X* provided?
- $\boldsymbol{v_i}$ – the value individual *i* obtains when the good is provided
- An advisory referendum: the more votes for the project, the more likely it is implemented

  The probability of the project implementation: $q_i\left(\frac{1}{N}\sum_{k=1}^{N} y_k\right)$

  where: y_k is the individual *k*'s vote ($y_k = 1$ when "yes", $y_k = 0$ when "no"),
  N is the number of voters,
  $q_i(.)$ is a (weakly) increasing function how votes translate into the probability
- $q_i\left(\frac{1}{N}\sum_{k=1}^{N} y_k\right) = q_i\left(\frac{I_{-i}^{E} + y_k}{N}\right)$, where I_{-i}^{E} is the expected (by individual *i*) number of votes for the project excluding the *i*'s vote

Expected utility from voting behaviour

Expected utility from voting "yes", $y_i = 1$: $$EU_{YES,i} = q_i\left(\frac{I_{-i}^{E}+1}{N}\right)EU_{I,i} + \left[1-q_i\left(\frac{I_{-i}^{E}+1}{N}\right)\right]EU_{NI,i}$$

Expected utility from voting "no", $y_i = 0$: $$EU_{NO,i} = q_i\left(\frac{I_{-i}^{E}}{N}\right)EU_{I,i} + \left[1-q_i\left(\frac{I_{-i}^{E}}{N}\right)\right]EU_{NI,i}$$

$EU_{I,i}$: Expected utility when the project is implemented

$EU_{NI,i}$: Expected utility when the project is not implemented

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Expected utility when the project is implemented

Expected utility when the project is not implemented

Probability of the project implementation

Incentive compatible survey

$$EU_{YES,i} - EU_{NO,i} = \left[q_i\left(\frac{I_{-i}^{E}+1}{N}\right) - q_i\left(\frac{I_{-i}^{E}}{N}\right)\right]\left(EU_{I,i} - EU_{NI,i}\right)$$

Incentive compatibility holds iff

$$\begin{cases} EU_{YES,i} > EU_{NO,i} & for\ v_i > c \\ EU_{YES,i} = EU_{NO,i} & for\ v_i = c. \\ EU_{YES,i} < EU_{NO,i} & for\ v_i < c \end{cases}$$

A respondent prefers to vote "yes" when his valuation of the project is higher than the cost.

1) When $q_i\left(\frac{I_{-i}^{E}+1}{N}\right) - q_i\left(\frac{I_{-i}^{E}}{N}\right) \approx 0$, the respondent is indifferent between voting "yes" and "no" regardless of his project valuation – lack of incentive compatibility.

2) When $q_i\left(\frac{I_{-i}^{E}+1}{N}\right) - q_i\left(\frac{I_{-i}^{E}}{N}\right) > 0$, the incentive compatibility properties of the survey depend on $EU_{I,i} - EU_{NI,i}$.

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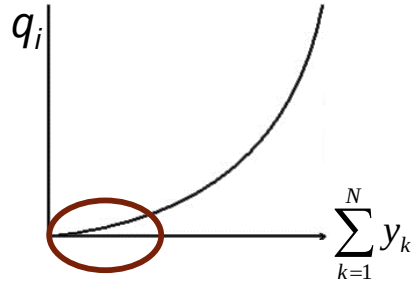
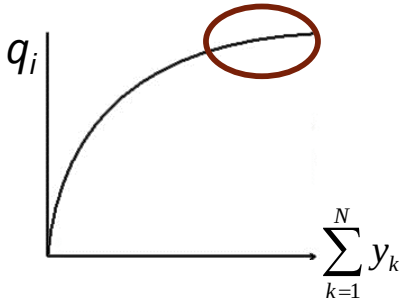
The survey is not incentive compatible when $q_i\left(\frac{I_{-i}^{E}+1}{N}\right)-q_i\left(\frac{I_{-i}^{E}}{N}\right)\approx 0$, that is, when…

- The size of the voting population (*N*) is close to infinity.
- Incentive properties may be weakened when an individual:
  - thinks that the probability of the project implementation (q_i) increases non-linearly with the number of "yes" votes
  - and has strong expectations about preferences of others.



others are thought to be against the project



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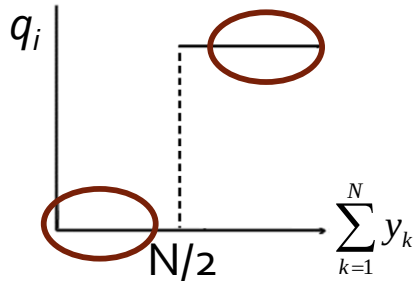

majority voting

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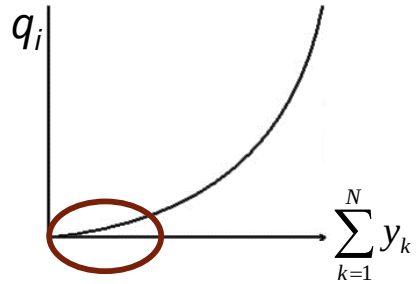

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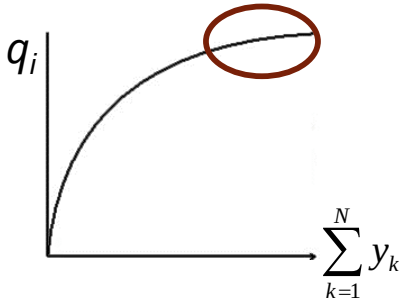

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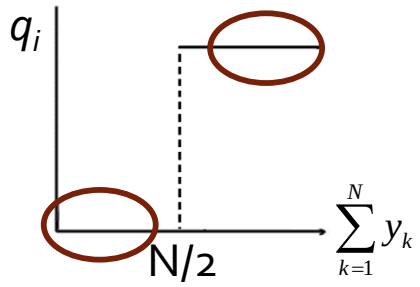

majority voting

The importance of the own vote's consequentiality

Incentive compatible survey

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How $EU_I - EU_{NI}$ affects incentive compatibility?

(For simplicity we drop index *i*.)

Project

Not implemented
$U(0)$

EU_{NI}

Implemented

		$p_p(v)$ Payment collected	$1-p_p(v)$ Payment not collected
$p_s(v)$	Successful implementation	$U(v-c)$	$U(v)$
$1-p_s(v)$	Unsuccessful implementation	$U(-c)$	$U(o)$

EU_I

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EU_I

- $\dfrac{\partial(EU_I - EU_{NI})}{\partial(v-c)} > 0$
- $EU_I - EU_{NI}$ is an increasing function of $v-c$.
- For incentive compatibility, enough to verify when $EU_I - EU_{NI} = 0$ for $v-c=0$.

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EU_I

Obviously,
– when $p_s(v) = 1$ and $p_p(v) = 1$, the survey is incentive compatible;
– when $p_s(v) = 0$ and / or $p_p(v) = 0$, the survey is not incentive compatible.

How $EU_I - EU_{NI}$ affects incentive compatibility?

- Assume that $p_p(v) \in (0,1)$ and $p_s(v) \in (0,1)$.
- For $v - c = 0$, incentive compatibility holds when $EU_I - EU_{NI} = 0$, that is, when

$$\frac{U(c) - U(0)}{U(0) - U(-c)} = \frac{p_p(1 - p_s)}{p_s(1 - p_p)}.$$

The left-hand side is tied to the individual's attitude towards risk.

	Truthful responding when…
For a risk-neutral individual, $U(c) - U(0) = U(0) - U(-c)$	$p_s = p_p$
For a risk-averse individual, $U(c) - U(0) < U(0) - U(-c)$	$p_s > p_p$
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How $EU_I - EU_{NI}$ affects incentive compatibility?

The importance of the subjectively perceived provision consequentiality

The importance of the subjectively perceived payment consequentiality

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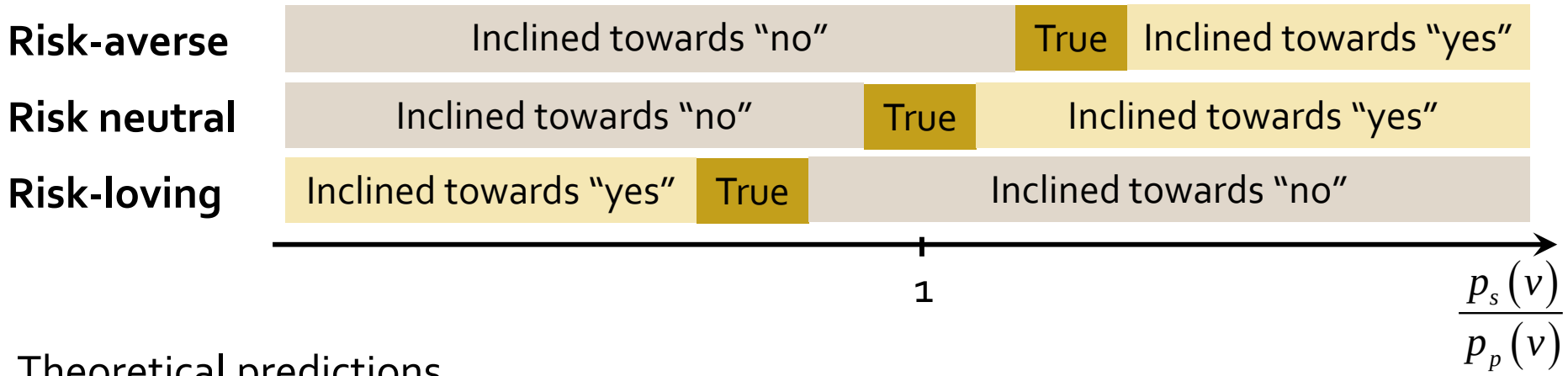
Conclusions

- An essential role of consequentiality perceptions for respondents' behaviour in stated preference surveys with a coercive payment.
- Elicited preferences may be biased when it is not taken into account that the respondents' perceptions might diverge from the information in survey scripts.
- Instead of measuring self-perceived consequentiality as a whole, one should include separate questions measuring individual's perceptions over:
  – own vote's consequentiality,
  – provision consequentiality,
  – payment consequentiality.
- Additionally, the individual's risk attitude should be controlled for.

Summary: Possible bias

A respondent does not have incentives to answer truthfully when he does not believe in consequentiality of the own vote, which may happen for

- An infinitely large research sample;
- Strong expectations about preferences of other voters.



- Theoretical predictions
- Empirical verification in progress
- Crucial implications for validity of value estimates based on stated preferences

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