

# Carbon Tax Aversion, Yellow Vests, and Biased Beliefs

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## Are French people ecologist?



Figure: Some yellow vests

## Relation to literature

- Surveys on the topic: Carattini et al. (2018), Klenert et al. (2018)
- Altruistic vs. egoistic motives / beliefs vs. values: Stern et al. (1993)
- Correlation between carbon tax acceptance and self-interest: Thalmann (2004)
- Higher approval when distributional issues addressed: Bristow et al. (2010), Brannlund & Persson (2012)
- Belief that tax is ineffective: Baranzini & Carattini (2017), Dresner et al. (2006)
- Effectiveness and distributional effects matter more than self-interest: Kallbekken & Sælen (2011)

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**Our contribution:** run a survey to:

- ➊ test previous results on a representative sample of the French population;
- ➋ disentangle erroneous beliefs from *pure* effects of preferences;
- ➌ quantify biases regarding the costs of carbon tax;
- ➍ show persistence of beliefs over carbon tax;
- ➎ estimate causal effects.

## 1 Survey and data

## 2 Perceptions

## 3 Are beliefs persistent?

## 4 Motives for acceptance

## 5 Conclusion

## Survey data collection

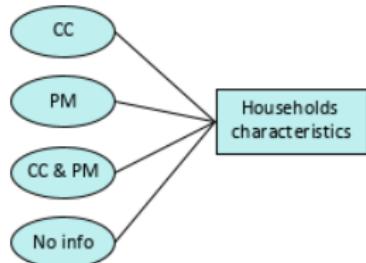
- 3002 responses collected on-line in February/March 2019
- Representative along: gender, age, education, profession, size of town, region
- Median duration: 19 min, important questions in the first half
- We exclude: 4% of respondents answering in less than 7 min, 9% who fail test of quality
- We flag 273 inconsistent answers, such as too high fuel economy or incomes: they are not correlated with our main variables of interest

▶ See the questionnaire

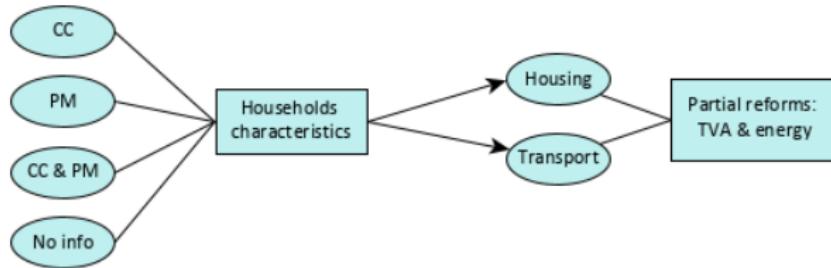
## Our survey: Priming

- CC
- PM
- CC & PM
- No info

## Our survey



## Our survey

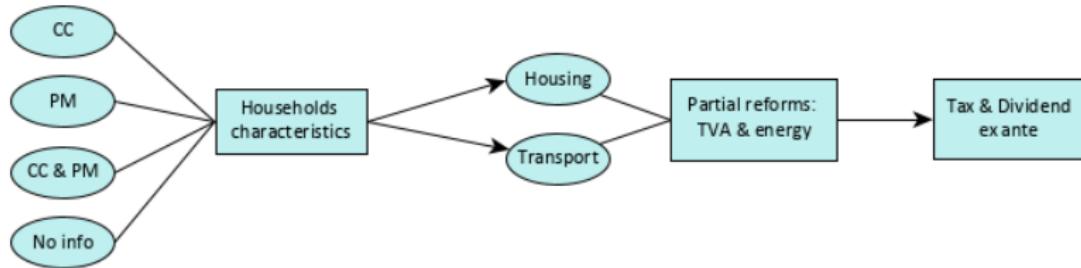


- The government studies +50€/tCO<sub>2</sub> specific to housing or transport:
  - ▶ +13% on gas (resp. +15% on domestic fuel) redistributed: 50€/y per adult
  - ▶ +0.11€/L on gasoline (resp. +0.13€/L on diesel) → 60€/y per adult

## Partial tax reforms

- The government studies +50€/tCO<sub>2</sub> specific to housing or transport:
  - ▶ +13% on gas (resp. +15% on domestic fuel) redistributed: 50€/y per adult
  - ▶ +0.11€/L on gasoline (resp. +0.13€/L on diesel) → 60€/y per adult
- Would you lose, win or be unaffected by the reform?
- Expected loss (or gain) among 6 (or 5) intervals?
- Price elasticity of your household? of French people?

## Our survey



## Tax & Dividend: *ex ante*

- Description of our Tax & Dividend reform:
  - ▶ Both partial reforms combined: +50€/tCO<sub>2</sub>
  - ▶ Revenues from households redistributed lump-sum: 110€/year by adult
  - ▶ Tax incidence: borne at 80% by consumers
  - ▶ Elasticities: -0.4 for transport, -0.2 for housing

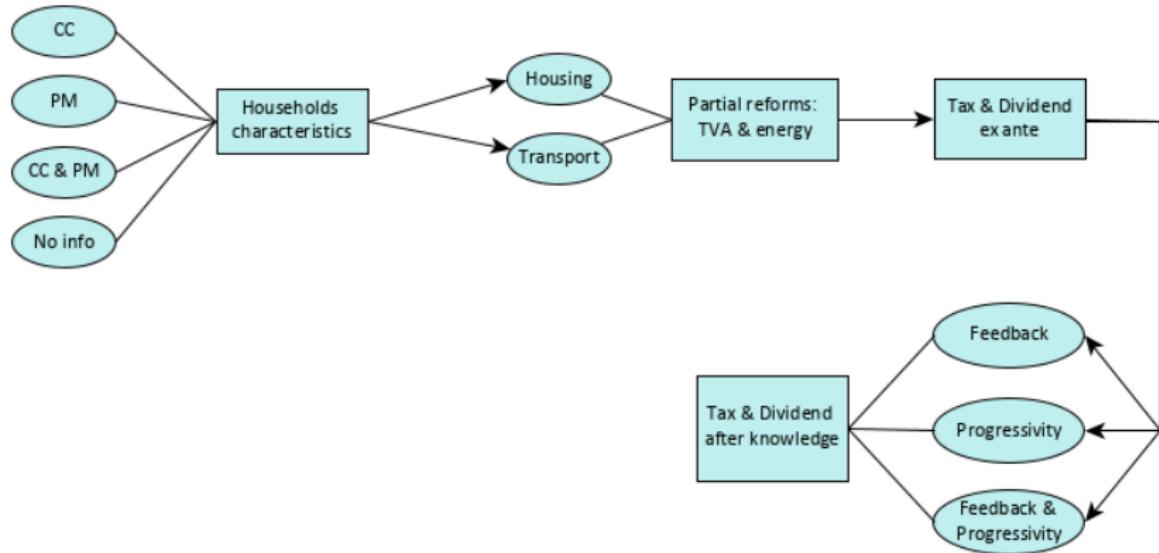
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  - ▶ “scientists agree that a carbon tax would be effective in reducing pollution” randomly displayed or not
- Would you lose, win or be unaffected by the reform?
- Expected loss (or gain) among 6 (or 5) intervals?
- Would you approve this reform?
  - ▶ 10% ‘Yes’: approval
  - ▶ 19% ‘PNR’ (I don’t know, I don’t want to answer): acceptance
  - ▶ 70% ‘No’: disapproval

# Our survey



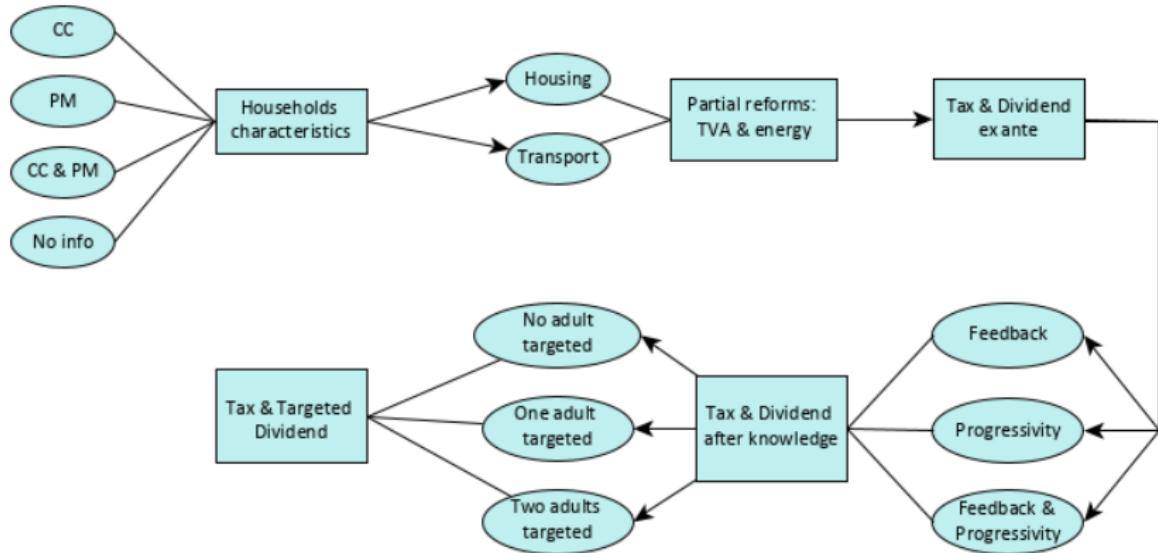
## Tax & Dividend: after knowledge

- Information on the effect of the reform
  - ▶ Feedback: "In five cases over six, a household with your characteristics would [win/lose] through the reform. (The characteristics taken into account are: heating using [energy source] for an accommodation of [surface] m<sup>2</sup>; [distance] km traveled with an average consumption of [fuel economy] L for 100 km.)" (1/2)
  - ▶ Progressivity: "this reform would increase the purchasing power of the poorest households and decrease that of the richest, who consume more energy" (1/3)
  - ▶ or both (to 1/6 of respondents)

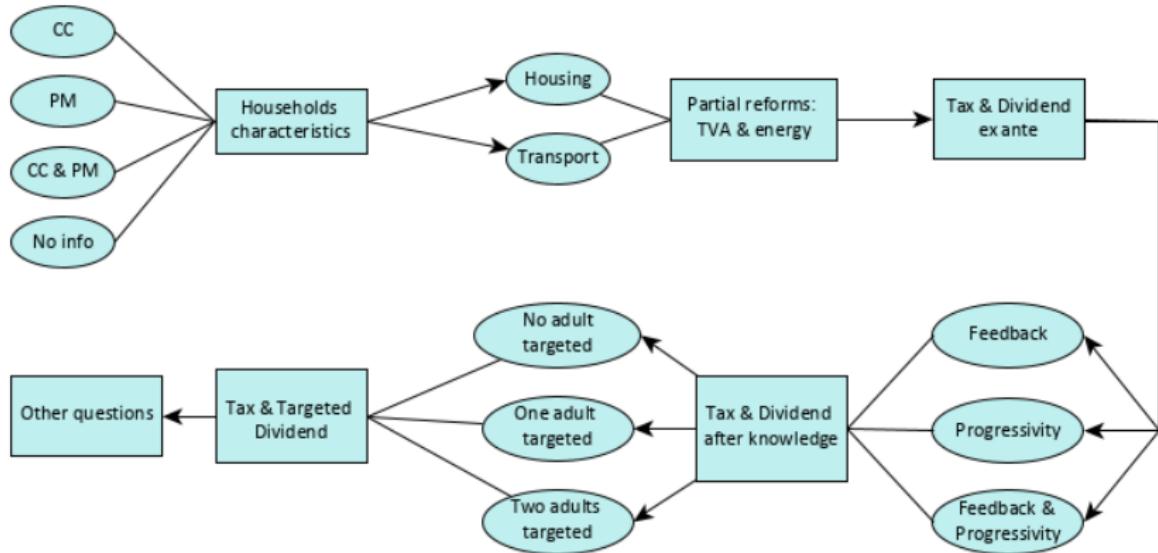
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  - ▶ Progressivity: "this reform would increase the purchasing power of the poorest households and decrease that of the richest, who consume more energy" (1/3)
  - ▶ or both (to 1/6 of respondents)
- Is the reform beneficial to the poorest? (1/2)
- Would you lose, win or be unaffected by the reform?
- Would you approve this reform?

# Our survey



# Our survey



## French households surveys

- We estimate net gains of respondents using another Insee survey:
  - ▶ *Enquête Logement 2013* (EL): 27,000 HH, good on housing
  - ▶ increase in housing expenditures =  $\beta_0 + \beta_f$  fuel +  $\beta_g$  gas +  $\beta_s$  surface
    - ▶ See regressions
  - ▶ increase in transport energy expenditures computed directly from HH characteristics
- We estimate the revenues of the reform with the database of Douenne (2018) that matches two Insee surveys:
  - ▶ *Budget de Famille 2011* (BdF): 10,000 HH, good on housing, not on transport
  - ▶ *Enquête Nationale Transports et Déplacements 2008* (ENTD): 20,000 HH, used for transport
- In 83.4% of cases, we predict correctly the winning category (win/lose) on out-of-sample (BdF) data
- Similar (or higher) error rates with other specifications or methods (e.g. regression tree, matching). Adding variables barely improves prediction.

**1** Survey and data

**2** Perceptions

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## Biased perception of net gain

PDF of objective vs. subjective net gains from Tax & Dividend  
(in € per year per c.u.). Mean reported in captions:

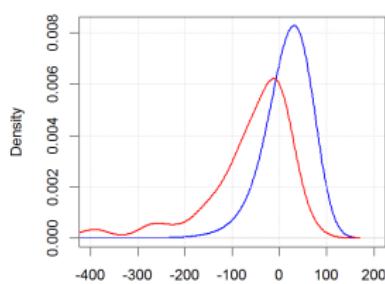


Figure: Transport: -61/+18

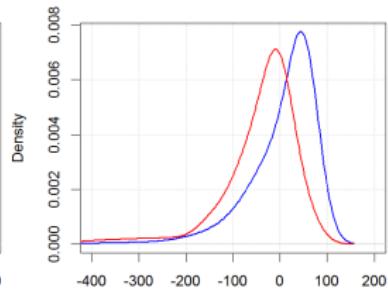


Figure: Housing: -43/+6

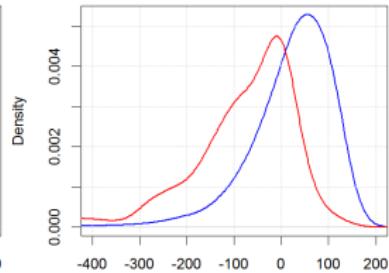


Figure: Both: -89/+24

- 64% think they lose; only 14% think they win
- Objectively, 70% win
- 89% underestimate their gain, 53% by more than 110€.
- Median gap of 116€.

# CDF of net gains

objective vs. subjective net gains from Tax & Dividend (in € per year per c.u.):

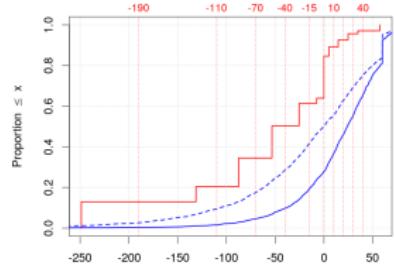


Figure: Transport

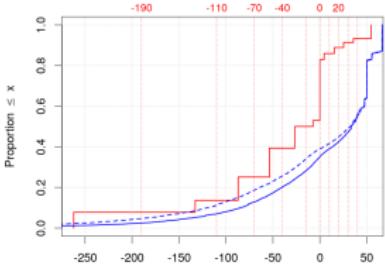


Figure: Housing

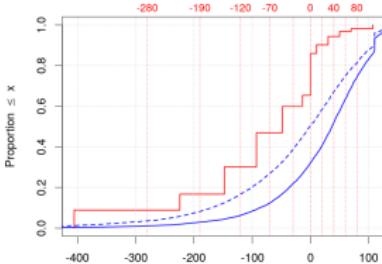


Figure: Both

NOTE: - - - : case of inelastic expenditures.

Assuming that everyone's fossils consumption is totally inelastic:

- 77% underestimate their gain, 37% by more than 110€.
- Median gap: 80€.

## (Not so) heterogeneous bias

**Table:** Determinants of a large bias in subjective gains.

	Large bias ( $ \hat{\gamma} - g  > 110$ )		
	OLS	logit	OLS
Initial tax: PNR (I don't know)			-0.179*** (0.023)
Initial tax: Approves			-0.284*** (0.031)
Sex: Female	0.036* (0.020)	0.030 (0.020)	0.042** (0.019)
Ecologist	-0.064** (0.026)	-0.061** (0.026)	-0.025 (0.026)
Yellow Vests: PNR	0.039 (0.036)	0.035 (0.035)	0.024 (0.036)
Yellow Vests: understands	0.081*** (0.025)	0.062*** (0.024)	0.041* (0.025)
Yellow Vests: supports	0.108*** (0.026)	0.103*** (0.025)	0.051* (0.026)
Yellow Vests: is part	0.202*** (0.048)	0.193*** (0.040)	0.147*** (0.047)
✓ Observations	✓ 3,002	3,002	3,002
R <sup>2</sup>	0.061		0.098

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

⇒ Motivated reasoning interpretation (Kunda, 1990): the more opposed to the tax, the more bias. *Question: which direction does the effect goes?*

## Beliefs over environmental effectiveness

Reform effective to "reduce pollution and fight climate change"?

17% 'Yes', 66% 'No' and 18% 'PNR'.

→ Tempting interpretation: people perceive aggregate consumption as inelastic  
(Kallbekken & Sælen, 2011; Carattini et al, 2018)

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**Table:** Effect of subjective elasticities on perceived environmental effectiveness

	Environmental effectiveness: not 'No'			
	(1)	(2)	(3)	(4)
Price elasticity: Housing	-0.062*		-0.055*	
	(0.032)		(0.032)	
Price elasticity: Transports		-0.056*		-0.060**
		(0.030)		(0.030)
Controls: Socio-demographics, energy			✓	✓
Observations	1,501	1,501	1,501	1,501
R <sup>2</sup>	0.003	0.002	0.089	0.090

*Note:*

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

Effect too low to explain the beliefs.

Those can be due to low objective impact of the reform: -0.8% of French GhG emissions, vs. official goal of -1.8% per year.

## Beliefs over progressivity

Reform would benefit poorer households? 19% 'Yes', 60% 'No', 21% 'PNR'.

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**Yet, the tax is progressive:**

Average gain of Tax & Dividend by income decile...

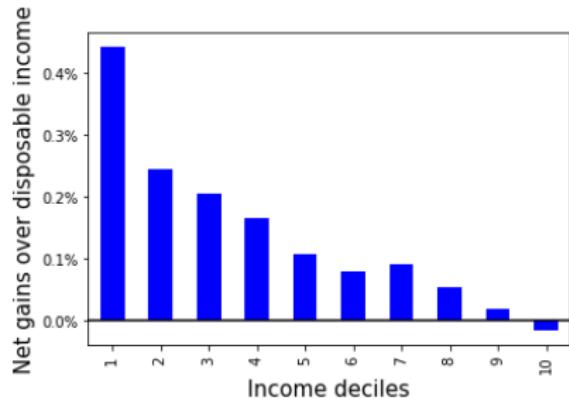


Figure: ...as a share of disposable income

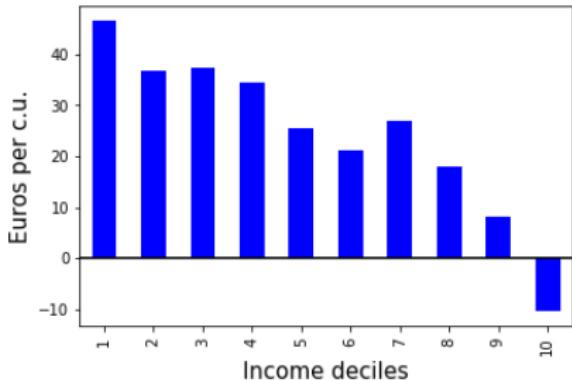


Figure: ...in euros per consumption unit

On average, Tax & dividend increases purchasing power of low income groups more than others (West & Williams, 2004; Bento et al., 2009).

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**Table:** Share of respondents with new beliefs aligned with feedback

	<i>Aligned with feedback: <math>G^F = \hat{\Gamma}</math></i>	
	$\hat{\Gamma} > 0$ (75.8%)	$\hat{\Gamma} < 0$ (24.2%)
Initial belief: winner ( $G > 0$ ) (14.0%)	78.8% [73.2% ; 83.4%]	81.5% [65.0% ; 91.3%]
Initial belief: unaffected ( $G = 0$ ) (21.7%)	21.6% [17.6% ; 26.2%]	44.9% [33.5% ; 56.8%]
Initial belief: loser ( $G < 0$ ) (64.3%)	12.2% [10.3% ; 14.5%]	93.9% [90.9% ; 96.0%]
Initial belief: affected ( $G \neq 0$ ) (78.3%)	26.1% [23.7% ; 28.7%]	92.9% [89.8% ; 95.1%]
All (100%)	25.1% [23.0% ; 27.3%]	85.7% [82.2% ; 88.7%]

NOTE: The 95% confidence intervals for binomial probabilities is given in brackets.

# Conservatism and pessimism

Two main results:

- ① Losers update correctly (on average): 86% align with feedback
- ② Winners do not update enough: only 25% align

▶ See regressions

Possible interpretations:

- Respondents think our feedback is biased (upwards).
- Respondents give too much value to their (biased) private information.
- Respondents are uncertain and risk (or loss) averse: they don't report the expected outcome but something more pessimistic.

# Determinants of correct updating

▶ See prediction's precision

Table: Asymmetric updating of winning category

	Correct updating ( $U$ )			
	(1)	(2)	(3)	(4)
Winner, before feedback ( $\hat{G}$ )	<b>0.695***</b> (0.078)	0.685*** (0.080)	0.646*** (0.080)	0.646*** (0.080)
Initial tax: PNR (I don't know)			0.163*** (0.031)	0.163*** (0.031)
Initial tax: Approves			<b>0.158***</b> (0.046)	0.158*** (0.046)
Diploma (1 to 4)	0.015 (0.013)	0.016 (0.013)	0.011 (0.014)	0.011 (0.014)
Diploma × Initial tax: Approves				0.074** (0.037)
Retired	0.143* (0.080)	0.146* (0.079)	0.142* (0.079)	0.142* (0.079)
Active	0.165*** (0.055)	0.175*** (0.054)	0.175*** (0.054)	0.175*** (0.054)
Student	0.249*** (0.076)	0.234*** (0.075)	0.239*** (0.075)	0.239*** (0.075)
Yellow Vests: understands	-0.090*** (0.034)	-0.063* (0.034)	-0.064* (0.034)	-0.064* (0.034)
Yellow Vests: supports	-0.101*** (0.035)	-0.059* (0.036)	-0.060* (0.036)	-0.060* (0.036)
Yellow Vests: is part	-0.172*** (0.062)	<b>-0.137**</b> (0.062)		
Among invalidated	✓	✓	✓	✓
Includes controls		✓	✓	✓
Observations	1,365	1,365	1,365	1,365
R <sup>2</sup>	0.055	0.111	0.133	0.136

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

## Beliefs over environmental effectiveness

**Table:** Effect of primings on beliefs about environmental effectiveness

	Environmental effectiveness			
	not "No"		"Yes"	<i>OLS</i> (4)
	<i>OLS</i> (1)	<i>logistic</i> (3)		
Info on Environmental Effectiveness ( $Z_E$ )	0.043** (0.017)	0.063*** (0.018)	0.052*** (0.018)	0.059*** (0.014)
Info on Climate Change ( $Z_{CC}$ )	0.044* (0.024)	0.041* (0.024)	0.043* (0.024)	0.029 (0.018)
Info on Particulate Matter ( $Z_{PM}$ )	0.039 (0.024)	0.029 (0.024)	0.037 (0.024)	0.017 (0.019)
$Z_{CC} \times Z_{PM}$	-0.040 (0.035)	-0.033 (0.034)	-0.042 (0.033)	-0.005 (0.027)
Controls: Socio-demographics		✓	✓	✓
Observations	3,002	3,002	3,002	3,002
R <sup>2</sup>	0.003	0.047		0.075

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

⇒ Primings do increase beliefs about effectiveness, but the effect remains limited.  
Beliefs well anchored.

## Beliefs over progressivity

Correlation between belief that tax is regressive and seeing the information that it is progressive: 0.006% !

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Correlation between belief that tax is regressive and seeing the information that it is progressive: 0.006% !

It seems we do not convince people at all here ! How come?

⇒ Evidences of psychological reactance from biased people (boomerang effect, see Hovland 1953):

**Table:** Effect of information on perceived progressivity

	Progressivity: not No ( $P$ )		
	(1)	(2)	(3)
Constant	0.419*** (0.022)	0.435*** (0.033)	0.386** (0.186)
Information on progressivity ( $Z_P$ )	-0.021 (0.027)	0.050 (0.040)	0.014 (0.239)
Large bias ( $ \hat{\gamma} - g  > 110$ )		-0.028 (0.045)	-0.019 (0.045)
Interaction $Z_P \times ( \hat{\gamma} - g  > 110)$		-0.130** (0.055)	-0.126** (0.055)
Controls: Socio-demo, politics			✓
Observations	1,444	1,444	1,444
R <sup>2</sup>	0.0004	0.018	0.100

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

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## Tax & Targeted Dividend

- +50€/tCO<sub>2</sub>
- Revenues distributed equally among adults below some income threshold
- Respondents allocated to different thresholds: bottom 20, 30, 40 and 50%
  - ▶ Randomly between two thresholds if respondent's income is within them
  - ▶ When income close to only one threshold (i.e. percentile < 20 or in [50; 70]), allocated to that one
  - ▶ When percentile is > 70, threshold determined by spouse's income
  - ▶ If no spouse or if both have high incomes, threshold allocated randomly
- Would you lose, win or be unaffected by the reform?
- Would you approve this reform?

**Table:** Characteristic of the targeted reform by target of the payment.

Targeted percentiles ( <i>c</i> )	≤ 20	≤ 30	≤ 40	≤ 50
Income threshold (€/month)	780	1140	1430	1670
Payment to recipients (€/year)	550	360	270	220
Proportion of respondents	.356	.152	.163	.329
<i>Expected proportion of respondents</i>	.349	.156	.156	.339

## Self-interest - Main identification strategy

Targeted transfers are defined as:

$$T_i = \begin{cases} 0, & \text{if } I_i > c_i \\ 1, & \text{otherwise} \end{cases} \quad (1)$$

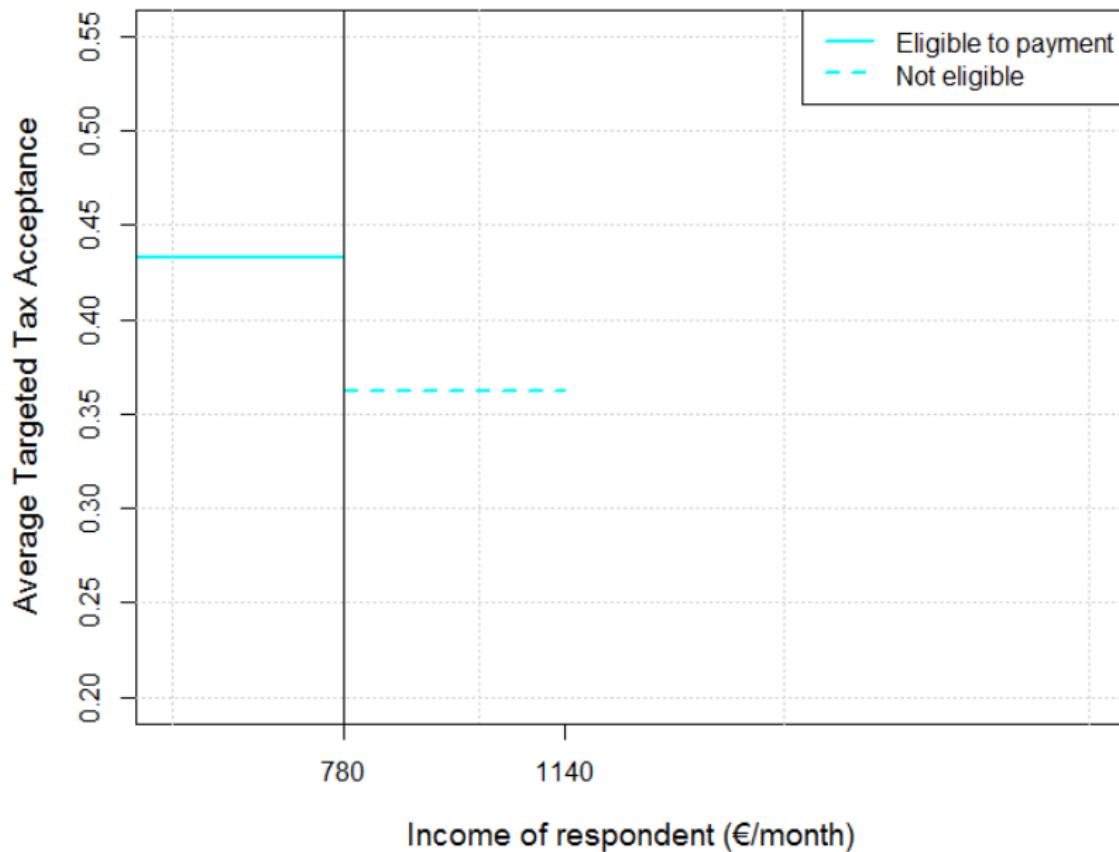
where  $c_i$  is the income threshold randomly assigned to respondent  $i$ . We can write a Two-Stage Least Square model as follows:

$$G_i^T = \alpha_0 + \alpha_1 T_{1,i} + \alpha_2 T_{2,i} + \alpha_c c_i + \sum_{j=1}^2 (\alpha_{1,j} I_{1,i}^j + \alpha_{2,j} I_{2,i}^j) + \eta_i \quad (2)$$

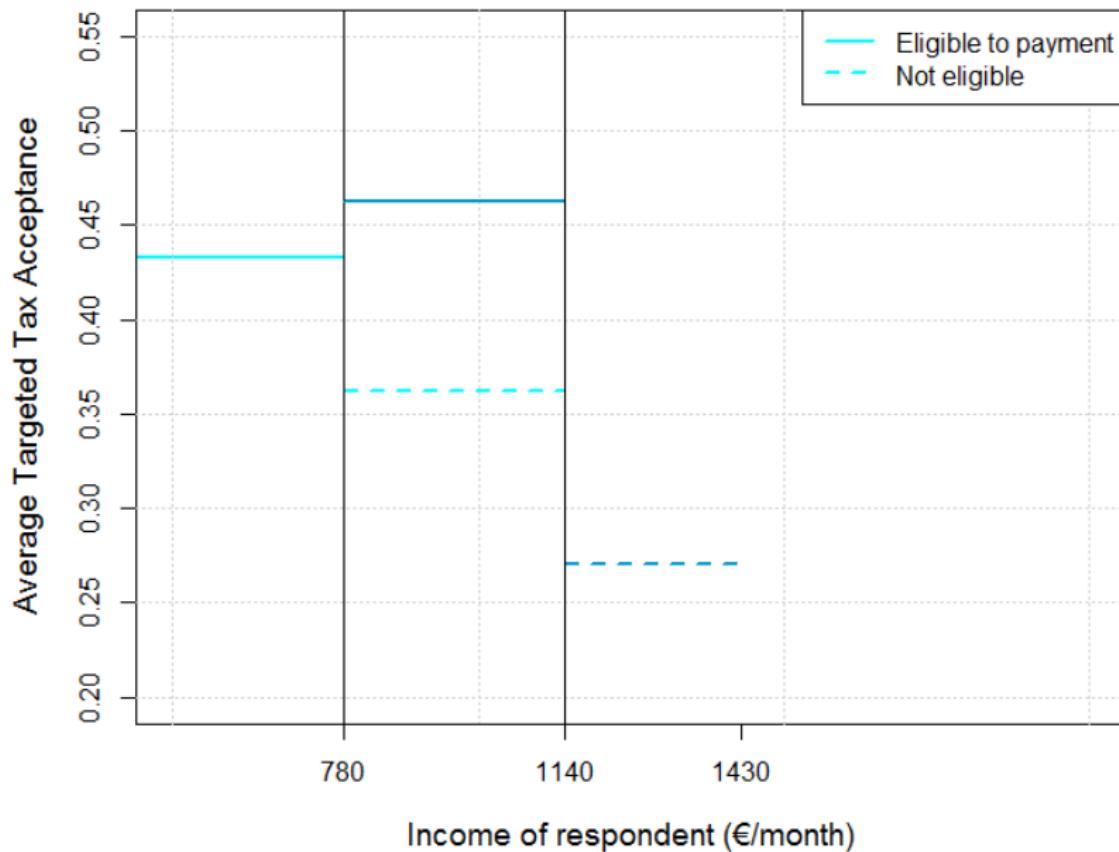
$$A_i^T = \beta_0 + \beta_1 \widehat{G}_i^T + \beta_c c_i + \sum_{j=1}^2 (\beta_{1,j} I_{1,i}^j + \beta_{2,j} I_{2,i}^j) + \epsilon_i \quad (3)$$

*Identification assumption:* conditional on income and target, being eligible affects approval solely through beliefs of winning.

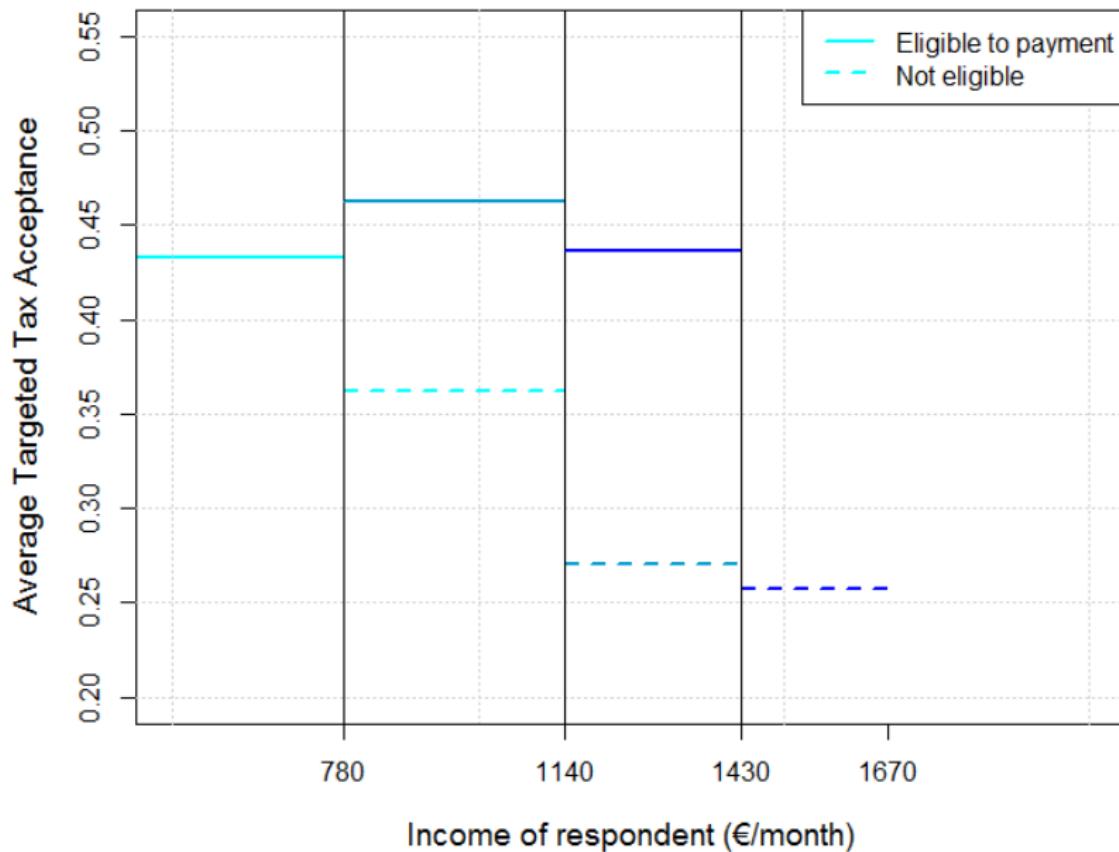
## Tax & Targeted Dividend: a primer



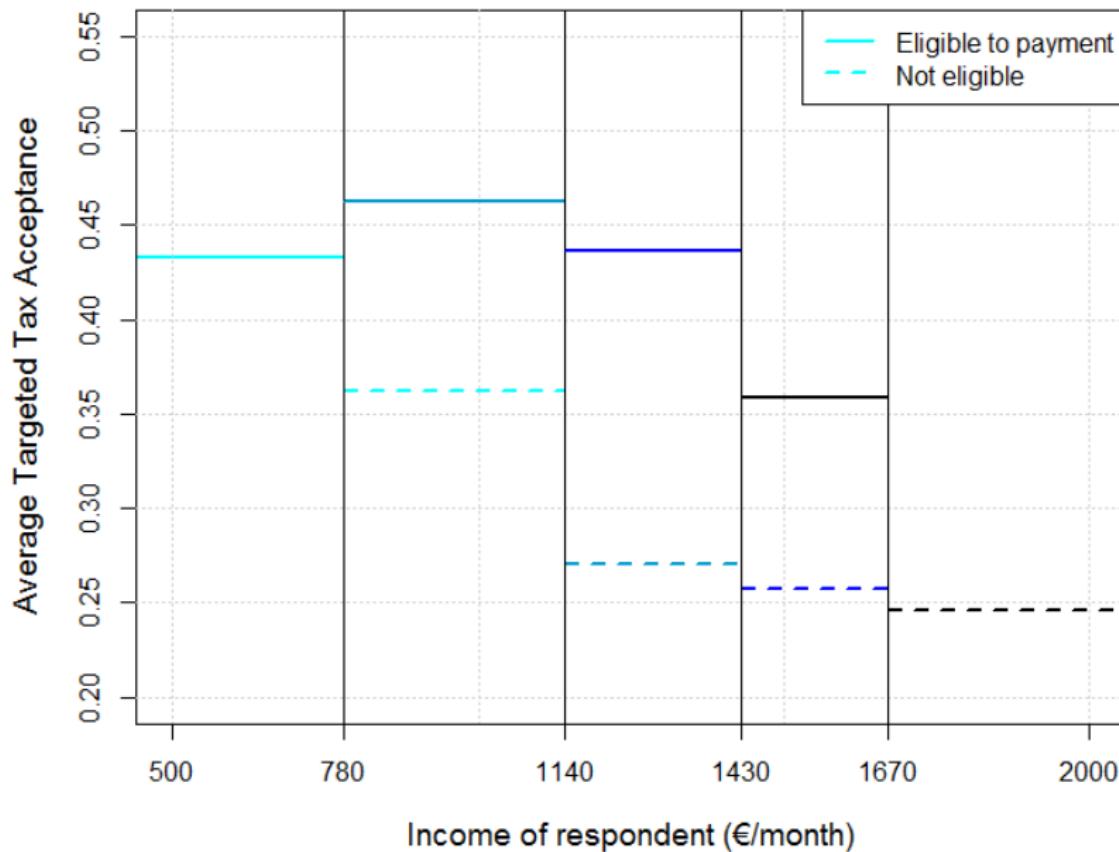
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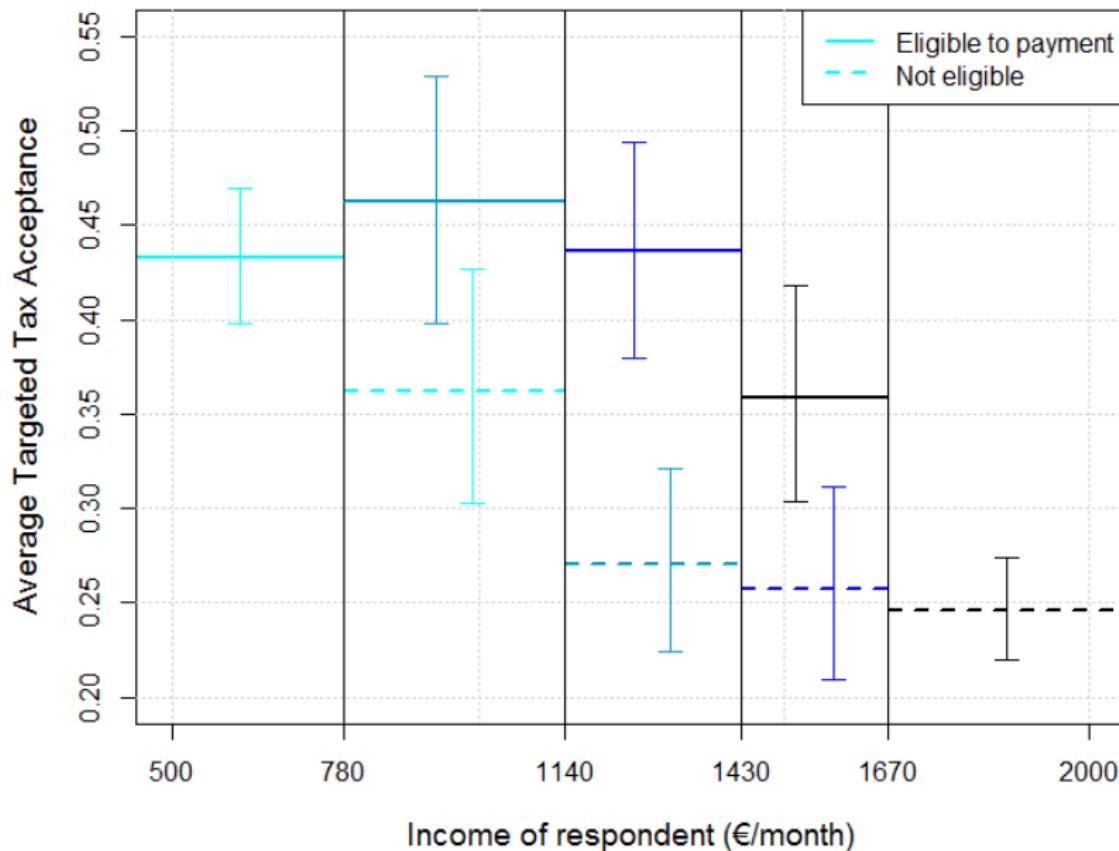
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## Self-interest - Alternative specifications

To ensure the robustness of our results, we run four other specifications:

- The same 2SLS with relevant control variables
- An OLS regression
- A logit regression
- An alternative 2SLS with RDD on the feedback for the first stage:

$$G_i^F = \alpha_0 + \alpha_1 \widehat{\Gamma}_i + \sum_{j=1}^2 \alpha_{1,j} \widehat{\gamma}_i^j + \eta_i \quad (4)$$

$$A_i^F = \beta_0 + \beta_1 \widehat{G}_i^F + \sum_{j=1}^2 \beta_{1,j} \widehat{\gamma}_i^j + \epsilon_i \quad (5)$$

*Identification assumption:* conditional on simulated net gains, being simulated winner affects approval solely through beliefs of winning.

# Self-interest - Results

**Table:** Effect of self-interest on acceptance

	Targeted Acceptance ( $A^T$ )				Feedback Acceptance ( $A^F$ )	
	IV		OLS	logit	IV	
	(1)	(2)	(3)	(4)	(5)	(6)
Believes does not lose	<b>0.571***</b> (0.092)	0.567*** (0.092)	<b>0.443***</b> (0.014)	0.431*** (0.018)	0.517*** (0.170)	0.434*** (0.135)
Initial tax Acceptance ( $A^I$ )		0.339*** (0.033)	0.360*** (0.026)	0.342*** (0.034)		0.428*** (0.055)
Controls: Incomes	✓	✓	✓	✓		✓
Controls: Estimated gain		✓	✓	✓	✓	✓
Controls: Target of the tax	✓	✓	✓	✓		
Controls: Socio-demo, other motives		✓	✓	✓		✓
Observations	3,002	3,002	3,002	3,002	1,968	1,968
R <sup>2</sup>	0.033	0.302	0.470		0.044	0.526

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

NOTE: (Standard errors). For logit, average marginal effects are reported.

⇒ LATE around 57 p.p. > ATE around 44 p.p.

▶ First stage results

## Environmental effectiveness - Main identification strategy

Two types of exogenous information (randomly displayed) may affect respondents' beliefs about environmental effectiveness:

- Information on scientific agreement about carbon tax efficiency (E)
- Information on climate change (CC)

These variables are both exogenous and *a priori* relevant → we can write a 2SLS as follows:

$$E_i = \alpha_0 + \alpha_1 Z_{E,i} + \alpha_2 Z_{CC,i} + \alpha_C \mathbf{C}_i + \eta_i \quad (6)$$

$$A_i^I = \beta_0 + \beta_1 \widehat{E}_i + \beta_C \mathbf{C}_i + \epsilon_i \quad (7)$$

*Identification assumption:* being displayed information affects approval solely through beliefs over policy's environmental effectiveness.

## Environmental effectiveness - Alternative specifications

Again, to ensure the robustness of our results, we run five other specifications:

- The same 2SLS without control variables
- An OLS regression
- A logit regression
- The same 2SLS with 'Yes' instead of 'not No' for Environmental Effectiveness
- The same 2SLS with 'Yes' instead of 'not No' for Tax Approval

# Environmental effectiveness - Results

**Table:** Effect of believing in environmental effectiveness on acceptance

	Tax Acceptance ( $A^I$ )				Tax Approval ( $A^I$ )	
	IV (1)	IV (2)	OLS (3)	logit (4)	IV (5)	IV (6)
Environmental effectiveness: not "No"	<b>0.479**</b> <b>(0.230)</b>	0.515 (0.344)	<b>0.391***</b> <b>(0.015)</b>	0.370*** (0.018)		
Environmental effectiveness: "Yes"					0.505** (0.242)	0.416** (0.168)
Instruments: info E.E., C.C. & P.M.	✓	✓			✓	✓
Controls: Socio-demo, other motives	✓		✓	✓	✓	✓
Observations	3,002	3,002	3,002	3,002	3,002	3,002
R <sup>2</sup>	0.218	0.001	0.390		0.218	0.161

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

NOTE: (Standard errors). For logit, average marginal effects are reported.

⇒ LATE around 50 p.p. > ATE close to 40 p.p.

▶ First stage results

## Progressivity - Main identification strategy

Could in theory run a 2SLS with random information on progressivity.

*Problem:* Weak instrument... Our info does not convince

Alternative specifications:

- OLS regression with relevant controls
- Logit regression
- Again, distinguish results with 'Yes' vs not No'

*Identification assumption:* conditional on respondents' beliefs over self-gains, environmental effectiveness, their socio-demographic and energetic characteristics, answer on beliefs over progressivity captures approval solely through beliefs over progressivity.

## Progressivity - Results

**Table:** Effect of beliefs over progressivity on acceptance. Covariates refer either to broad (1-4) or strict (5-6) definitions of the beliefs, where strict dummies do not cover “PNR” or “Unaffected” answers.

	Acceptance ( $A^P$ ) on not “No”				Approval ( $A^P$ ) on “Yes”	
	<i>OLS</i>		<i>logit</i>		<i>OLS</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
Progressivity ( $P$ )	0.223*** (0.038)	0.237*** (0.044)	0.560*** (0.023)	0.544*** (0.019)	0.228*** (0.041)	0.482*** (0.023)
Winner ( $G^P$ )	0.332*** (0.020)	0.332*** (0.020)			0.303*** (0.019)	
Effective ( $E$ )	0.258*** (0.023)	0.259*** (0.023)			0.244*** (0.020)	
$(G^P \times E)$	0.127*** (0.034)	0.127*** (0.034)			0.126*** (0.037)	
Interaction: winner ( $P \times G^P$ )	0.183*** (0.050)	0.183*** (0.050)			0.098** (0.048)	
Interaction: effective ( $P \times E$ )	0.172*** (0.057)	0.172*** (0.057)			0.281*** (0.059)	
Income ( $I$ , in k€/month)	0.017 (0.022)	0.018 (0.022)			0.037** (0.018)	
Interaction: income ( $P \times I$ )		-0.008 (0.013)			-0.019 (0.014)	
$P \times G^P \times E$	-0.400*** (0.072)	-0.399*** (0.072)			-0.314*** (0.083)	
Controls: Socio-demo, incomes, estimated gains	✓	✓			✓	
Observations	3,002	3,002	3,002	3,002	3,002	3,002
R <sup>2</sup>	0.460	0.460	0.162		0.391	0.130

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

Motives for acceptance 34 / 40

## Combined effects

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Effects of beliefs on approval (strict definitions):

- Three motives: +97 p.p.
- SI & EE: +69 p.p.
- SI & P: +64 p.p.
- EE & P: +74 p.p.

*Altruistic motives matter!*

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*Altruistic motives matter!*

⇒ Correcting all beliefs (i.e. accounting for the 30% of objective losers): approval rate would go up to 90%!

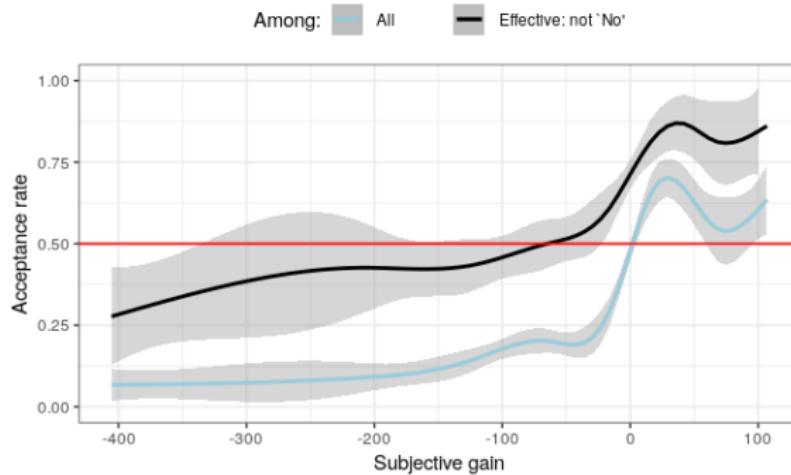
## Summary and relation to literature

First study identifying causal effects of beliefs about carbon tax outcome on acceptance. Results confirm importance of the three motives stressed in the literature:

- **Self interest (ATE  $\simeq 45$  p.p.):** result in accordance with previous findings (e.g. Stern et al., 1993; Thalmann, 2004; Baranzini & Carattini, 2017), but at odds with Kallbekken & Saelen (2011).
- **Environmental effectiveness (ATE  $\simeq 40$  p.p.):** results consistent with previous studies (e.g. Saelen & Kallbekken, 2011; Kallbekken & Saelen, 2011; Baranzini & Carattini, 2017) although these did not properly identify a causal effect.
- **Progressivity (ATE  $\simeq 30$  p.p.):** confirms some previous evidences (Kallbekken & Saelen, 2011; Brannlund & Persson, 2012; Gevrek & Uyduranoglu, 2015) and contrasts with others (Baranzini & Carattini, 2017).
- **Relative importance:** self-interest seems to matter slightly more, progressivity slightly less, but still the combination of the two altruistic motives dominates.

## Willingness to pay

Our results are also indicative of a WTP for an effective policy:



**Figure:** Acceptance rate by subjective gain, informing on the willingness to pay for climate mitigation.

Results suggest a WTP of 60€ per c.u. (i.e. about 100€ per household) in the typical range of the literature (Jenkins, 2014; Streimikiene et al., 2019).

**1** Survey and data

**2** Perceptions

**3** Are beliefs persistent?

**4** Motives for acceptance

**5** Conclusion

## Key results

- ➊ French people would largely reject a carbon tax policy with uniform lump-sum transfer
- ➋ Their perceptions about the properties of the scheme are biased:
  - ▶ they over-estimate the negative impact on their purchasing power;
  - ▶ they do not think it is environmentally effective;
  - ▶ they wrongly perceive it as regressive.
- ➌ Providing information can hardly help correct these misperceptions:
  - ▶ people give little weight to these information;
  - ▶ they tend to trust more negative news about the tax than positive ones.
- ➍ Nonetheless: if one could convince them, the scheme would reach majority acceptance.
  - ▶ Self-interest, environmental effectiveness and progressivity are critical motives of acceptance:  $\simeq + 40$  p.p. in likelihood to accept for the two firsts,  $+ 27$  p.p. for the latter.
  - ▶ Motives are complementary: correcting biased beliefs would lead to a 90% approval.
  - ▶ Complementarity particularly strong for altruistic motives (+74 p.p. together).

## Discussion

Many people report important concerns about climate change, but are opposed to solutions typically proposed by economists.

**Questions: Are people still willing to exert efforts to tackle climate change?  
What design for French climate policies?**

- Carbon tax is known as the most efficient instrument, but:
  - ▶ People currently largely opposed
  - ▶ To make it acceptable/desirable, need to design a progressive scheme and convince people about the true tax' properties
  - ▶ Overall, need to solve a deep dis-trust problem...
  - ▶ ...which might take time
- If (at least for now) carbon tax cannot be implemented, which alternatives?
  - ▶ People usually favor policies with *hidden costs* ▶ See results from our survey
  - ▶ Should we promote what is most accepted knowing it will end up being more costly and potentially more regressive?
  - ▶ What if these policies also have hidden benefits? (e.g. create a shift in preferences)

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**Thank you!**

## 6 Appendix

# Categories of winners and losers

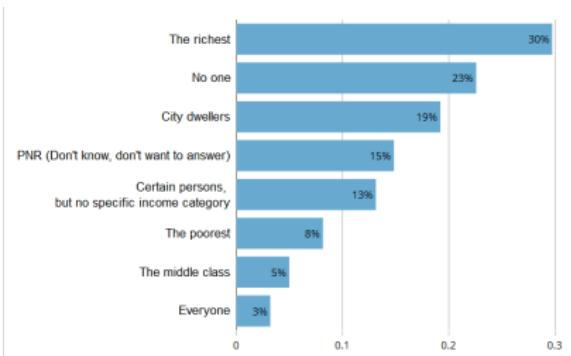


Figure: winners

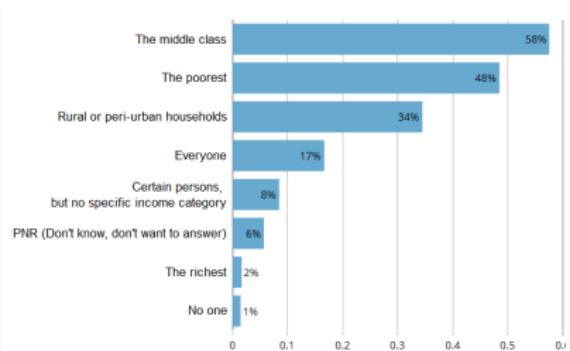


Figure: losers

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# Estimation of increase in housing energy expenditures

**Table:** Determinants of housing energy expenditures

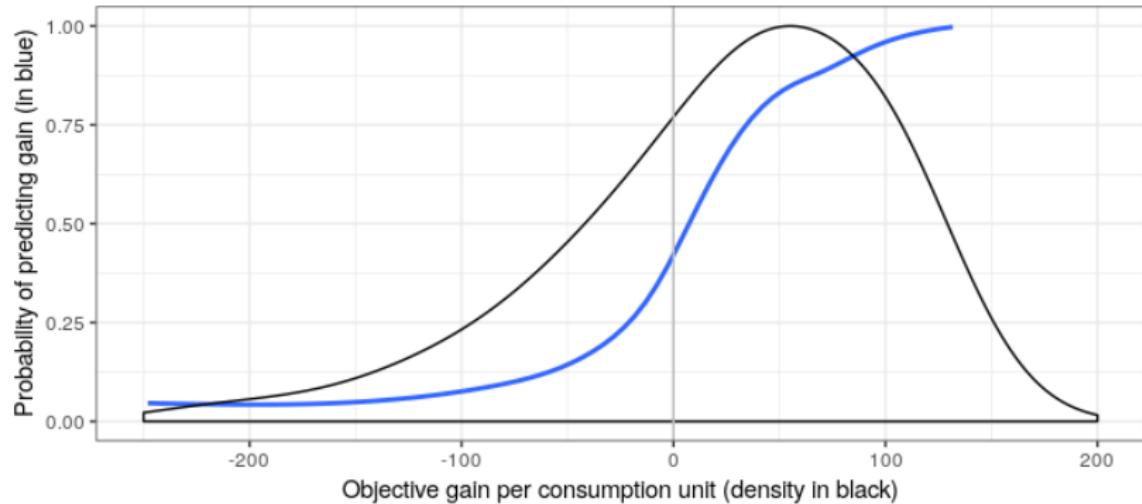
	Increase in housing energy expenditures (€/year)		
	(1)	(2)	(3)
Constant	-55.51*** (1.237)		-0.634 (1.489)
Housing energy: Gas	124.6*** (1.037)		1.173 (2.323)
Housing energy: Fuel oil	221.1*** (1.719)	129.8*** (3.752)	130.4*** (4.002)
Accommodation size (m <sup>2</sup> )	0.652*** (0.012)		0.024 (0.015)
Accommodation size × Gas		1.425*** (0.007)	1.397*** (0.024)
Accommodation size × Fuel oil		0.945*** (0.029)	0.922*** (0.032)
Observations	26,729	26,729	26,729
R <sup>2</sup>	0.545	0.716	0.599
Error rate	0.166	0.155	0.155

Note:

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

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## Prediction's precision



**Figure:** Probability that our estimation of net gains correctly predicts the winning category.

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# First stage self-interest

**Table:** First stage regressions results for self-interest

	Believes does not lose			
	Targeted tax ( $G^T$ )		After feedback ( $G^F$ )	
	(1)	(2)	(5)	(6)
Transfer to respondent ( $T_1$ )	0.268*** (0.028)	0.227*** (0.027)		
Transfer to spouse ( $T_2$ )	0.180*** (0.031)	0.174*** (0.030)		
$T_1 \times T_2$	-0.190*** (0.038)	-0.161*** (0.037)		
Initial tax Acceptance ( $A^I$ )		0.163*** (0.033)		0.333*** (0.038)
Simulated winner ( $\widehat{\Gamma}$ )			0.217*** (0.036)	0.210*** (0.035)
Controls: Incomes	✓	✓		✓
Controls: Estimated gain		✓	✓	✓
Controls: Target of the tax, single	✓	✓		
Controls: Socio-demo, other motives		✓		✓
Effective F-Statistic (Montiel & Pflueger, 2013)	44.093	40.834	37.966	57.866
Observations	3,002	3,002	1,968	1,968
R <sup>2</sup>	0.082	0.177	0.131	0.319

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

Go back to second stage

# First stage environmental effectiveness

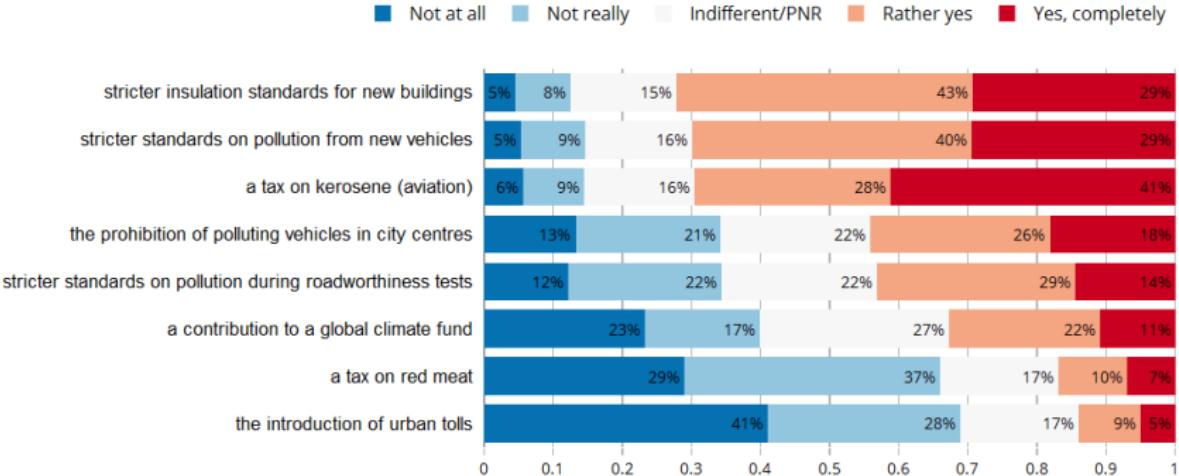
**Table:** First stage regressions results for environmental effectiveness

	Environmental effectiveness		
	(1)	not "No"	"Yes"
(5,6)			
Info on Environmental Effectiveness ( $Z_E$ )	0.062*** (0.017)	0.043** (0.017)	0.059*** (0.014)
Info on Climate Change ( $Z_{CC}$ )	0.030* (0.017)	0.024	0.028** (0.013)
Controls: Socio-demo, other motives, incomes, estimated gains	✓		✓
Effective F-Statistic (Montiel & Pflueger, 2013)	5.866	2.523	11.145
Observations	3,002	3,002	3,002
R <sup>2</sup>	0.121	0.003	0.123

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

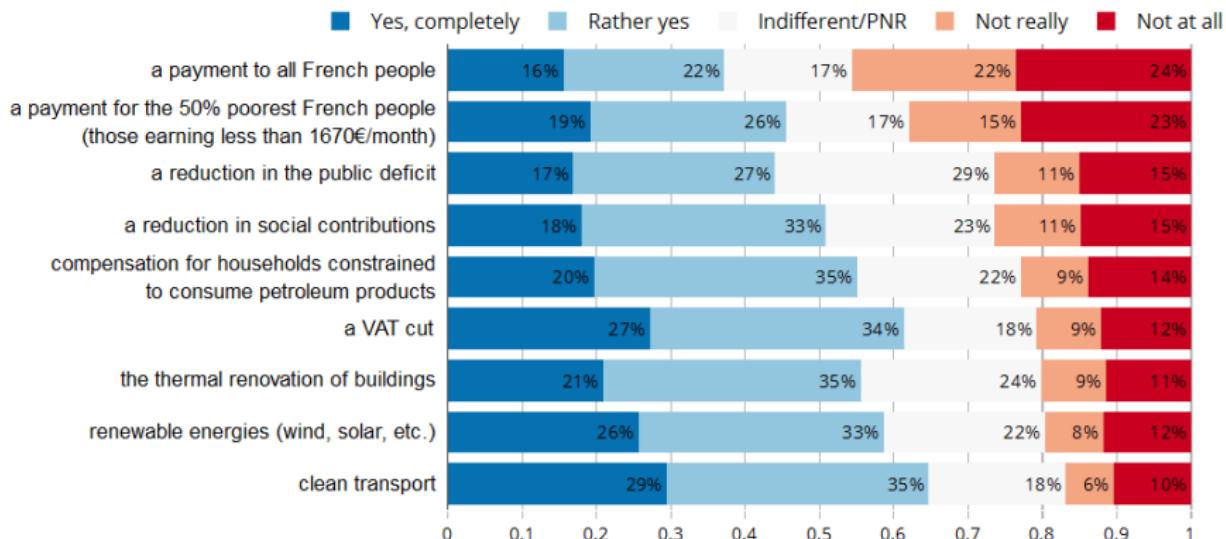
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# French favored environmental policies



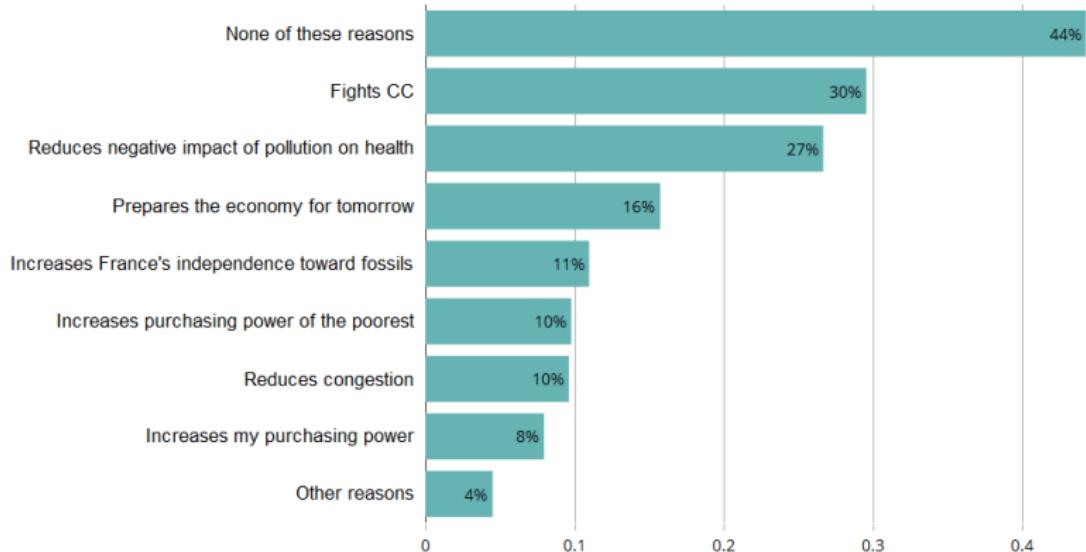
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# French favored redistribution of tax carbon revenue



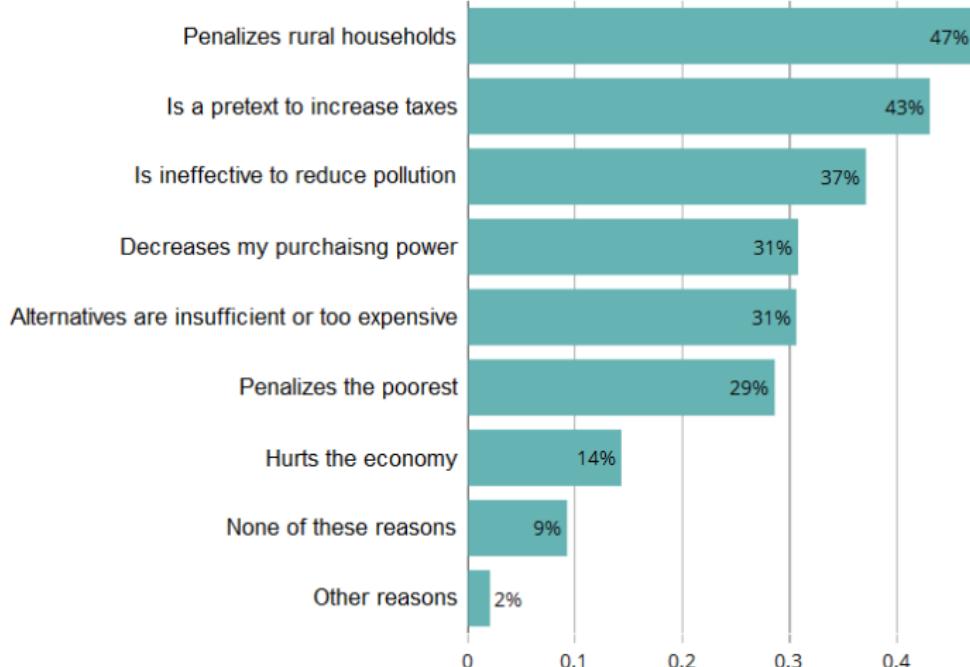
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# Benefits of a Tax & dividend



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# Problems of a Tax & dividend



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