A carbon price by another name may seem sweeter: Consumers prefer upstream offsets to downstream taxes

Online Supplement

Table of Contents

Appendix A. Policy descriptions used in Studies 1 and 2 2
Appendix B. Flight Choice Pairs used in Studies 1 and 2. 3
Appendix C. Key Dependent measures used in Studies 1 and 2 13
Appendix D. Demographic questionnaire items 15
Appendix E. Supplemental "Study S1" 18
Appendix F. Complete text of study materials for Study S1. 24
Appendix G. Additional Analyses: Political Affiliation 53
Appendix H. Additional Analyses: Binary Choice 56
Appendix I. Additional Analyses: 5-flight Composite in Study 2 58

Appendix A. Policy descriptions used in Studies 1 and 2

"Upstream Offset" condition:

Proposal for Carbon Offset Program for Aviation Fuel Production and Import

Some governments are considering imposing a mandatory carbon offset program for aviation fuel production and import. Aviation fuel producers and importers would need to purchase offsetting emission reductions to address a share of their associated greenhouse gas emissions.

"Downstream Tax" condition:

Proposal for Carbon Tax Program for Airplane Travel and Cargo

Some governments are considering imposing a mandatory carbon tax program for airplane travel and cargo. Airlines and airline customers would need to pay a tax to address a share of their associated greenhouse gas emissions.

"Downstream Offset" condition:

Proposal for Carbon Offset Program for Airplane Travel and Cargo

Some governments are considering imposing a mandatory carbon offset program for airplane travel and cargo. Airlines and airline customers would need to purchase offsetting emission reductions to address a share of their associated greenhouse gas emissions.

"Upstream Tax" condition:

Proposal for Carbon Tax Program for Aviation Fuel Production and Import

Some governments are considering imposing a mandatory carbon tax program for aviation fuel production and import. Aviation fuel producers and importers would need to pay a tax to address a share of their associated greenhouse gas emissions.

Note: The "Downstream Tax" condition was not included in Study 2.

Appendix B. Flight Choice Pairs used in Studies 1 and 2.

*****Notes: For a subsample of participants in Study 2, only flight pair choice #4 was used.

"Downstream Tax" condition(s) ("Downstream Tax", "No-Policy Downstream Tax"):

1. Imagine that you are planning a vacation in the Caribbean.

Flight A: The Island of Tortola	Flight B: The Island of Anegada
Price: $625.25	Price: $605.25 plus an additional $14.00 carbon tax on airplane travel and cargo.

2. Imagine that you are planning a vacation in the South Pacific.

Flight A: Isla Guamblin	Flight B: Isla Melchor
Price: $1,156.16	Price: $1,146.16 plus an additional $14.00 carbon tax on airplane travel and cargo.

3. Imagine that you are planning a vacation in the South Pacific.

Flight A: Rarotongo

Price: $772.50

Flight B: Mo'orea

Price: $764.50

plus an additional $14.00 carbon tax on airplane travel and cargo.

4. Imagine that you are planning a vacation in the Caribbean.

Flight A: The Island of Nevis

Price: $322.99

Flight B: The Island of Bequia

Price: $310.99

plus an additional $14.00 carbon tax on airplane travel and cargo.

5. Imagine that you are planning a vacation in the South Pacific.

Flight A: Majuro

Flight B: Upolu

Price: $1,025.00

Price: $1,011.00

plus an additional $14.00 carbon tax on airplane travel and cargo.

"Upstream Offset" condition(s) ("Upstream Offset", "No-Policy Upstream Offset):

1. Imagine that you are planning a vacation in the Caribbean.

Flight A: The Island of Tortola

Price: $625.25

Flight B: The Island of Anegada

Price: $605.25

plus an additional $14.00 carbon offset for aviation fuel production and importation.

2. Imagine that you are planning a vacation in the South Pacific.

Flight A: Isla Guamblin

Flight B: Isla Melchor

Price: $1,156.16

Price: $1,146.16

plus an additional $14.00 carbon offset for aviation fuel production and importation.

3. Imagine that you are planning a vacation in the South Pacific.

Flight A: Rarotongo

Price: $772.50

Flight B: Mo'orea

Price: $764.50

plus an additional $14.00 carbon offset for aviation fuel production and importation.

4. Imagine that you are planning a vacation in the Caribbean.

Flight A: The Island of Nevis

Price: $322.99

Flight B: The Island of Bequia

Price: $310.99

plus an additional $14.00 carbon offset for aviation fuel production and importation.

5. Imagine that you are planning a vacation in the South Pacific.

Flight A: Majuro

Price: $1,025.00

Flight B: Upolu

Price: $1,011.00

plus an additional $14.00 carbon offset for aviation fuel production and importation.

"No-Information Control" condition:

1. Imagine that you are planning a vacation in the Caribbean.

Flight A: The Island of Tortola

Price: $625.25

Flight B: The Island of Anegada

Price: $619.25

2. Imagine that you are planning a vacation in the South Pacific.

Flight A: Isla Guamblin

Price: $1,156.16

Flight B: Isla Melchor

Price: $1,160.16

3. Imagine that you are planning a vacation in the South Pacific.

Flight A: Rarotongo

Flight B: Mo'orea

Price: $772.50

Price: $778.50

4. Imagine that you are planning a vacation in the Caribbean.

Flight A: The Island of Nevis

Price: $322.99

Flight B: The Island of Bequia

Price: $324.99

5. Imagine that you are planning a vacation in the South Pacific.

Flight A: Majuro

Price: $1,025.00

Flight B: Upolu

Price: $1,025.00

"No-Fee Control" condition:

1. Imagine that you are planning a vacation in the Caribbean.

Flight A: The Island of Tortola

Price: $625.25

Flight B: The Island of Anegada

Price: $605.25

2. Imagine that you are planning a vacation in the South Pacific.

Flight A: Isla Guamblin

Price: $1,156.16

Flight B: Isla Melchor

Price: $1,146.16

3. Imagine that you are planning a vacation in the South Pacific.

Flight A: Rarotongo

Price: $772.50

Flight B: Mo'orea

Price: $764.50

4. Imagine that you are planning a vacation in the Caribbean.

Flight A: The Island of Nevis

Price: $322.99

Flight B: The Island of Bequia

Price: $310.99

5. Imagine that you are planning a vacation in the South Pacific.

Flight A: Majuro

Price: $1,025.00

Flight B: Upolu

Price: $1,011.00

Appendix C. Key Dependent measures used in Studies 1 and 2

Dependent measures used in both Studies

1. [CONTINUOUS FLIGHT PREFERENCE ITEM USED IN ALL MAIN ANALYSES]
   How likely would you be to buy Flight B instead of Flight A?

Definitely Not	Probably Not	Maybe Not	Unsure	Maybe	Probably	Definitely
○	○	○	○	○	○	○

2. [BINARY FLIGHT PREFERENCE ITEM; ANALYSES FOR THIS ITEM NOT REPORTED]
   Which of these two flights would you prefer to buy?

Product/Flight A	**Product/Flight B**
○	○

Dependent measures used in Study 2

1. [POLICY SUPPORT ITEM]
   How much would you support the implementation of this carbon regulatory program on a national level?

Strongly opposed	Moderately opposed	Slightly opposed	Neutral	Slightly support	Moderately support	Strongly support
○	○	○	○	○	○	○

2. [PERCEIVED ENVIRONMENTAL IMPACT ITEM]
   Would you expect this carbon regulatory program to have a significant impact on climate change?

Definitely not						Definitely
○	○	○	○	○	○	○

3. [PERCEIVED CARBON EMISSIONS ACCOUNTABILITY ITEM]
   Does this carbon regulatory program ensure that those who are responsible for carbon emission pollution are the ones who pay to reduce it?

Definitely not						Definitely
○	○	○	○	○	○	○

Appendix D. Demographic questionnaire items

What is your gender?

- ❍ Male (1)
- ❍ Female (2)
- ❍ Other (3)

What is your marital status?

- ○ Single
- ○ Living together
- ○ Married
- ○ Divorced or living separated
- ○ Widowed

How old are you (in years)?

_____

How would you describe your race? Pick the category that best describes you in your view.

- ❍ Asian/Asian American (1)
- ❍ Black/African American (2)
- ❍ White/ European American (3)
- ❍ Latino/Hispanic (4)
- ❍ Native American/ Alaska Native (5)
- ❍ South East Asian American (6)
- ❍ Middle Eastern (7)
- ❍ Pacific Islander (8)
- ❍ Other (9)
- ❍ More than one on this list (please list): (10) _____

Last year, before taxes, what would you say was your household income?

- ❍ Less than $20,000 (1)
- ❍ $20,000 - $39,999 (2)
- ❍ $40,000 - $59,999 (3)
- ❍ $60,000 - $89,999 (4)
- ❍ $90,000 - $119,999 (5)
- ❍ $120,000 - $149,999 (6)
- ❍ $150,000 - $199,999 (7)
- ❍ $200,000 or more (8)
- ❍ I would rather not say (9)

Please indicate the highest level of education you have completed.

- ❍ Less than 5th grade (1)
- ❍ Less than 8th grade (2)
- ❍ Less than High School (3)
- ❍ High School Diploma or GED (4)
- ❍ Some College or Technical Training School (5)
- ❍ Associate's Degree (6)
- ❍ Bachelor's Degree (7)
- ❍ Some graduate school (8)
- ❍ Professional Degree or graduate school (9)

Do you consider yourself more liberal or more conservative?

- ❍ Strongly Liberal (1)
- ❍ Moderately Liberal (2)
- ❍ Slightly Liberal (3)
- ❍ Slightly Conservative (4)
- ❍ Moderately Conservative (5)
- ❍ Strongly Conservative (6)

What is your political orientation?

- ❍ Democratic
- ❍ Republican
- ❍ Independent
- ❍ Libertarian
- ❍ Green
- ❍ Other

Imagine that you had to pay an unexpected bill immediately. For example, suppose that you needed an expensive medical treatment that was not covered by insurance. Considering all possible resources available to you (including savings, borrowing, etc.), what is the **maximum** amount that you could come up with on short

notice? (optional)
$

All things considered, do you now feel economically secure?

- Definitely Yes
- Yes
- Maybe yes
- Unsure
- Maybe no
- No
- Definitely No

How much do you agree with the following statement:
"I feel I have lost all control over my economic future."

- Strongly Agree
- Agree
- Agree a little
- Neutral
- Disagree a little
- Disagree
- Strongly Disagree

Appendix E. Supplemental "Study S1"

In pilot Study S1, we compared eight carbon price conditions (described below) and three different flight pairs (with different price levels and price differences) in an exploratory fashion. Chronologically, we ran this study before Study 1 (reported in the main manuscript). Methodologically, this study is quite similar to Study 1. However, while Study 1 (main manuscript) endevours to avoid experimental confounds in the policy descriptions (i.e., between conditions we only manipulated small amounts of text germane to testing key research questions), this study (Study S1) has policy descriptions that are more real-world accurate but have multiple factors varying between them. Also, this study (Study S1) includes a carbon "permit" condition that we subsequently dropped from the research project for future studies, as it gave similar but weaker results as compared to the carbon "offset" condition, and had weaker links to previous research and application.

Study S1: Method

Participants

Participants were 416 residents of the United States (53% men; *M* age = 35.31 years [*SD* = 11.41]) who were recruited through Amazon.com's Mechanical Turk website. Participants completed the present study and two other pilot studies that are not reported here.

Experimental Manipulation: Proposed Carbon Regulatory Policies

Respondents were randomly assigned to one of eight conditions: "upstream offset", "upstream permit", "upstream tax", "downstream offset", "downstream permit", "downstream tax", "no-fee control", or "no-information control".

In the six carbon fee labeling conditions, participants were presented with a narrative (95-134 words in length; complete text in Appendix F of this Online Supplement) describing the proposed legislation to establish an aviation-related carbon fee to limit carbon dioxide emissions. The specific dollar costs and predicted effects

of this fee were the same across policy descriptions. However, the "stream" (upstream vs downstream) and "frame" (tax vs. offset vs. permit) were varied between conditions. For example, in the "upstream offset" condition the regulatory policy described a proposal for a carbon [*offset*] program for [*aviation fuel production and import*], whereas in the "downstream tax" condition, the regulatory policy described a proposal for a carbon [*tax*] on [*the carbon dioxide emissions of airplanes*]. Thus, the six experimental conditions were, "upstream offset", "upstream permit", "upstream tax", "downstream offset", "downstream permit", and "downstream tax". Other than varying the labelling of the proposed carbon fee, the content in each of the six experimental conditions also varied in their descriptions of the fee and how it would be imposed. Care was taken to ensure that the descriptions were nearly identical in length and content, however, as mentioned previously, these descriptions have relatively more factors varying between them than those used in Study 1 (reported in the main manuscript), and therefore this study (Study S1) offers relatively weaker experimental control. After reading the regulatory policy, participants moved on to the dependent measures.

Participants in the two additional control conditions (the "no-information control" condition and the "no-fee control" condition), were not asked to read a proposed regulatory policy at all and instead directly moved on to the dependent measures described below.

Measure of Pro-Environmental Flight Preference

Immediately following the manipulation, participants in the six experimental conditions were asked to imagine that they were planning a vacation and were presented with three pairs of similarly priced flights to small island vacation destinations. For each pair of flight decisions, Flight B included an "additional $14.00 carbon [tax] (or offset, or permit) on [aviation fuel production and importation] (or airplane travel)." The exact wording of the additional $14.00 carbon fee on Flight B varied between each of the six experimental conditions. For example, one flight pair decision in the "upstream offset" condition had participants choose between "Flight A to the Island of Tortola for $625.25 OR Flight B to the Island of Anegada for $605.25 plus an additional $14.00 carbon [offset] on [aviation fuel production and importation]." We used approximate current market prices for these flights (based on departure from Miami, Florida), and determined the $14.00 price of the carbon

fee as an illustrative estimate, chosen to be higher than likely costs under CORSIA. (This estimate is based on a rough estimate of the cost to consumer for completely offsetting the emissions of flights of this length, which is more than the requirement under CORSIA.) For each flight pair, participants indicated how likely they would be to buy Flight A instead of Flight B using a 7-point scale (from "1- Definitely Not" to "7- Definitely"). For each flight pair, participants also indicated their preferred flight ("Which of these two flights would you prefer to buy, Flight A or Flight B?"). Results from analyses on this dichotomous choice variable are not reported but are consistent with those of the continuous choice measure. The two flight pairs differed slightly in price difference: Flight B was $6.00 cheaper than Flight A in the first flight pair decision, $20.00 more expensive in the second decision, and $4.00 more expensive than Flight A in the third.

Participants in the two control conditions underwent slightly different procedures: In the "no-information control" condition, the $14.00 carbon fee applied to Flight B in each of the flight pair decisions was embedded into the price of Flight B with no additional information provided. For example, one flight pair decision in the "no-information control" condition had participants choose between, "Flight A to the Island of Tortola for $625.25 OR Flight B to the Island of Anegada for $619.25." This control condition allowed us to examine whether preferences for Flight B in our experimental conditions were driven by the given explanations of additional carbon fees or by something idiosyncratic about Flight B (e.g., price, destination). In contrast, in the "no fee control" condition the $14.00 carbon fee was not applied to Flight B in either of the flight pair decisions (e.g., "…Flight B to the Island of Anegada for $605.25."). The "no fee" control condition allowed us to examine how a preference for Flight B in our experimental conditions differed from a preference for the exact same flights when they did not carry an imposed carbon fee and were $14.00 less expensive.

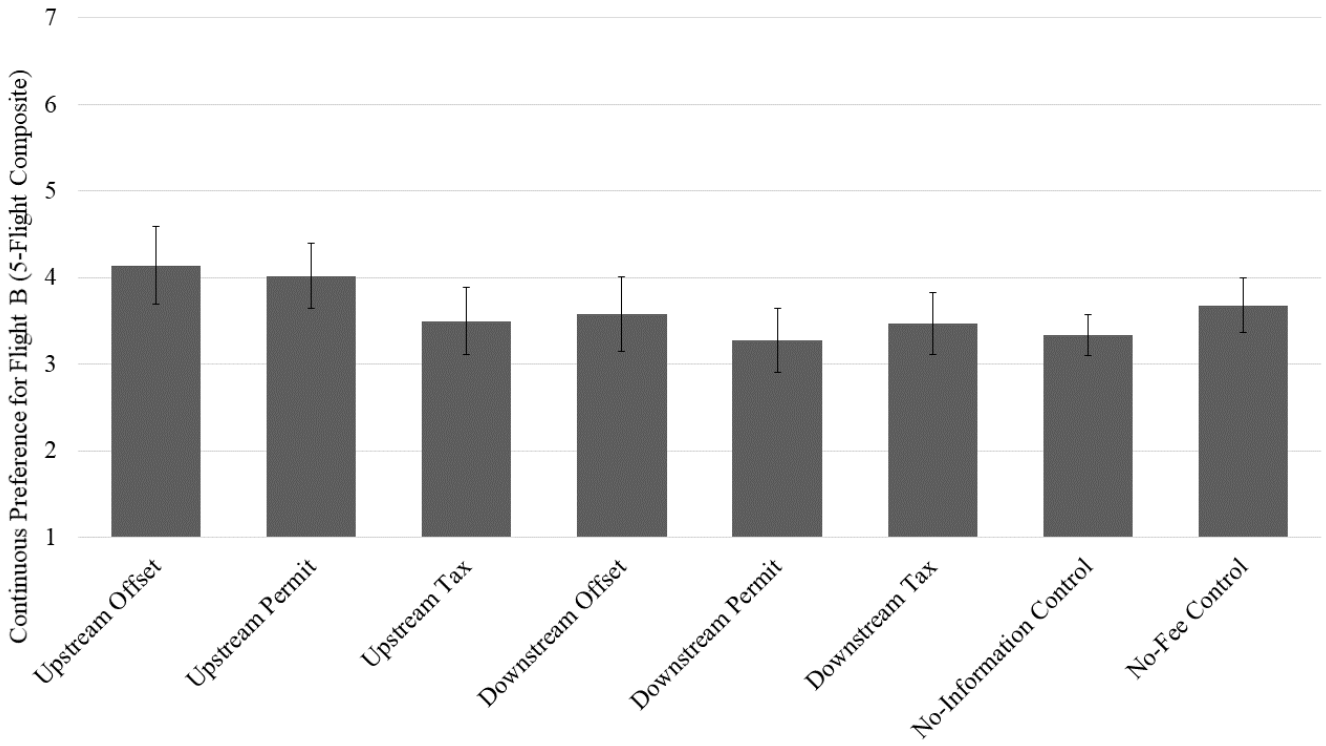
Participants in this study also completed the 15-item New Ecological Paradigm (NEP; Dunlap, Van Liere, Mertig, & Jones, 2000) which is designed to assess dispositional environmental attitudes and concerns. Analyses were conducted to test whether any of the primary results (reported below) were moderated by this questionnaire and there was no evidence of meaningful moderating effects so this variable is not discussed further. Finally, participants in all six conditions provided demographic information (e.g., age, sex, income).

Study S1: Results

As seen in Figure S1, price framing condition had a significant impact on consumers' flight preferences. A repeated-measures ANOVA with framing conditions (8 levels, between-subjects) and flight pair (3 levels, within-subjects) found a main effect of framing condition, $F(7,408)=2.47$, $p=.02$, $\eta^2 = 0.04$, indicating that frames such as the "upstream offset" were more attractive, and a main effect of flight pair, $F(2,816)=97.3$, $p<.001$, $\eta^2 = 0.19$, indicating that more expensive flights are less popular overall, but no significant interaction, $F(14,816)=97.3$, $p=.12$, $\eta^2 = .03$. (A visual inspection shows that there is a directional trend for the second pair, in which there is a $20 price difference between the flights, to show weaker price framing effects.) Given the lack of interaction between flight pairs and framing conditions, and that the main effect of price is uninteresting, we collapsed across flight pairs for our subsequent analyses: we created a composite flight preference measure by averaging the three flight pair decisions, and used this composite in our following analyses and figures.

To test the effect of the experimental conditions, we conducted a one-way analysis of variance (ANOVA) on continuous preference for Flight B (collapsed across flight pair choices), with condition as the independent variable. Results revealed a significant main effect of experimental condition, $F(7,408) = 1.96$, $p = .02$, $\eta^2 = 0.04$. Figure 1 shows that the "upstream offset" and "upstream permit" conditions appear to be most effective at eliciting pro-environmental flight preferences.

Figure S1. Mean likelihood to buy Flight B (carrying a $14.00 carbon fee) vs Flight A within each carbon pricing condition in Study S1. Participants responded on a scale from 1 = "Definitely not" to 7= "Definitely". Error bars indicate 95% confidence intervals.



In light of the significant omnibus ANOVA, we followed up with a series of "protected" pairwise contrasts to better understand the differences between frames. Flight preferences were were not significantly different between "upstream offset" and the "upstream permit" conditions, $t(91) = 0.40$, $p = .69$, $d = 0.08$. Going forward, we compare the "upstream offset" condition to each of the other conditions as this is the focal condition in our future studies that is consistently the most attractive.

Preference for flights carrying a $14.00 carbon fee in the "upstream offset" condition was significantly greater when compared to the "upstream tax" condition, $t(106) = 2.12$, $p = .04$, $d = 0.41$, the "downstream tax" condition, $t(106) = 2.34$, $p = .02$, $d = 0.46$, and the downstream permit condition, , $t(101) = 2.90$, $p < .01$, $d = 0.57$; it was marginally greater when compared to the "downstream offset" condition, $t(106) = 1.80$, $p = .08$, $d = 0.35$. Preference to purchase Flight B in the "upstream offset" condition was also significantly greater when compared to the "no-information control" condition, $t(91) = 3.00$, $p < .01$, $d = 0.67$. Finally, individuals in the "upstream offset" condition were marginally more likely to prefer flights carrying a carbon fee when compared to the "no-fee control" condition in which the $14.00 carbon fee was not even applied, $t(95) = 1.67$, $p = .10$, $d = 0.35$.

Study S1: Discussion

Individuals who had read a description (119 words in length; 3-4 times lengthier than those used in studies reported in main text) of a proposed regulation for a carbon fee described as a "carbon offset on aviation fuel production and importation" (or "carbon permit for aviation fuel production and importation") reported a greater preference to purchase flights carrying a $14.00 carbon fee (versus similarly priced flights with no carbon fee) than, a) individuals who read other descriptions (95-134 words in length) describing the carbon fee under different labels, b) individuals who did not read any description of an additional carbon fee and for whom this $14.00 fee was embedded in the cost of the flight, and c) individuals who did not read any description of an additional carbon fee and for whom this $14.00 fee was not even applied to the cost of the flight.

An important caveat on Study S1 is that it is not clear whether one specific part of the carbon pricing description was critical, or if the effect was driven by a more general understanding and engagement with the content. The policy descriptions in this study were written to be comprehensive in order to fully and accurately inform potential real-world consumers; therefore, these descriptions also carry non-trivial differences in content beyond just "stream" (upstream vs. downstream) and "frame" (tax vs. offset vs permit). Given this, Study S1 offers relatively weaker experimental control when testing key hypotheses versus Studies 1 and 2 reported in the main text. Further, given the practical problem of consumer engagement when purchasing flights (i.e., some consumers may not have the time nor desire to read multi-paragraph policy descriptions), the lengthy policy descriptions used in Study S1 may be less actionable in a real-world setting than the shorter policy descriptions used in Studies 1 and 2 reported in the main text. Still, though they lack a relative degree of experimental control (and potentially real-world utility), it is encouraging that the findings of Study S1 are consistent with those of Studies 1 and 2 reported in the main manuscript.

Appendix F. Complete text of study materials for Study S1.

[Upstream offset condition:]

Proposal for Carbon Offset Program for Aviation Fuel Production and Import

As you may know, carbon dioxide emissions are produced by many human activities, such as burning fossil fuels for driving, generating electricity, or flying, and these emissions are contributing to climate change.

Some governments are considering imposing a mandatory carbon offset program for aviation fuel production and import. Aviation fuel producers and importers would need to purchase offsetting emission reductions (e.g., from programs that reduce emissions at electric power plants, or that protect forests which would otherwise be chopped down). "Offsetting" would send a price signal that should, over time, elicit a market response across the entire aviation industry. It's estimated that the program would add $5.70 to the cost of a flight from New York to Los Angeles.

Please ensure that you have read the article carefully and understood its contents.

○ I have read the article carefully and am ready to proceed

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of Tortola

Price: $625.25

Flight B: The Island of Anegada

Price: $605.25
plus an additional $14.00 carbon offset for aviation fuel production and importation.

Which of these two flights would you prefer to buy?

○ Flight A

Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of St. Croix

Price: $279.76

Flight B: The Island of St. John

Price: $285.76
plus an additional $14.00 carbon offset for aviation fuel production and importation.

Which of these two flights would you prefer to buy?

Flight A

Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Imagine that you are planning a vacation in the South Pacific...

Flight A: Isla Guamblin

Price: $1,156.16

Flight B: Isla Melchor

Price: $1,146.16
plus an additional $14.00 carbon offset for aviation fuel production and importation.

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

[Upstream permit condition:]

Proposal for Carbon Permit Program for Aviation Fuel Production and Import

As you may know, carbon dioxide emissions are produced by many human activities, such as burning fossil fuels for driving, generating electricity, or flying, and these emissions are contributing to climate change.

Some governments are considering capping the carbon dioxide emissions of aviation fuel. The governments would issue (or sell) carbon dioxide emissions permits to aviation fuel producers and importers. Fuel producers and importers that cut the carbon dioxide emissions of their fuels below the number of permits they hold could sell their extra permits to other producers/importers who find it more difficult to cut these emissions. This would send a price signal that should, over time, elicit a market response across the entire aviation industry. It's estimated that offsetting would add $5.70 to the cost of a flight from New York to Los Angeles.

Please ensure that you have read the article carefully and understood its contents.

I have read the article carefully and am ready to proceed

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of Tortola

Price: $625.25

Flight B: The Island of Anegada

Price: $605.25
plus an additional $14.00 carbon permit for aviation fuel production and importation.

Which of these two flights would you prefer to buy?

Flight A

Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of St. Croix

Price: $279.76

Flight B: The Island of St. John

Price: $285.76
plus an additional $14.00 carbon permit for aviation fuel production and importation.

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Imagine that you are planning a vacation in the South Pacific...

Flight A: Isla Guamblin

Price: $1,156.16

Flight B: Isla Melchor

Price: $1,146.16
plus an additional $14.00 carbon permit for aviation fuel production and importation.

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

[Upstream tax condition:]

Proposal for Carbon Tax on Aviation Fuel Production and Import

As you may know, carbon dioxide emissions are produced by many human activities, such as burning fossil fuels for driving, generating electricity, or flying, and these emissions are contributing to climate change.

Some governments are considering imposing a tax on the production and import of aviation fuels. This would raise the cost of producing and importing aviation fuels, sending a price signal that should, over time, elicit a market response across the entire aviation industry. It's estimated that this tax would add $5.70 to the cost of a flight from New York to Los Angeles.

Please ensure that you have read the article carefully and understood its contents.

- I have read the article carefully and am ready to proceed

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of Tortola

Price: $625.25

Flight B: The Island of Anegada

Price: $605.25
plus an additional $14.00 carbon tax on aviation fuel production and importation.

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of St. Croix

Price: $279.76

Flight B: The Island of St. John

Price: $285.76
plus an additional $14.00 carbon tax on aviation fuel production and importation.

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Imagine that you are planning a vacation in the South Pacific...

Flight A: Isla Guamblin

Price: $1,156.16

Flight B: Isla Melchor

Price: $1,146.16
plus an additional $14.00 carbon tax on aviation fuel production and importation.

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

[Downstream offset condition:]

Proposal for Carbon Offset Program for Airplane Travel

As you may know, carbon dioxide emissions are produced by many human activities, such as burning fossil fuels for driving, generating electricity, or flying, and these emissions are contributing to climate change.

Some governments are considering capping the carbon dioxide emissions of airplanes. Airlines would need to reduce their emissions to the level of the cap, or purchase offsetting emission reductions (e.g., from programs that reduce emissions at electric power plants, or that protect forests which would otherwise be chopped down). “Offsetting” would send a price signal that should, over time, elicit a market response across the entire aviation industry. It’s estimated that offsetting would add $5.70 to the cost of a flight from New York to Los Angeles.

Please ensure that you have read the article carefully and understood its contents.

I have read the article carefully and am ready to proceed

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of Tortola

Price: $625.25

Flight B: The Island of Anegada

Price: $605.25
plus an additional $14.00 carbon offset for airplane travel.

Which of these two flights would you prefer to buy?

Flight A

Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of St. Croix

Price: $279.76

Flight B: The Island of St. John

Price: $285.76
plus an additional $14.00 carbon offset for airplane travel.

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Imagine that you are planning a vacation in the South Pacific...

Flight A: Isla Guamblin

Price: $1,156.16

Flight B: Isla Melchor

Price: $1,146.16
plus an additional $14.00 carbon offset for airplane travel.

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

[Downstream permit condition:]

Proposal for Carbon Permit Program for Airplane Travel

As you may know, carbon dioxide emissions are produced by many human activities, such as burning fossil fuels for driving, generating electricity, or flying, and these emissions are contributing to climate change.

Some governments are considering capping the carbon dioxide emissions of airplanes. The governments would issue (or sell) carbon dioxide emissions permits to the airlines. Airlines that cut their carbon dioxide emissions below the number of permits they hold could sell their extra permits to airlines that find it more difficult to cut these emissions. This would send a price signal that should, over time, elicit a market response across the entire aviation industry. It's estimated that offsetting would add $5.70 to the cost of a flight from New York to Los Angeles.

Please ensure that you have read the article carefully and understood its contents.

I have read the article carefully and am ready to proceed

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of Tortola

Price: $625.25

Flight B: The Island of Anegada

Price: $605.25
plus an additional $14.00 carbon permit for airplane travel.

Which of these two flights would you prefer to buy?

Flight A

Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of St. Croix

Price: $279.76

Flight B: The Island of St. John

Price: $285.76
plus an additional $14.00 carbon permit for airplane travel.

Which of these two flights would you prefer to buy?

- ○ Flight A
- ○ Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
○	○	○	○	○	○	○

Imagine that you are planning a vacation in the South Pacific...

Flight A: Isla Guamblin

Price: $1,156.16

Flight B: Isla Melchor

Price: $1,146.16
plus an additional $14.00 carbon permit for airplane travel.

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

[Downstream tax condition:]

Proposal for Carbon Tax on Airplane Travel

As you may know, carbon dioxide emissions are produced by many human activities, such as burning fossil fuels for driving, generating electricity, or flying, and these emissions are contributing to climate change.

Some governments are considering imposing a tax on the carbon dioxide emissions of airplanes. This puts a price on each ton of carbon dioxide that airplanes emit, sending a price signal that should, over time, elicit a market response across the entire aviation industry. It's estimated that this tax would add $5.70 to the cost of a flight from New York to Los Angeles.

Please ensure that you have read the article carefully and understood its contents.

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of Tortola

Price: $625.25

Flight B: The Island of Anegada

Price: $605.25
plus an additional $14.00 carbon tax on airplane travel.

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of St. Croix

Price: $279.76

Flight B: The Island of St. John

Price: $285.76
plus an additional $14.00 carbon tax on airplane travel.

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Imagine that you are planning a vacation in the South Pacific...

Flight A: Isla Guamblin

Price: $1,156.16

Flight B: Isla Melchor

Price: $1,146.16
plus an additional $14.00 carbon tax on airplane travel.

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

[No-information control]

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of Tortola

Price: $625.25

Flight B: The Island of Anegada

Price: $619.25

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of St. Croix

Price: $279.76

Flight B: The Island of St. John

Price: $299.76

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Imagine that you are planning a vacation in the South Pacific...

Flight A: Isla Guamblin

Price: $1,156.16

Flight B: Isla Melchor

Price: $1,160.16

Which of these two flights would you prefer to buy?

- Flight A
- Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

[No-fee control]

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of Tortola

Price: $625.25

Flight B: The Island of Anegada

Price: $605.25

Which of these two flights would you prefer to buy?

- ○ Flight A
- ○ Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
○	○	○	○	○	○	○

Imagine that you are planning a vacation in the Caribbean...

Flight A: The Island of St. Croix

Price: $279.76

Flight B: The Island of St. John

Price: $285.76

Which of these two flights would you prefer to buy?

- ○ Flight A

Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Imagine that you are planning a vacation in the South Pacific...

Flight A: Isla Guamblin

Price: $1,156.16

Flight B: Isla Melchor

Price: $1,146.16

Which of these two flights would you prefer to buy?

Flight A

Flight B

How likely would you be to buy Flight A instead of Flight B?

1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely
1- Definitely not	2- Probably not	3- Maybe not	4- Unsure	5- Maybe	6- Probably	7- Definitely

Listed below are statements about the relationship between humans and the environment. For each one, please indicate whether you STRONGLY DISAGREE, MILDLY DISAGREE, are UNSURE, MILDLY AGREE or STRONGLY AGREE with it.

	1- Strongly disagree	2- Mildly disagree	3- Unsure	4- Mildly agree	5- Strongly agree
1. We are approaching the limit of the number of people the Earth can support.	1. We are approaching the limit of the number of people the Earth can support. 1- Strongly disagree	1. We are approaching the limit of the number of people the Earth can support. 2- Mildly disagree	1. We are approaching the limit of the number of people the Earth can support. 3- Unsure	1. We are approaching the limit of the number of people the Earth can support. 4- Mildly agree	1. We are approaching the limit of the number of people the Earth can support. 5- Strongly agree
2. Humans have the right to modify the natural environment to suit their needs.	2. Humans have the right to modify the natural environment to suit their needs. 1- Strongly disagree	2. Humans have the right to modify the natural environment to suit their needs. 2- Mildly disagree	2. Humans have the right to modify the natural environment to suit their needs. 3- Unsure	2. Humans have the right to modify the natural environment to suit their needs. 4- Mildly agree	2. Humans have the right to modify the natural environment to suit their needs. 5- Strongly agree
3. When humans interfere with nature it often produces disastrous consequences.	3. When humans interfere with nature it often produces disastrous consequences. 1- Strongly disagree	3. When humans interfere with nature it often produces disastrous consequences. 2- Mildly disagree	3. When humans interfere with nature it often produces disastrous consequences. 3- Unsure	3. When humans interfere with nature it often produces disastrous consequences. 4- Mildly agree	3. When humans interfere with nature it often produces disastrous consequences. 5- Strongly agree
4. Human ingenuity will insure that we do not make the Earth unlivable.	4. Human ingenuity will insure that we do not make the Earth unlivable. 1- Strongly disagree	4. Human ingenuity will insure that we do not make the Earth unlivable. 2- Mildly disagree	4. Human ingenuity will insure that we do not make the Earth unlivable. 3- Unsure	4. Human ingenuity will insure that we do not make the Earth unlivable. 4- Mildly agree	4. Human ingenuity will insure that we do not make the Earth unlivable. 5- Strongly agree
5. Humans are seriously abusing the environment.	5. Humans are seriously abusing the environment. 1- Strongly disagree	5. Humans are seriously abusing the environment. 2- Mildly disagree	5. Humans are seriously abusing the environment. 3- Unsure	5. Humans are seriously abusing the environment. 4- Mildly agree	5. Humans are seriously abusing the environment. 5- Strongly agree
6. The Earth has plenty of natural resources if we just learn how to develop them.	6. The Earth has plenty of natural resources if we just learn how to develop them. 1- Strongly disagree	6. The Earth has plenty of natural resources if we just learn how to develop them. 2- Mildly disagree	6. The Earth has plenty of natural resources if we just learn how to develop them. 3- Unsure	6. The Earth has plenty of natural resources if we just learn how to develop them. 4- Mildly agree	6. The Earth has plenty of natural resources if we just learn how to develop them. 5- Strongly agree

	1- Strongly disagree	2- Mildly disagree	3- Unsure	4- Mildly agree	5- Strongly agree
7. Plants and animals have as much right as humans to exist.	7. Plants and animals have as much right as humans to exist. 1- Strongly disagree	7. Plants and animals have as much right as humans to exist. 2- Mildly disagree	7. Plants and animals have as much right as humans to exist. 3- Unsure	7. Plants and animals have as much right as humans to exist. 4- Mildly agree	7. Plants and animals have as much right as humans to exist. 5- Strongly agree
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.	8. The balance of nature is strong enough to cope with the impacts of modern industrial nations. 1- Strongly disagree	8. The balance of nature is strong enough to cope with the impacts of modern industrial nations. 2- Mildly disagree	8. The balance of nature is strong enough to cope with the impacts of modern industrial nations. 3- Unsure	8. The balance of nature is strong enough to cope with the impacts of modern industrial nations. 4- Mildly agree	8. The balance of nature is strong enough to cope with the impacts of modern industrial nations. 5- Strongly agree
9. Despite our special abilities, humans are still subject to the laws of nature.	9. Despite our special abilities, humans are still subject to the laws of nature. 1- Strongly disagree	9. Despite our special abilities, humans are still subject to the laws of nature. 2- Mildly disagree	9. Despite our special abilities, humans are still subject to the laws of nature. 3- Unsure	9. Despite our special abilities, humans are still subject to the laws of nature. 4- Mildly agree	9. Despite our special abilities, humans are still subject to the laws of nature. 5- Strongly agree
10. The so-called “ecological crisis” facing humankind has been greatly exaggerated.	10. The so-called “ecological crisis” facing humankind has been greatly exaggerated. 1- Strongly disagree	10. The so-called “ecological crisis” facing humankind has been greatly exaggerated. 2- Mildly disagree	10. The so-called “ecological crisis” facing humankind has been greatly exaggerated. 3- Unsure	10. The so-called “ecological crisis” facing humankind has been greatly exaggerated. 4- Mildly agree	10. The so-called “ecological crisis” facing humankind has been greatly exaggerated. 5- Strongly agree
11. The Earth is like a spaceship with very limited room and resources.	11. The Earth is like a spaceship with very limited room and resources. 1- Strongly disagree	11. The Earth is like a spaceship with very limited room and resources. 2- Mildly disagree	11. The Earth is like a spaceship with very limited room and resources. 3- Unsure	11. The Earth is like a spaceship with very limited room and resources. 4- Mildly agree	11. The Earth is like a spaceship with very limited room and resources. 5- Strongly agree
12. Humans were meant to rule over the rest of nature.	12. Humans were meant to rule over the rest of nature. 1- Strongly disagree	12. Humans were meant to rule over the rest of nature. 2- Mildly disagree	12. Humans were meant to rule over the rest of nature. 3- Unsure	12. Humans were meant to rule over the rest of nature. 4- Mildly agree	12. Humans were meant to rule over the rest of nature. 5- Strongly agree
13. The balance of nature is very delicate and easily upset.	13. The balance of nature is very delicate and easily upset. 1- Strongly disagree	13. The balance of nature is very delicate and easily upset. 2- Mildly disagree	13. The balance of nature is very delicate and easily upset. 3- Unsure	13. The balance of nature is very delicate and easily upset. 4- Mildly agree	13. The balance of nature is very delicate and easily upset. 5- Strongly agree

	1- Strongly disagree	2- Mildly disagree	3- Unsure	4- Mildly agree	5- Strongly agree
14. Humans will eventually learn enough about how nature works to be able to control it.	14. Humans will eventually learn enough about how nature works to be able to control it. 1- Strongly disagree	14. Humans will eventually learn enough about how nature works to be able to control it. 2- Mildly disagree	14. Humans will eventually learn enough about how nature works to be able to control it. 3- Unsure	14. Humans will eventually learn enough about how nature works to be able to control it. 4- Mildly agree	14. Humans will eventually learn enough about how nature works to be able to control it. 5- Strongly agree
15. If things continue on their present course, we will soon experience a major ecological catastrophe.	15. If things continue on their present course, we will soon experience a major ecological catastrophe. 1- Strongly disagree	15. If things continue on their present course, we will soon experience a major ecological catastrophe. 2- Mildly disagree	15. If things continue on their present course, we will soon experience a major ecological catastrophe. 3- Unsure	15. If things continue on their present course, we will soon experience a major ecological catastrophe. 4- Mildly agree	15. If things continue on their present course, we will soon experience a major ecological catastrophe. 5- Strongly agree

What is your gender?

- Male
- Female
- Other

How old are you (in years)?

Are you responsible for paying your own home energy bill?

- No
- Yes

Do you consider yourself more liberal or more conservative?

1- Strongly liberal	2- Moderately liberal	3- Slightly liberal	4- Slightly conservative	5- Moderately conservative	6- Strongly conservative
1- Strongly liberal	2- Moderately liberal	3- Slightly liberal	4- Slightly conservative	5- Moderately conservative	6- Strongly conservative

What is your political orientation?

- Democratic
- Republican
- Independent

- Libertarian
- Green
- Other

Imagine that you had to pay an unexpected bill immediately. For example, suppose that you needed an expensive medical treatment that was not covered by insurance. Considering all possible resources available to you (including savings, borrowing, etc.), what is the maximum amount that you could come up with on short notice?

Last year, before taxes, what would you say was your household income?

- Less than $20,000
- $20,000 - $39,999
- $40,000 - $59,999
- $60,000 - $89,999
- $90,000 - $119,999
- $120,000 - $149,999
- $150,000 - $199,999
- $200,000 or more
- I would rather not say

All things considered, do you now feel economically secure?

Definitely no	No	Maybe no	Unsure	Maybe yes	Yes	Definitely yes
Definitely no	No	Maybe no	Unsure	Maybe yes	Yes	Definitely yes

How much do you agree with the following statement?:
"I feel I have lost all control over my economic future."

Strongly disagree	Disagree	Disagree a little	Neutral	Agree a little	Agree	Strongly Agree
Strongly disagree	Disagree	Disagree a little	Neutral	Agree a little	Agree	Strongly Agree

What is your marital status?

- Single
- Living together
- Married
- Divorced or living separated
- Widowed

How many children do you have?

In what country did you grow up?

- The United States
- Other (please specify)

In what state or U.S. territory did you grow up as a child? (If you did not grow up in the United States choose N/A from the dropdown menu)

In what state or U.S. territory do you currently reside? (If you do not currently reside in the United States choose N/A from the dropdown menu)

How would you describe your ethnicity? (e.g., caucasian)

How would you describe your race? Pick the category that best describes you in your view.

- Asian/Asian American
- Black/African American
- White/ European American
- Latino/Hispanic
- Native American/ Alaska Native
- South East Asian American
- Middle Eastern
- Other
- More than one on this list (please list):

Are you Hispanic or Latino?

- No
- Yes

How much do you agree with the following statement?:
"Any government or company that creates pollution should pay for the solutions to the problem and for the consequences of the pollution.'

Strongly disagree	Disagree	Disagree a little	Neutral	Agree a little	Agree	Strongly agree
○	○	○	○	○	○	○

How much do you agree with the following statement?:
"I believe the best action I can take to combat environmental problems is to live in a more sustainable way."

Strongly disagree	Disagree	Disagree a little	Neutral	Agree a little	Agree	Strongly agree
○	○	○	○	○	○	○

How much do you agree with the following statement?:
"Waiting for politicians and policy-makers to take action is not an effective way to save and protect the environment."

Strongly disagree	Disagree	Disagree a little	Neutral	Agree a little	Agree	Strongly agree
○	○	○	○	○	○	○

Please indicate the highest level of education you have completed

- ○ Less than 5th grade
- ○ Less than 8th grade
- ○ Less than High School
- ○ High School Diploma or GED
- ○ Some College or Technical Training School
- ○ Associate's Degree
- ○ Bachelor's Degree
- ○ Some graduate school
- ○ Professional Degree or graduate school

What is your current employment status?

- ○ Working full time
- ○ Working part time
- ○ Not currently employed

If you are currently working, how long have you been at your current job? Otherwise, if you are not employed, how long have you been out of the labor force?

- ○ Less than one month
- ○ Between one month and six months
- ○ Between six months and one year
- ○ Between one year and five years

- More than five years

Is there a carbon tax system in place where you currently reside?

- Yes
- No
- I don't know

Is there a carbon permit system in place where you currently reside?

- Yes
- No
- I don't know

Is there a carbon offset system in place where you currently reside?

- Yes
- No
- I don't know

Is there currently a mandatory charge for disposable plastic bags in place where you currently reside?

- Yes
- No
- I don't know

Appendix G. Additional Analyses: Political Affiliation

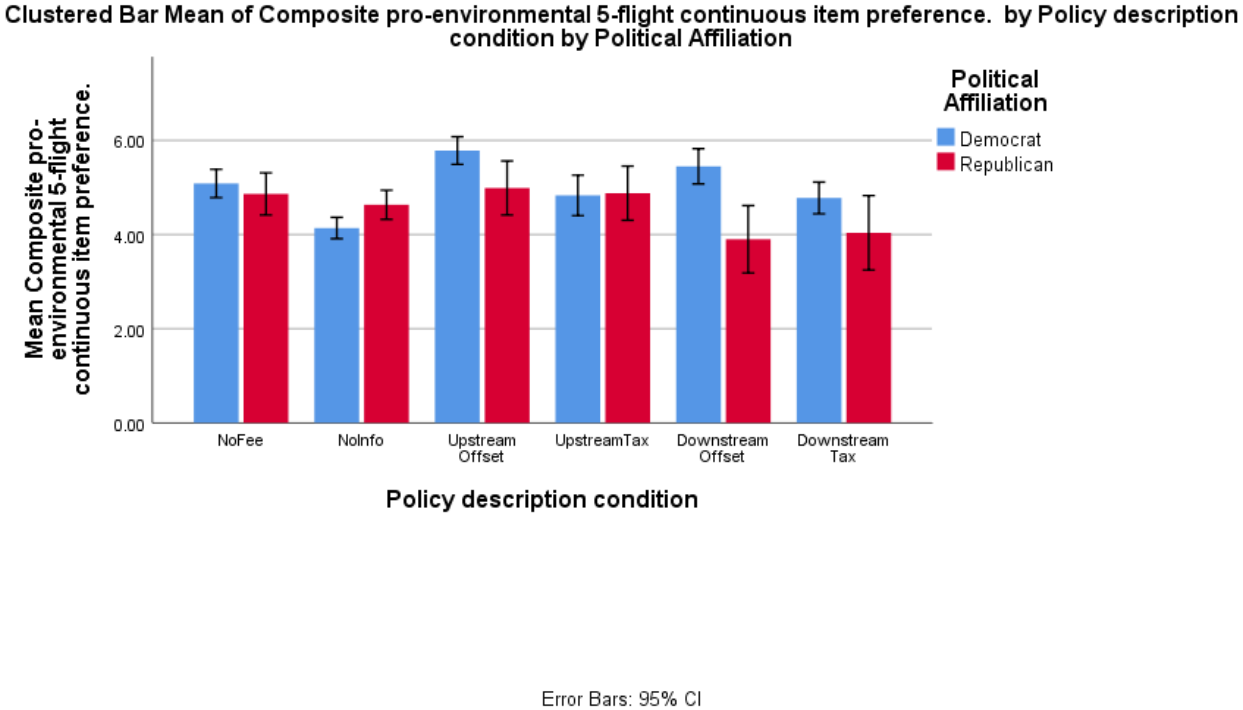
While it was not a focus of the current research project, political affiliation has been found to be an important moderator in previous studies on price framing (Hardisty, Johnson, & Weber, 2010; Sussman & Olivola, 2011). In particular, previous research on U.S. participants has found that Republicans are particularly opposed to taxes, and Democrats are less opposed. Therefore, in the following analyses we compare Republicans and Democrats in each study (and exclude participants from other political parties or those with no party affiliation, as predictions for them are unclear and sample sizes are often very small).

Political Affiliation in Study S1

With only 69 Republicans split across the 8 pricing conditions, statistical power is too low to examine the moderating effect of political affiliation. (Indeed, one cell had only five participants: Republicans in the Downstream Permit condition.) A GLM with policy description, political affiliation (Democrat or Republican) and the interaction predicting flight preference found no main effect of political affiliation, $F(1,220)=0.54$, $p=.46$, $\eta_p^2=.00$, and no interaction, $F(7,220)=1.04$, $p=.41$, $\eta_p^2=.03$.

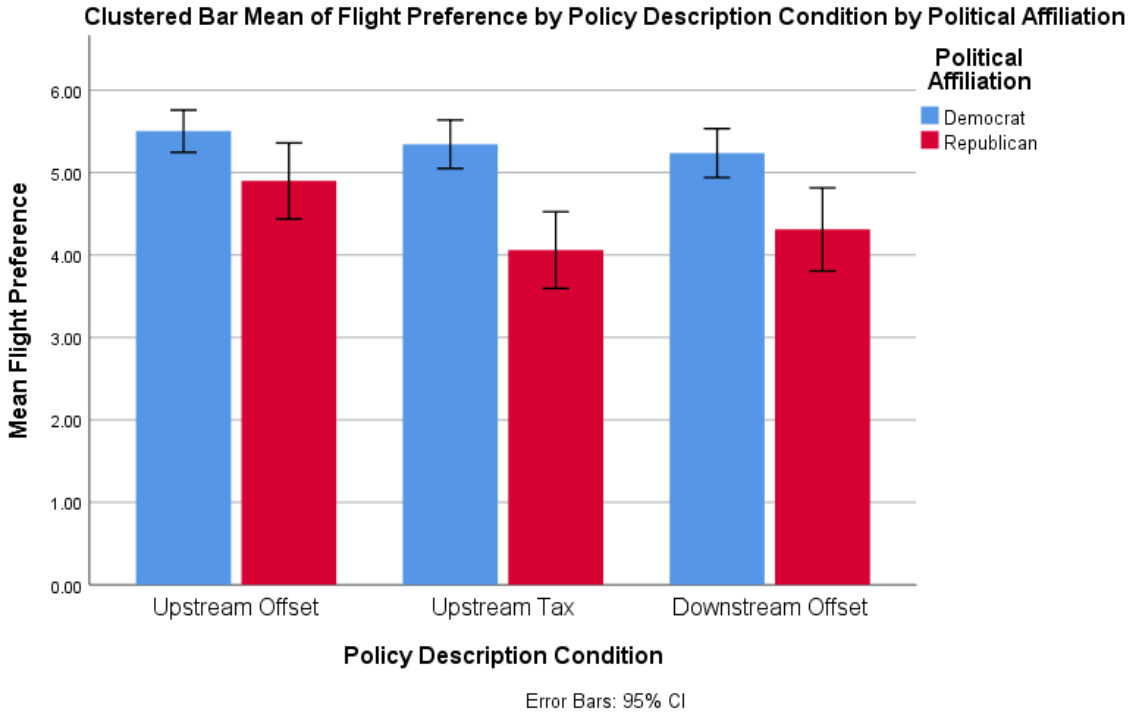
Political Affiliation in Study 1

Statistical power is again somewhat low in this study to examine the moderating effect of political affiliation, with 114 Republicans split across the 6 pricing conditions, resulting cell sizes as small as $n=16$. As seen in the figure below, there are policy differences between the political parties. A GLM with policy description, political affiliation, and the interaction predicting flight preference found a main effect of policy description, $F(5,344)=6.18$, $p<.001$, $\eta_p^2=.08$, a main effect of political affiliation, $F(1,344)=13.62$, $p<.001$, $\eta_p^2=.04$, and an interaction, $F(5,344)=6.75$, $p<.001$, $\eta_p^2=.08$.

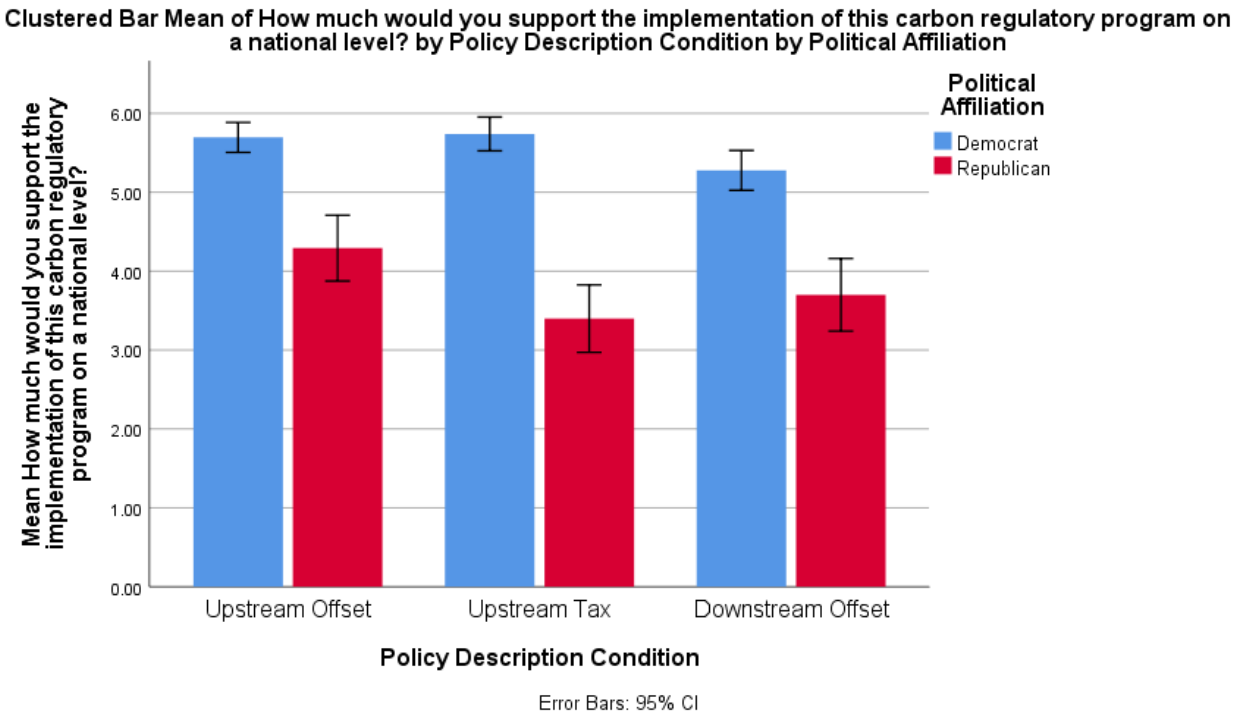


Political Affiliation in Study 2

In this study, the *n* per condition was more reasonable for examining the moderating role of political affiliation, with at least 83 participants in each cell (Republicans in the Upstream Tax condition was the smallest, with *n*=83). Visually inspecting the pattern of flight preference data in the figure below, it appears that Republicans show a stronger impact of price framing than Democrats. Indeed, among the Republican sample, the effect of policy description is significant, $F(2,259)=3.18$, $p=.04$, $\eta_p^2 = .02$, whereas in the Democrat sample, the effect of policy description is near zero, $F(2,514)=0.92$, $p=.40$, $\eta_p^2 = .00$. However, in an omnibus model with policy description, political affiliation, and the interaction predicting flight choice, there are significant main effects of condition, $F(2,773)=4.23$, $p=.02$, $\eta_p^2 = .01$, and political affiliation, $F(1,773)=4.23$, $p<.001$, $\eta_p^2 = .05$, but not the interaction, $F(2,773)=1.64$, $p=.20$, $\eta_p^2 = .00$.



Turning to policy support, there is significant moderation by political affiliation, as seen in the figure below. In particular, the largest difference between Democrats and Republicans is seen in the Upstream Tax condition, and is smallest in the Upstream Offset condition. Put another way, Republicans are more sensitive than Democrats to policy descriptions. A GLM with policy description, political affiliation, and their interaction predicting policy support found a main effect of policy description, $F(2,773)=6.20$, $p<.01$, $\eta_p^2 = .02$, a main effect of political affiliation, $F(1,773)=193.19$, $p<.001$, $\eta_p^2 = .20$, and a significant interaction, $F(2,773)=4.96$, $p<.01$, $\eta_p^2 = .01$.

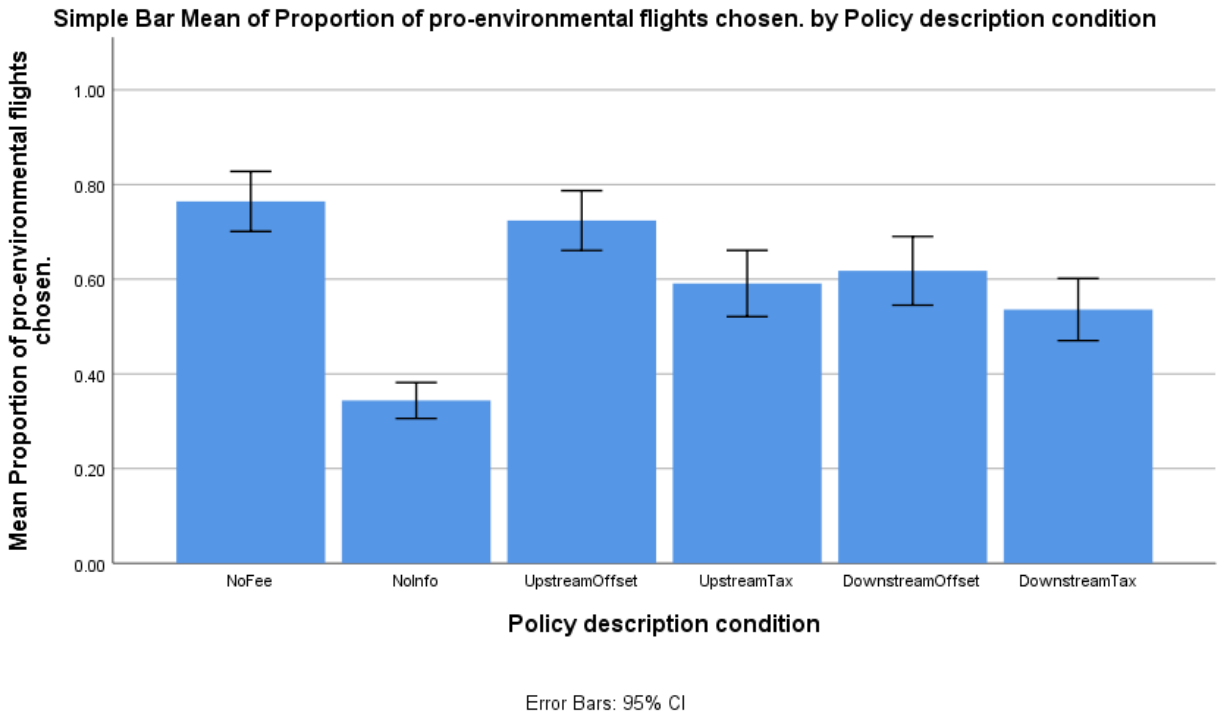

Clustered Bar Mean of How much would you support the implementation of this carbon regulatory program on a national level? by Policy Description Condition by Political Affiliation
Mean How much would you support the implementation of this carbon regulatory program on a national level?
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Upstream Offset
Upstream Tax
Downstream Offset
Policy Description Condition
Political Affiliation
Democrat
Republican
Error Bars: 95% CI

Appendix H. Additional Analyses: Binary Choice

In addition to the 7-item preference measures analyzed in the main paper, we also collected dichotomous measures, forcing participants to choose either Flight A (the flight without the carbon fee) or Flight B (the flight with the carbon fee). Overall, the pattern of results with the dichotomous choice measure is similar but stronger than the 7-item preference measure. In the following sections, we present the dichotomous choice data from each study.

Binary Choice Results in Study 1

Participants made five binary choices between flights, where "Flight B" was labeled as the more environmental option (except in the "no fee" and "no info" control conditions, where there was no envirionmental labeling). We averaged these five choices together to yield a choice proportion for each participant, summarized in the figure below. As seen there, the upstream offset condition was the most preferred carbon pricing condition, and carbon tax was the least preferred.



A GLM with policy description condition predicting choice proportion found a main effect of policy description, $F(5,582)=21.85$, $p<.001$, $\eta_p^2 = .16$. To protect against family-wise error in pairwise comparisons, we used Tukey's HSD for follow-up contrasts:

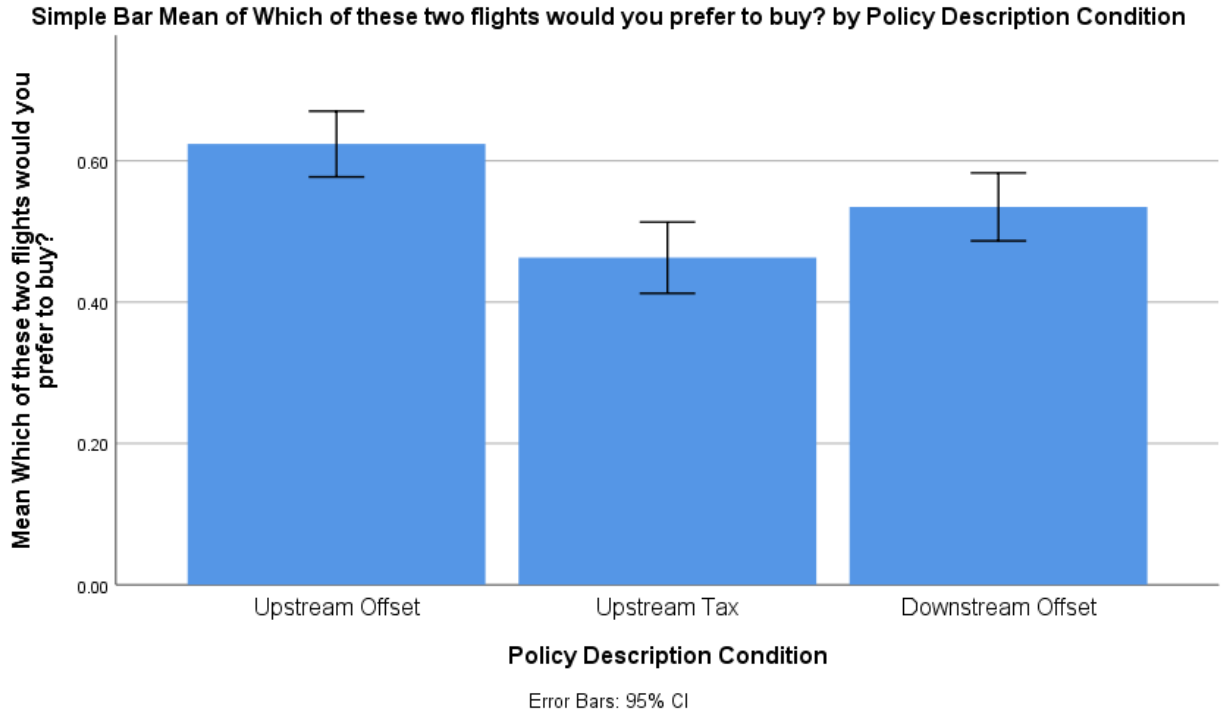
The Upstream Offset condition was preferred over the No Info condition, $p<.001$, the Downstream Tax condition, $p<.001$, and the Upstream Tax condition, $p=.04$, but was not significantly different from the No Fee condition, $p=.95$ or the Downstream Offset condition, $p=.15$.

The downstream tax condition was preferred to the No Info condition, $p<.001$, but was less popular than the No Fee condition, $p<.001$ and the Upstream Offset condition, $p<.001$, and was not different from the Upstream tax condition, $p=.84$ or the Downstream Offset condition, $p=.43$.

The Downstream Offset and Upstream Tax conditions did not differe from each other, p=.99. They were each more popular than the No Info control, both p<.001, and less popular than the No Fee control, p<.01 and p=.02, respectively.

Binary Choice Results in Study 2

As seen in the figure below, the proenvironmental flight was chosen more often in the Upstream Offset condition than in either of the other two conditions. A binary logistic regression with two dummary variables found that the effect of the Upstream Offset condition was significant when compared to the other two, beta=.37, SE=.14, p<.01. Furthermore, follow-up pairwise comparisons showed significant contrasts for both Upstream Offset vs Upstream Tax, beta=.65, SE=.14, p<.001, as well as Upstream Offset vs Downstream Offset, beta=.37, SE=.14, p<.01.

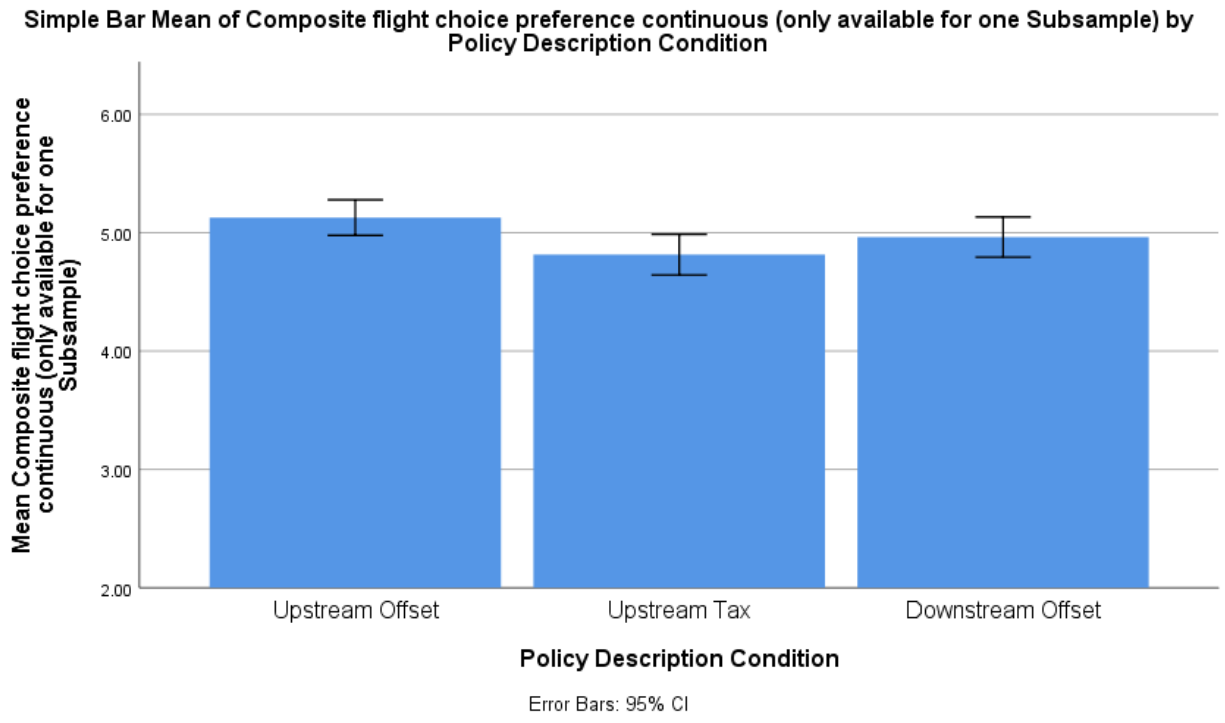


In a model with condition (dummy coded), perceived environmental impact, and perceived accountability predicting flight choice, there were significant effects of environmental impact, beta=.39, SE=.05, p<.001, and accountability, beta=.24, SE=.04, p<.001, and the effect of Upstream Offstream Offset framing dropped to non-significance, beta=.18, SE=.16, p=.26. In a parallel mediation model going from Upstream Offset framing through Impact and Accountability to Choice with 5000 bootstrapped replications, both the Impact and Accountability mediation pathways were significant (p<.01 and p<.001, respectively).

Appendix I. Additional Analyses: 5-flight Composite in Study 2

In Study 2 in the main paper, the data was collected in two waves (together with two different studies). In one wave, participants answered one flight choice question (due to study length constraints), and in the other wave, they answered five flight questions (including the one question from the first wave). In the main manuscript, we analyzed the data from the single flight preference question (with the 7-point scale), as this was the only flight pair considered by all participants. Here, we analyze the 5-flight pair composite data, which was only completed by the second wave of participants. Overall, the data is very similar, but due to the smaller sample size, power is a bit lower.

As seen in the figure below, the Upstream Offset condition was the most preferred overall. A GLM using policy description condition to predict the 5-flight composite preference found a significant effect of policy description, $F(2,809)=3.57$, $p=.03$, $\eta_p^2 = .01$. Follow-up pairwise comparisons found a difference between Upstream Offset and Upstream Tax, $t(542)=2.70$, $p<.001$, but not between Upstream Offset and Downstream Offset, $t(540)=1.44$, $p=.15$, and no difference between Upstream Tax and Downstream Offset, $t(530)=-1.21$, $p=.23$.



In a GLM with policy description, perceived environmental impact, and perceived accountability predicting the 5-flight composite, there were significant effects of both impact, $F(1,804)=115.20$, $p<.001$, $\eta_p^2 = .13$, and accountability, $F(1,804)=11.45$, $p<.01$, $\eta_p^2 = .01$. In a parallel mediation model going from Upstream Offset framing (dummy coded) through Impact and Accountability to the 5-flight composite with 5000 bootstrapped replications, both the Impact and Accountability mediation pathways were significant, both $p<.01$, and the effect of Upstream Offset framing was reduced to non-significance, $p=.78$.