

Using experiments to understand public attitudes towards environmental policy

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Image: Bengt Nyman



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Image: Mitya Zotov

Research agenda and motivation

- Economists recommend environmental (Pigouvian) taxes:
 - Reduce the environmental problems efficiently.
 - Generate income for the government.
- The public response is often less welcoming:
 - Yellow vest protests in France and Canada.
 - Carbon tax defeated in Washington State in referenda in 2016 and 2018.

Why does the public take a negative view of environmental taxes/policies?

And can those views be changed?

Using lab experiments to explore public attitudes

- Falk and Heckman (2009): the “lab offers possibilities to control decision environments in ways that are hard to duplicate with the use of naturally occurring settings.”
- Use lab experiments to explore (mechanisms behind) responses to policy design in a controlled manner.
- A complement to real-world data and surveys.

What is a lab experiment?



Photo: UCSD Jacobs School of Engineering - David Baillot

Lab experiments in economics

- Controlled environment
- Real monetary stakes
- Focus on strategic interaction
 - Outcome depends on actions of others
- Abstract framing
- Traditionally in physical lab
- Also done online
 - Less control, high attrition

Our experimental design (with variations)

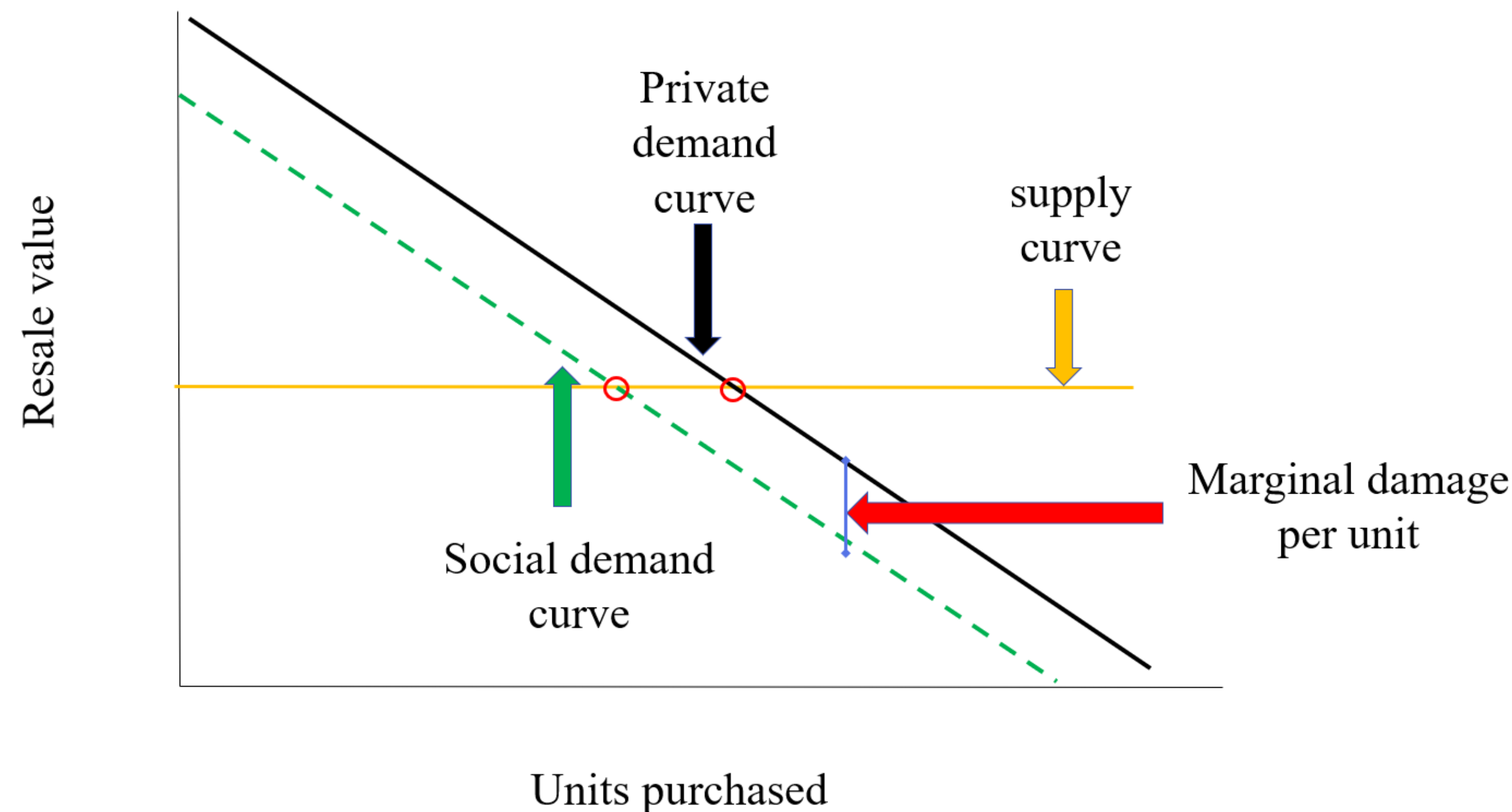
Create a «market with an externality» in a simplified setting

- 5 buyers, an automated seller, resale values and a uniform single price.
- Purchases impose 'additional costs' on (other) buyers.
 - Optimal number of purchases is lower than market equilibrium.
- Binding majority vote on introducing an efficiency enhancing policy.

= A stylized mini-economy: when we buy goods (cars) that impose costs on others (via climate change), are we willing to introduce policies that reduce the costs we impose on others?

Supply, demand and efficiency gains

Unit	Value	Price	Your gain	External cost	Social gain
1	130	40	90	40	50
2	110	40	70	40	30
3	90	40	50	40	10
4	40	40	30	40	-10
5	50	40	10	40	-30
6	30	40	-10	40	-50

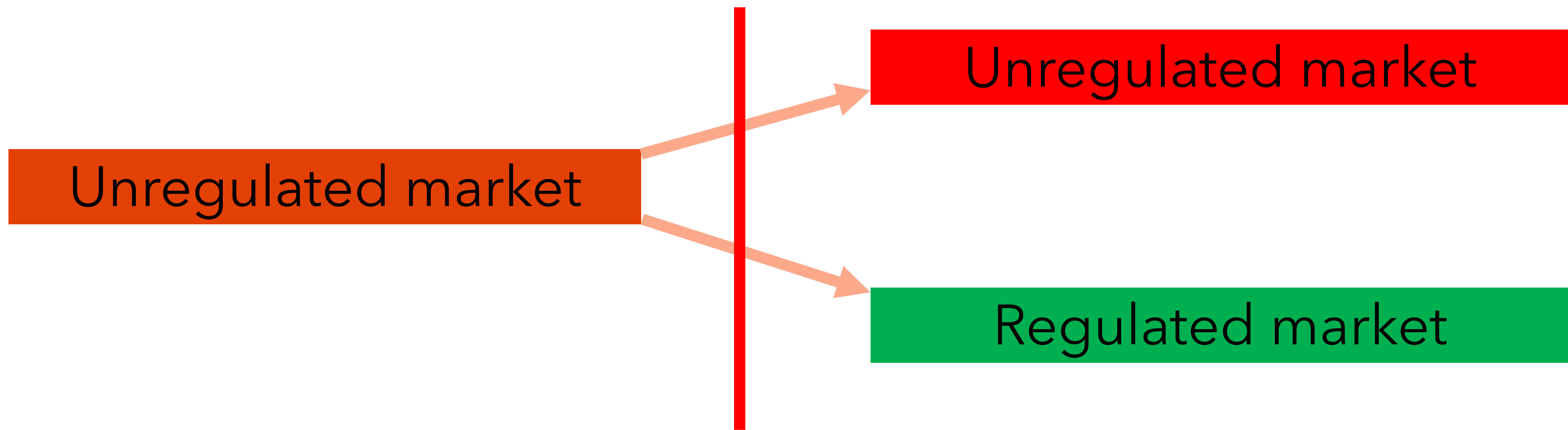


General time line

Unregulated market

Majority vote

General time line



Why we use lab experiments

- Policy features can be controlled:
 - The 'environmental' problem
 - Policy effectiveness
 - Distributional impact
- Exploring beliefs about outcomes in a setting with limited/controlled uncertainty allows us to dig deeper into behavioural mechanisms.
 - Understanding attitudes towards policy instruments per se, and not e.g. belief in climate change.

Do you not like Pigou, or do you not understand him?

(Kallbekken, Kroll, Cherry, 2011, JEEM)

- Participants frequently vote against a tax that would leave them better off.
- Exit survey provides further insights (3 response options):

Question: Under which tax scheme will...	Without info	With info
...the «polluters» purchase the fewest units?	63%	61%
...you earn the most money?	63%	61%
...the group income be the highest?	23%	51%

Do you not like Pigou, or do you not understand him?

"...it seems that what is obvious to an economist—if the activity causing the externality is reduced, overall welfare will increase—is far from obvious to our subjects, even when an explanation is provided."

Later defined tax aversion as:

"opposition towards tax schemes that would increase both individual and social economic welfare, based on incorrect and pessimistic beliefs about the properties of the tax such as its effectiveness and fairness."

Taxes vs. subsidies and the role of information

(Heres, Kallbekken, Galarraga, 2017, ERE)

- Observation: Subsidies appear to be more popular than taxes.
 - People underestimate the effectiveness of taxes relative to subsidies (thin evidence)?
- Asymmetric uncertainty regarding revenue use and collection.
- In the real world:
 - Effectiveness can be vary substantially
 - Cost per person can vary substantially
- The lab offers control over these policy properties.
 - Tax units purchased, revenues returned $1/n$
 - Subsidize units not purchased, subsidy funded $1/n$

Taxes vs. subsidies - questions

Subsidy: Clear who gains, less clear who pays (for the subsidy)

Tax: Clear who pays, less clear who gains (from the revenues)

- Is uncertainty about revenue use/financing more critical for taxes than for subsidies?
- Do participants expect to earn higher profits with a subsidy than with a tax?
- Do participants expect subsidies to be more effective?

Taxes vs subsidies - support levels

Treatment	Tax	Subsidy	S-T
Reduced Information	40%	72%	32%
Full Information	73%	90%	17%

Taxes vs subsidies - expectations

Own earnings	Tax	Subsidy
Full information	+4.2	+12.8
Reduced information	-5.8	+9.6

Units purchased by group (effectiveness)		
Full information	-4.4	-1.0
Reduced information	-5.8	-0.4

Taxes vs subsidies - findings

- Providing more (budgetary) information is likely to help boost support.
- Subsidy expected to yield larger payoff than the tax.
- ...but the subsidy is not expected to be more effective.
 - Reconciled if subjects do not expect to receive a significant share of the tax revenues.

Stockholm rush hour charge

- Decided to have a referendum on introducing a rush hour charge.
- Initially opposed by a majority.
- Charge introduced on a trial basis
 - Residents could experience benefits.
- After the trial: public support was up 18 percentage points.
- Can experience overcome tax aversion?

A blue rectangular sign with a white border. At the top is a graphic of a road with a dashed line, with two hands holding a coin over it. Below the graphic, the text 'Vardagar' is written in a large, bold, sans-serif font. Underneath that, in a smaller font, is '(ej dag före sön- och helgdag)'. Below this is a table with two columns: 'KI' and 'Kr'. The table lists time intervals and corresponding charges in Swedish Krona (Kr).

KI	Kr
0630 - 0659	10:-
0700 - 0729	15:-
0730 - 0829	20:-
0830 - 0859	15:-
0900 - 1529	10:-
1530 - 1559	15:-
1600 - 1729	20:-
1730 - 1759	15:-
1800 - 1829	10:-

Why use an experiment?

(Cherry, Kallbekken, Kroll, 2014, Res. & Energy Econ.)

The Stockholm experience was noisy:

- Media exposure, political debate, changes to public transport, etc., could all have affected the levels of support.

The lab allows us to isolate the effect of experience:

- Information is controlled (no communication)
- Avoid distributional effects (all participants have identical incentives).

Experience works!

No experience	Experience
40%	58%

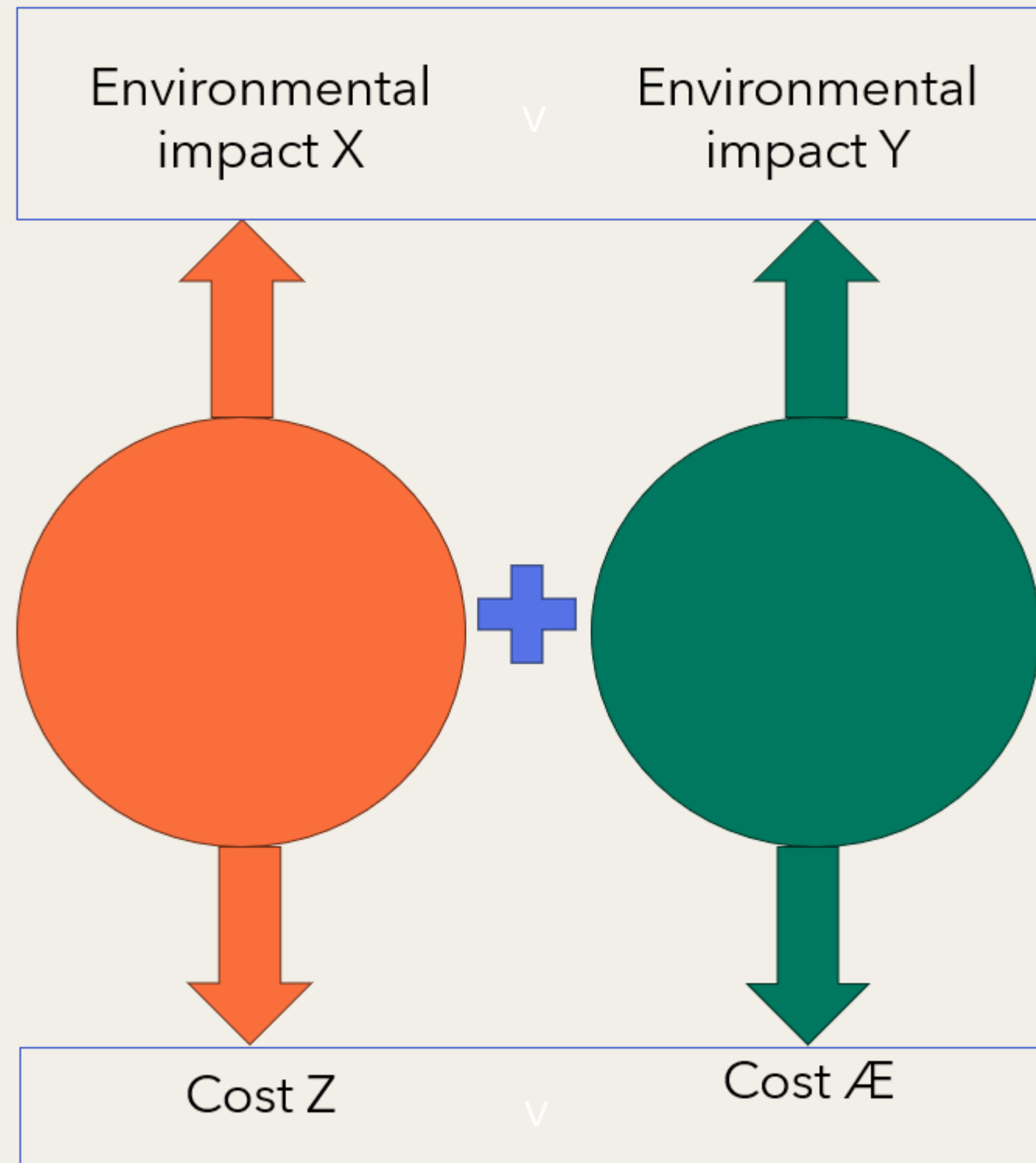
- Important to understand why experience works:
 - People underestimate the benefits of the tax?
 - People underestimate their own ability to adapt?
 - Trust issues?

What about combinations of policies?

Policy packaging hypothesized to increase public support

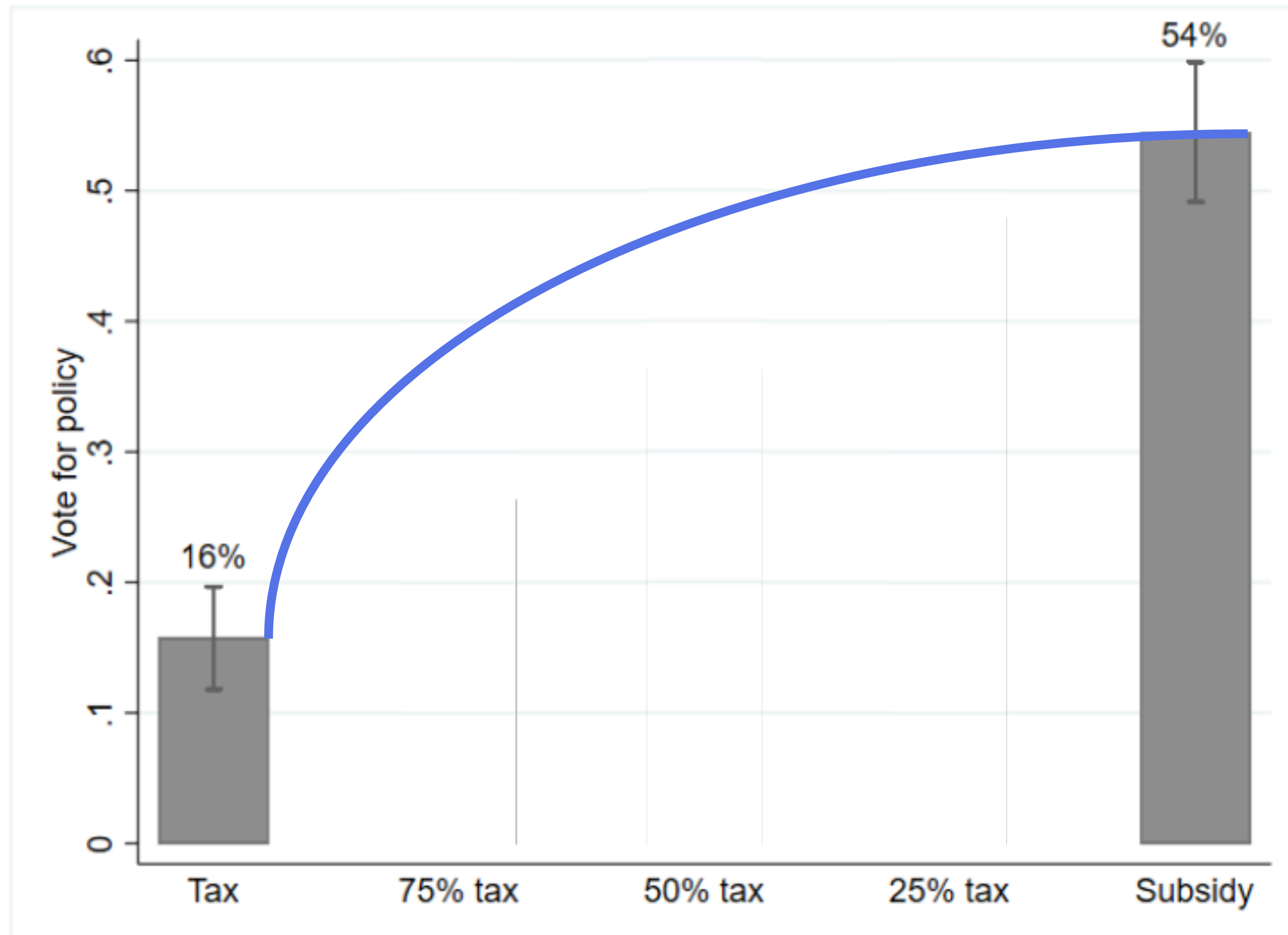
- Need a design that allows control over incentives and information.
 - Trivial if adding a popular (but costly) subsidy to a policy mix makes it more popular
 - Does not provide insights into underlying mechanisms.
 - Confounding variation in effectiveness, revenue and distributional implications etc.
- How can we design studies to understand if and how attitudes towards combined policies are formed?

Additive vs. fractional design



Treatment effect - lab experiment

(Andreassen, Kallbekken, Rosendahl, 2024, J Env, Econ. Mgt.)

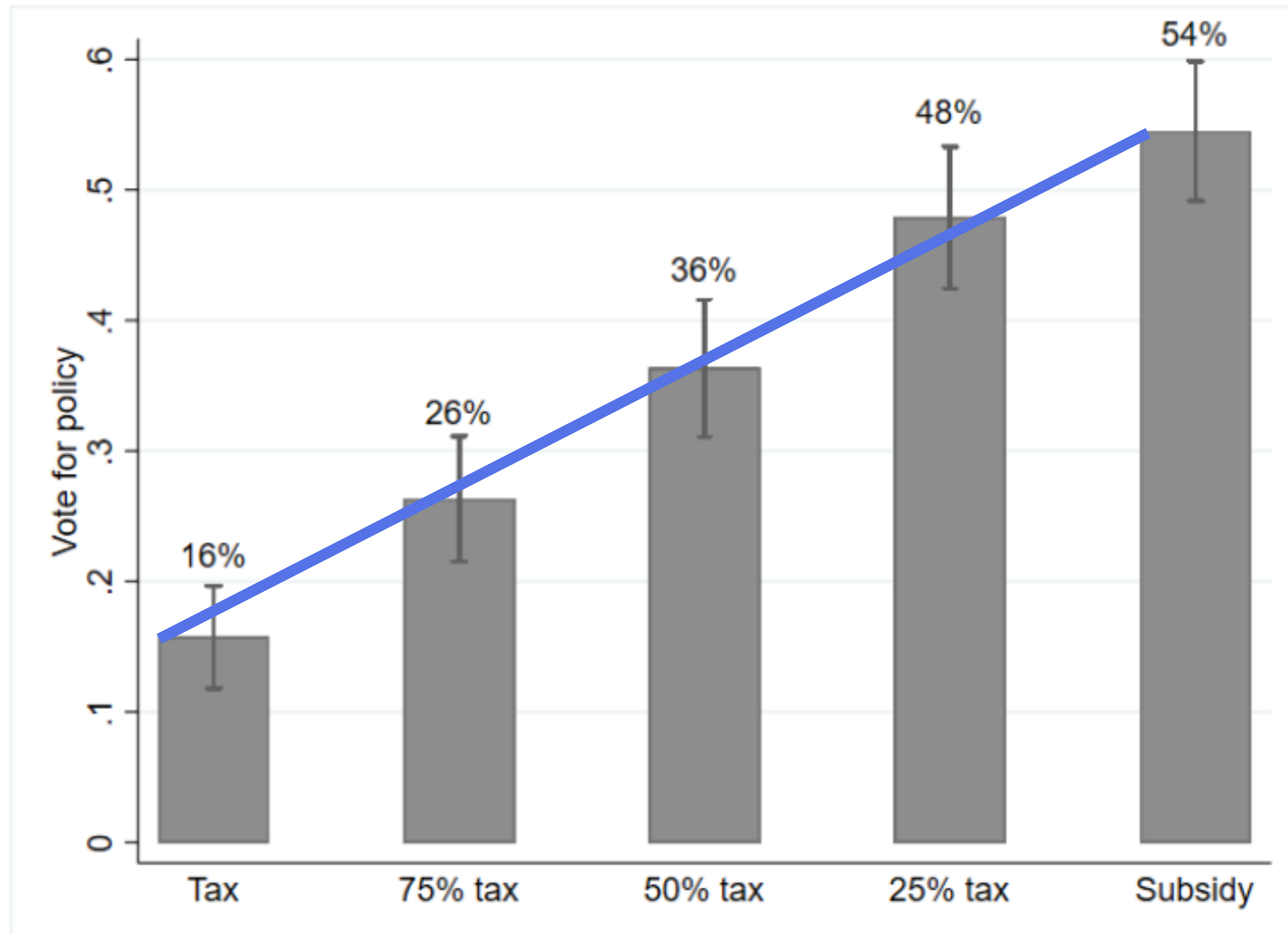


Online using
Prolific to recruit.

N=1641

Treatment effect - lab experiment

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Online using
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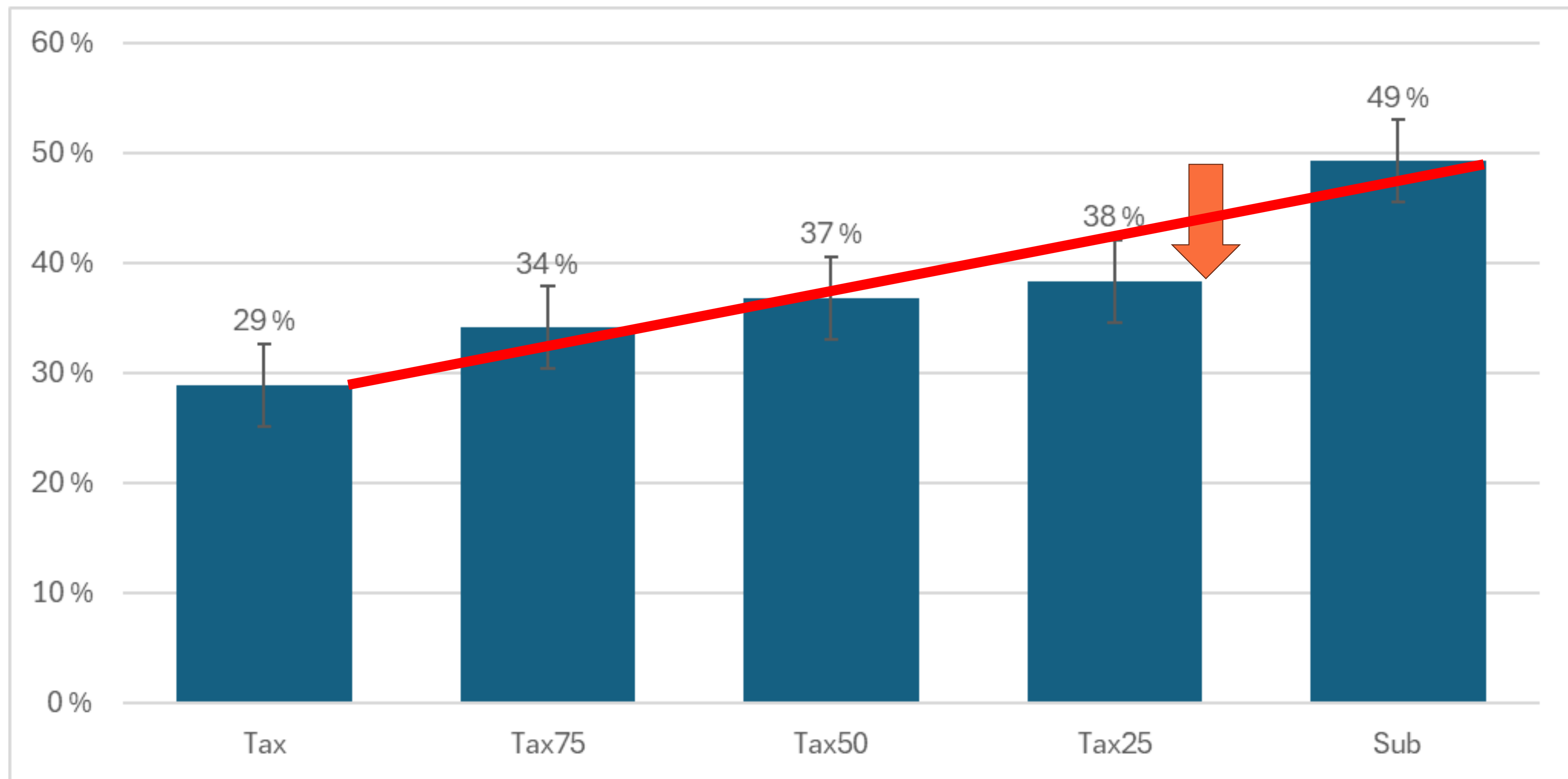
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Survey experiments

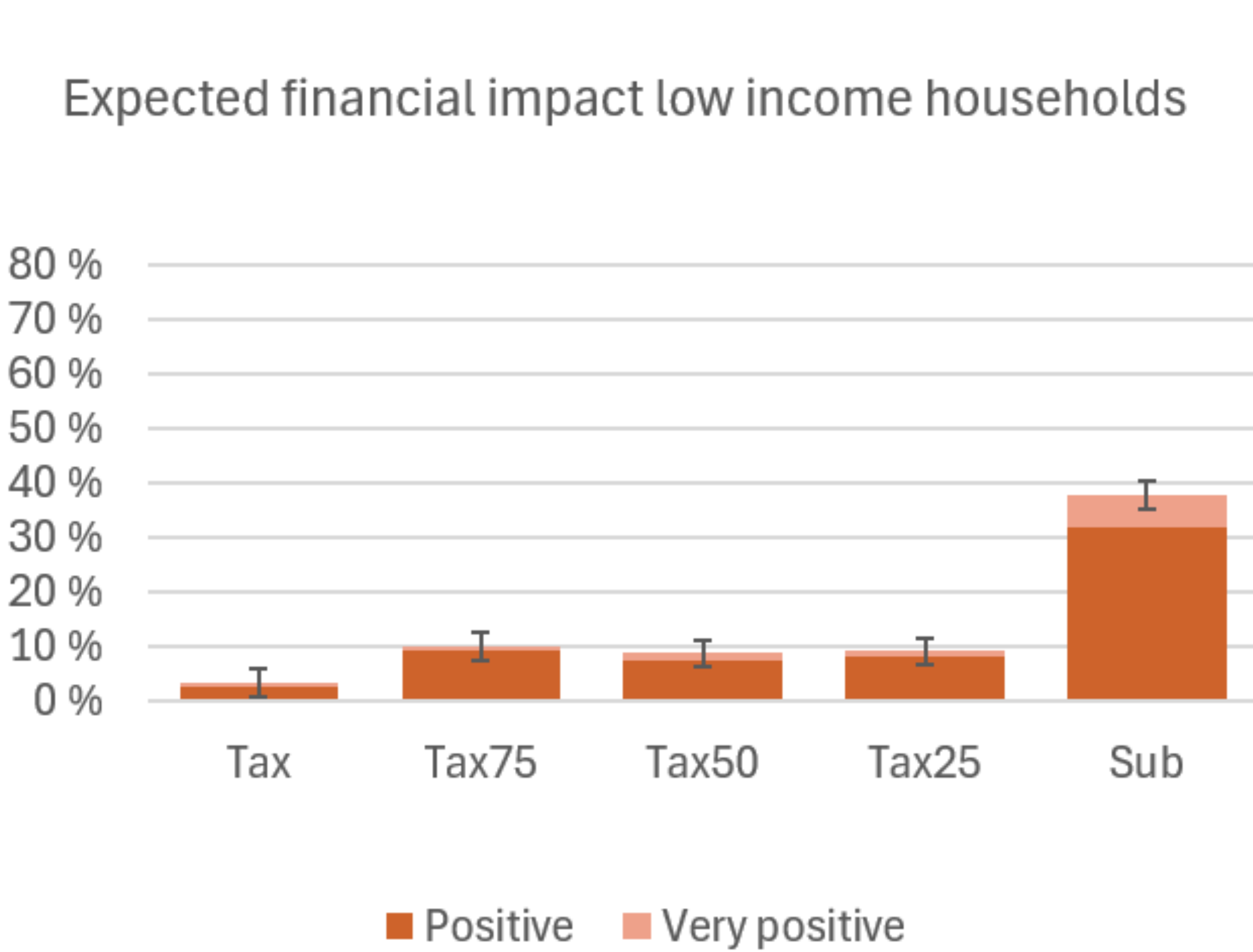
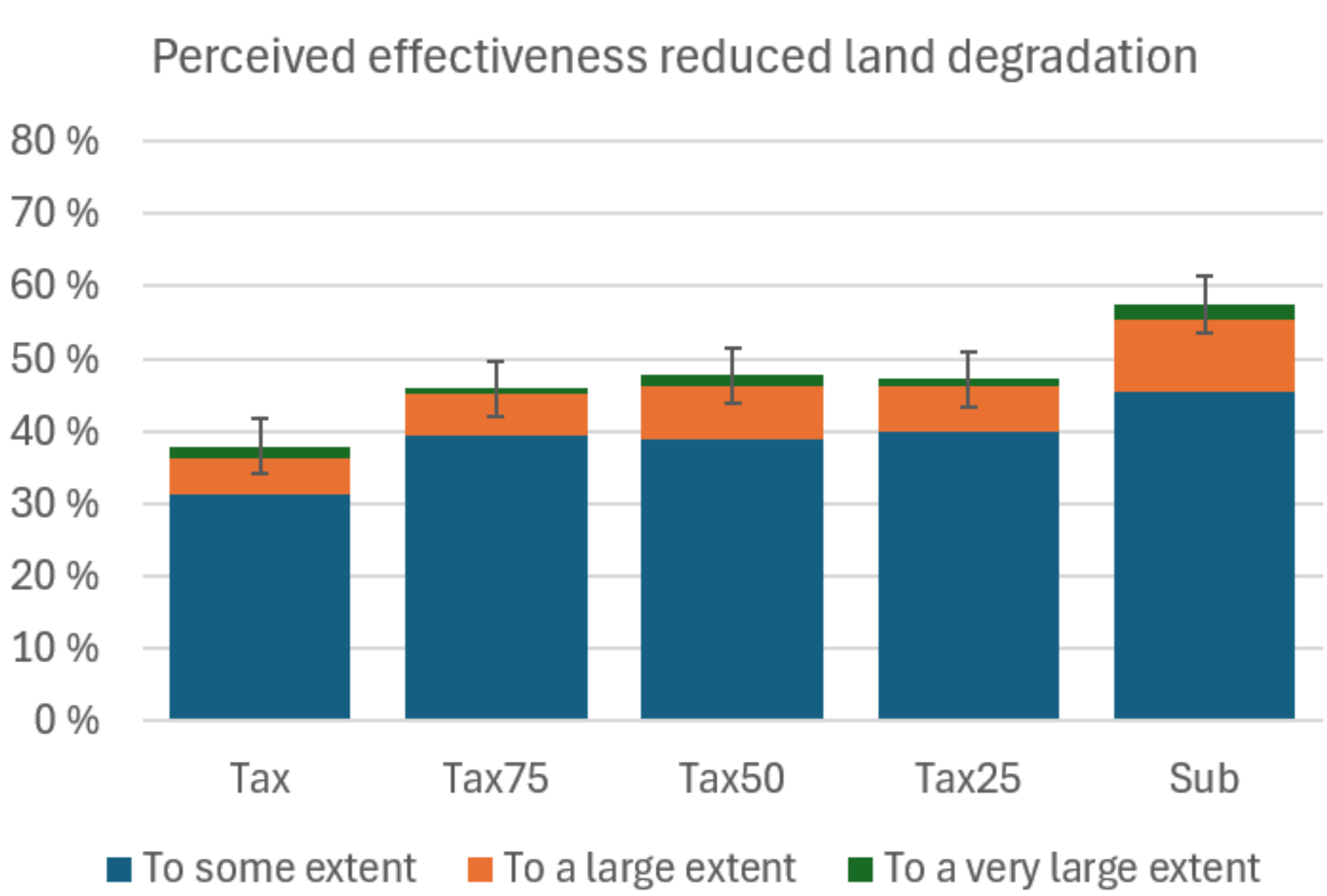
- Lab offers high degree of control, but does so by abstracting away from key policy features:
 - Distribution/heterogeneity.
 - Belief in externality or scenario.
- Survey experiments are (online) surveys conducted on a sample of the population, randomly assigning participants to different experimental conditions.
 - Levels are (more) meaningful.
 - Includes (at the cost of tractability) interactions between different preferences and beliefs.

Level of support by treatment: survey experiment

(Kallbekken, Skjeflo, Rosendahl, under review)



Policy specific beliefs by treatment



Discussion

Found results in line with our hypotheses, but results also revealed a pattern we did not anticipate:

...when policy instruments are combined, the negative perceptions of taxes dominate the positive perceptions of subsidies.

Discussion

Previous research offers potential mechanisms that could be explored:

- Rozin and Royzman (2001) describe **negativity dominance** as “combinations of negative and positive entities yield evaluations that are more negative than the algebraic sum of individual subjective valences would predict”.
- Partially consistent with **loss aversion** (Tversky and Kahneman 1991).
- Worldviews/ideology

Overall insights from the research agenda

- People do not understand how taxes can increase welfare.
 - Use of revenues, and information about usage is crucial
 - Earmarking reduces uncertainty and seems «logical».
- Freedom of choice/coerciveness is key:
 - Provide behavioural alternatives (e.g. transport taxes and public transport).
- Support increases with experience.
 - Less risky for politicians to act than they might believe.

Papers from this research agenda

- Andreassen, Gøril L., Steffen Kallbekken, and Knut Einar Rosendahl. 2024. "Can Policy Packaging Help Overcome Pigouvian Tax Aversion? A Lab Experiment on Combining Taxes and Subsidies." *Journal of Environmental Economics and Management*, 103010.
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