

Yellow Vests, Carbon Tax Aversion, 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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- Effectiveness and distributional effects matter more than self-interest: Kallbekken & Sælen (2011)

Our contribution: run a survey to:

- ① test previous results on a representative sample of the French population;
- ② disentangle erroneous beliefs from *pure* effects of preferences;
- ③ quantify biases regarding the costs of carbon tax;
- ④ show persistence of beliefs over carbon tax;
- ⑤ estimate causal effects.

1 Survey and data

2 Perceptions

3 Are beliefs persistent?

4 Motives for acceptance

5 Conclusion

Survey data collection

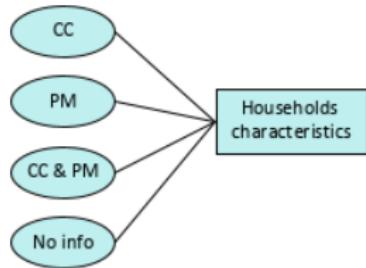
- 3002 responses collected on-line in February/March 2019
- Representative along: gender, age, education, profession, size of town, region
- Median duration: 19 min, important questions in the first half
- We exclude: 4% of respondents answering in less than 7 min, 9% who fail test of quality
- We flag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

▶ See the questionnaire

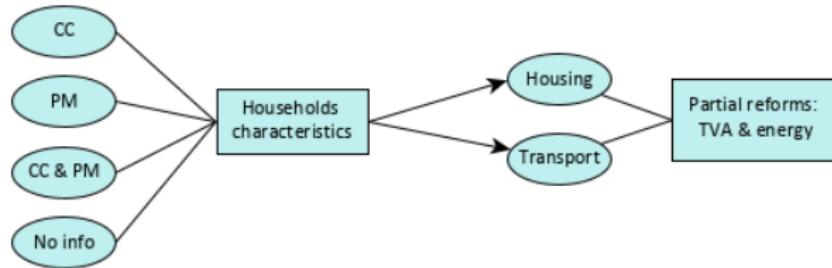
Our survey: Priming

- CC
- PM
- CC & PM
- No info

Our survey



Our survey

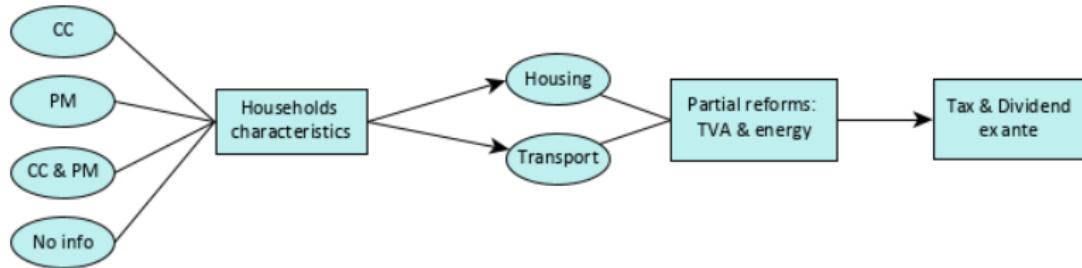


- The government studies +50€/tCO₂ specific to housing or transport:
 - ▶ +13% on gas (resp. +15% on domestic fuel) redistributed: 50€/y per adult
 - ▶ +0.11€/L on gasoline (resp. +0.13€/L on diesel) → 60€/y per adult

Partial tax reforms

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 - ▶ +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€/tCO₂
 - ▶ 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

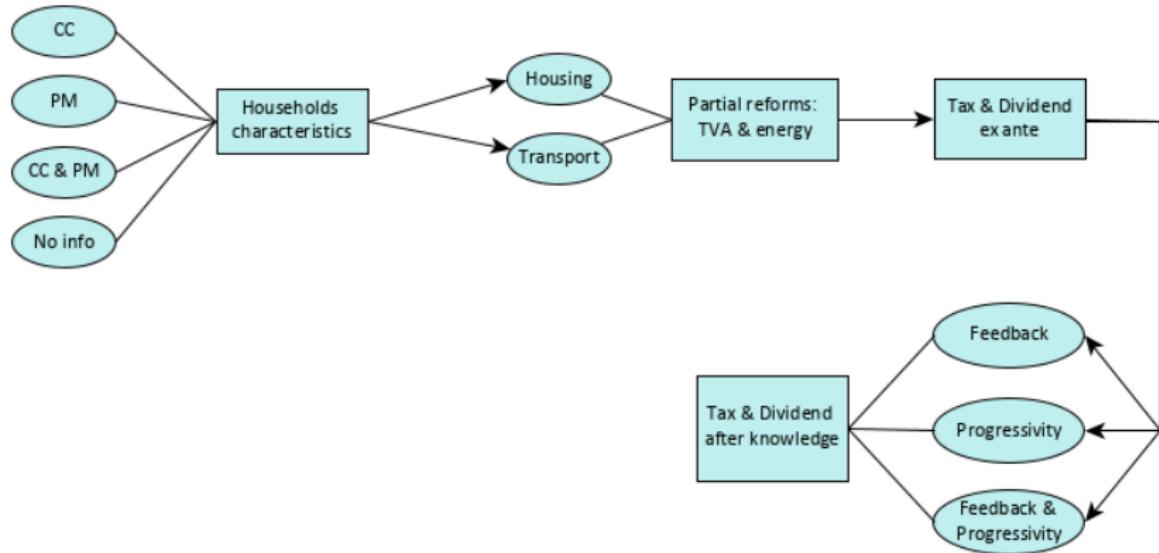
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- Do you think this reform would be effective in reducing pollution and fight climate change?
 - ▶ "scientists agree that a carbon tax would be effective in reducing pollution" randomly displayed or not

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- Do you think this reform would be effective in reducing pollution and fight climate change?
 - ▶ “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



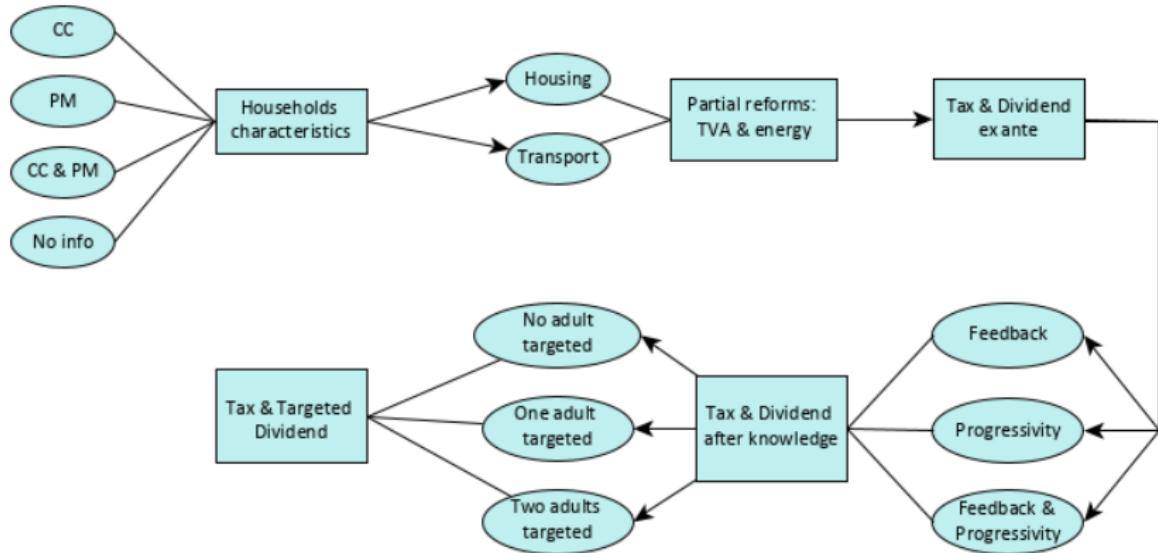
Tax & Dividend: after knowledge

- 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] m²; [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)

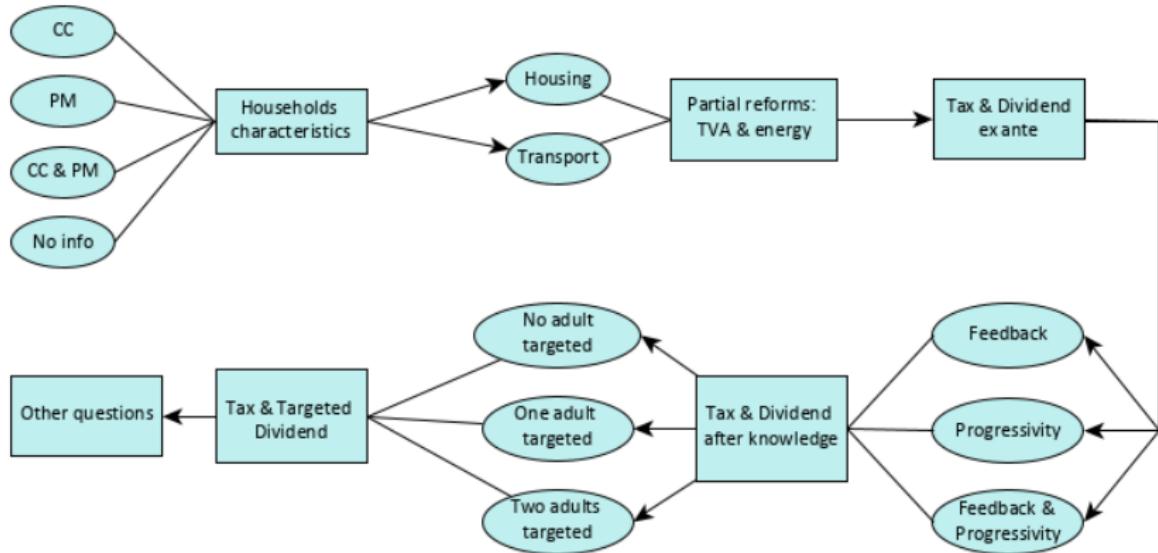
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 - ▶ Progressivity: "this reform would increase the purchasing power of the poorest households and decrease that of the richest, who consume more energy" (1/3)
 - ▶ or both (to 1/6 of respondents)
- Is the reform beneficial to the poorest? (1/2)
- 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 + β_g gas + β_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.

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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:

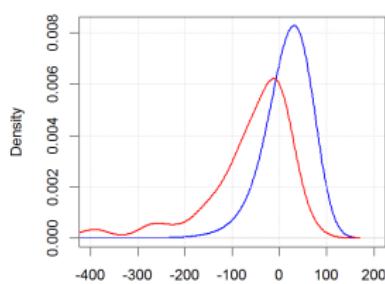


Figure: Transport: -61/+18

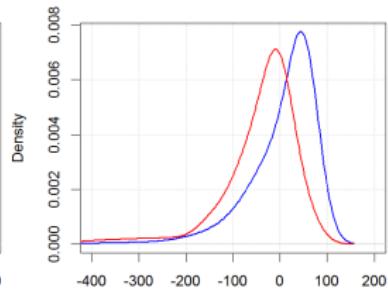


Figure: Housing: -43/+6

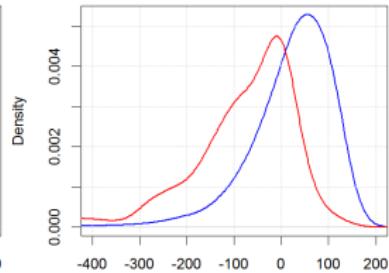


Figure: Both: -89/+24

- 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.):

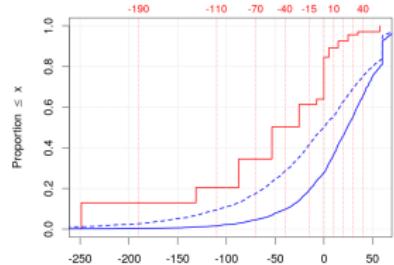


Figure: Transport

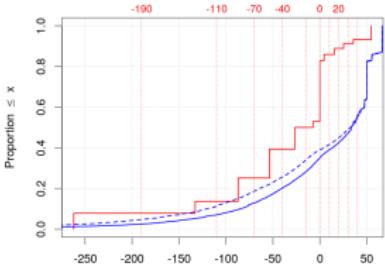


Figure: Housing

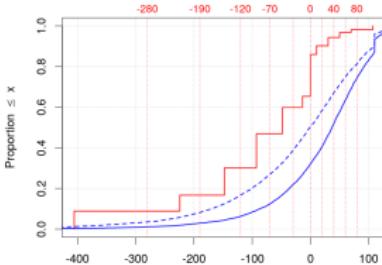


Figure: Both

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 ²	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 ²	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 -4.6% per year.

Beliefs over progressivity

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

Beliefs over progressivity

Reform would benefit poorer households? 19% 'Yes', 60% 'No', 21% 'PNR'.
Yet, the tax is progressive:

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

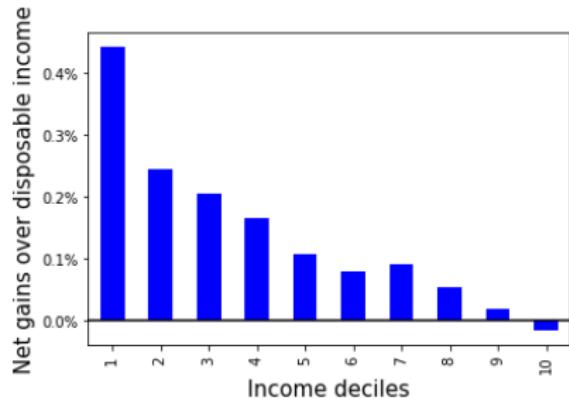


Figure: ...as a share of disposable income

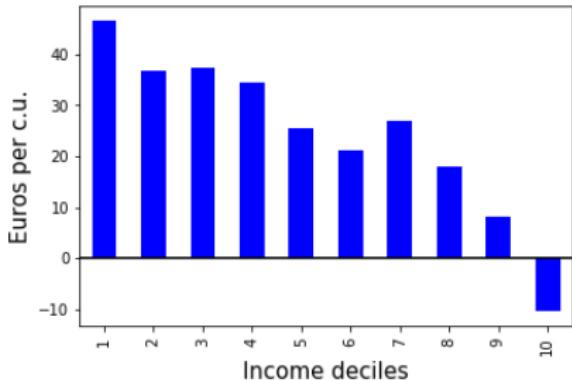


Figure: ...in euros per consumption unit

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: $G^F = \hat{\Gamma}$</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 loss (or risk) 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})	0.695*** (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			0.158*** (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)	-0.137** (0.062)		
Among invalidated	✓	✓	✓	✓
Includes controls		✓	✓	✓
Observations	1,365	1,365	1,365	1,365
R ²	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 ²	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 ²	0.0004	0.018	0.100

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

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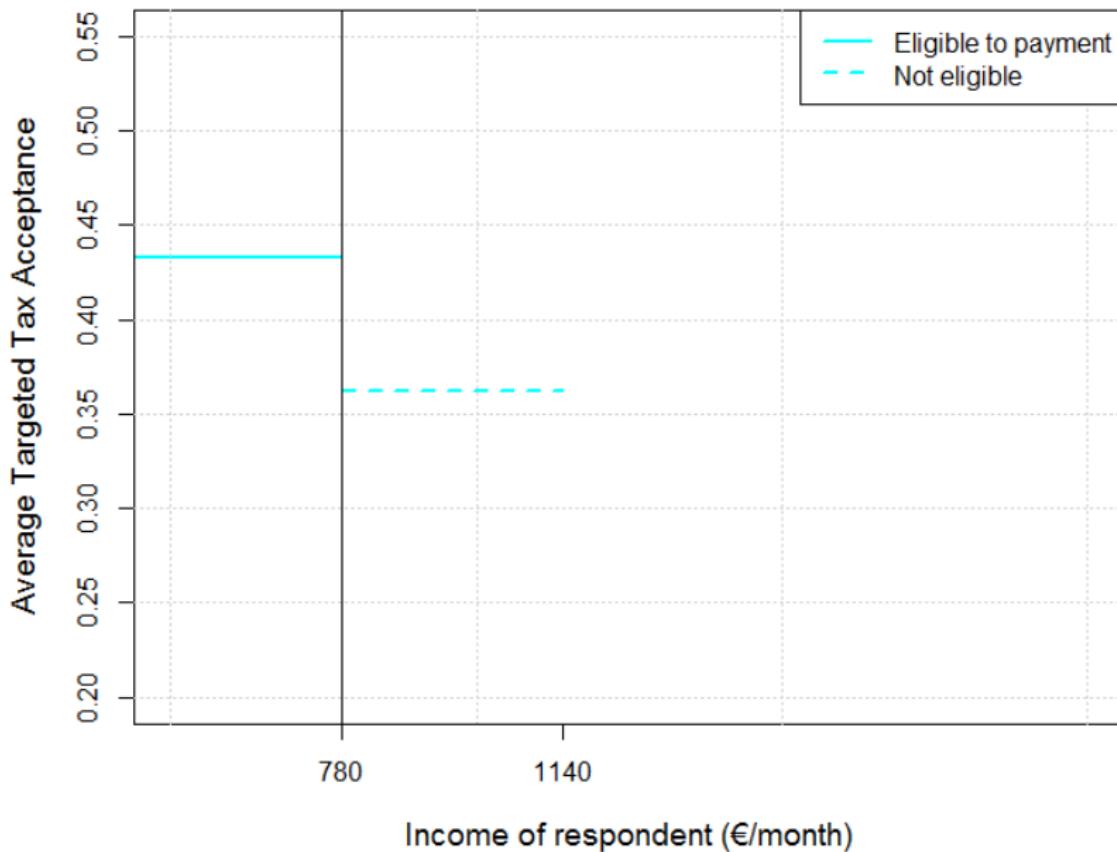
Tax & Targeted Dividend

- +50€/tCO₂
- 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?

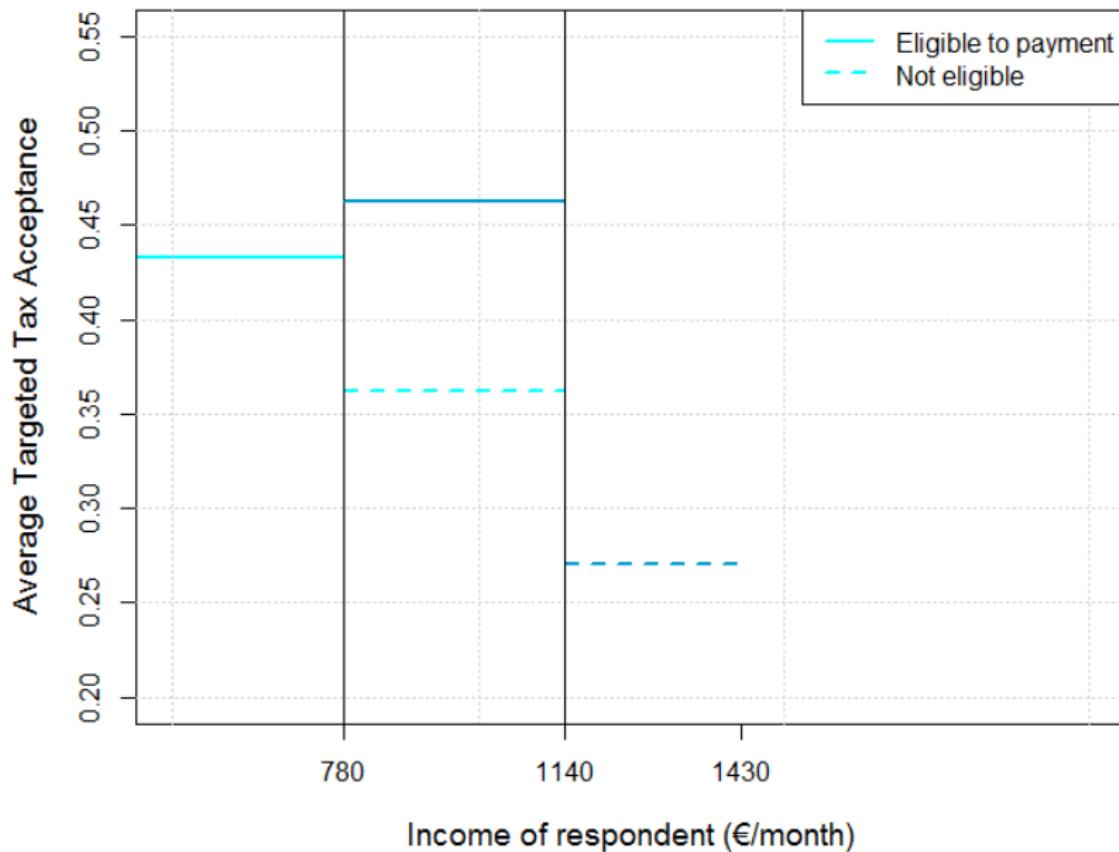
Table: Characteristic of the targeted reform by target of the payment.

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

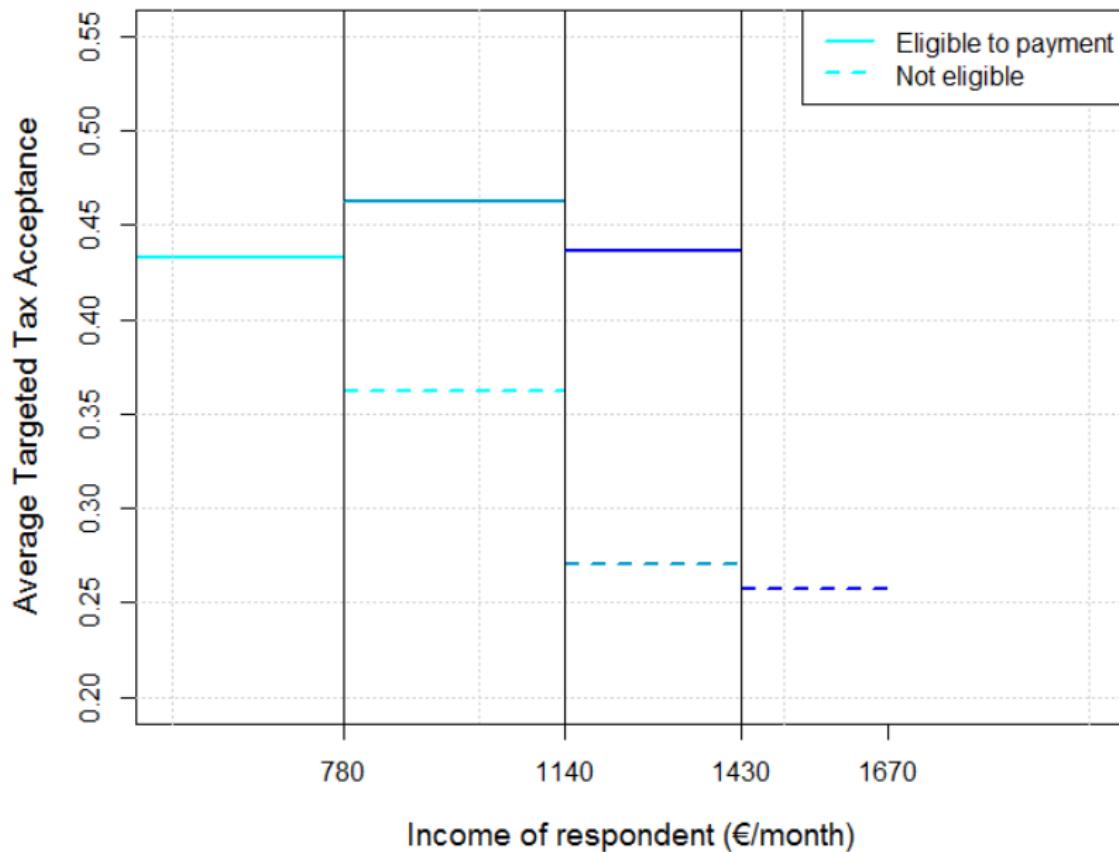
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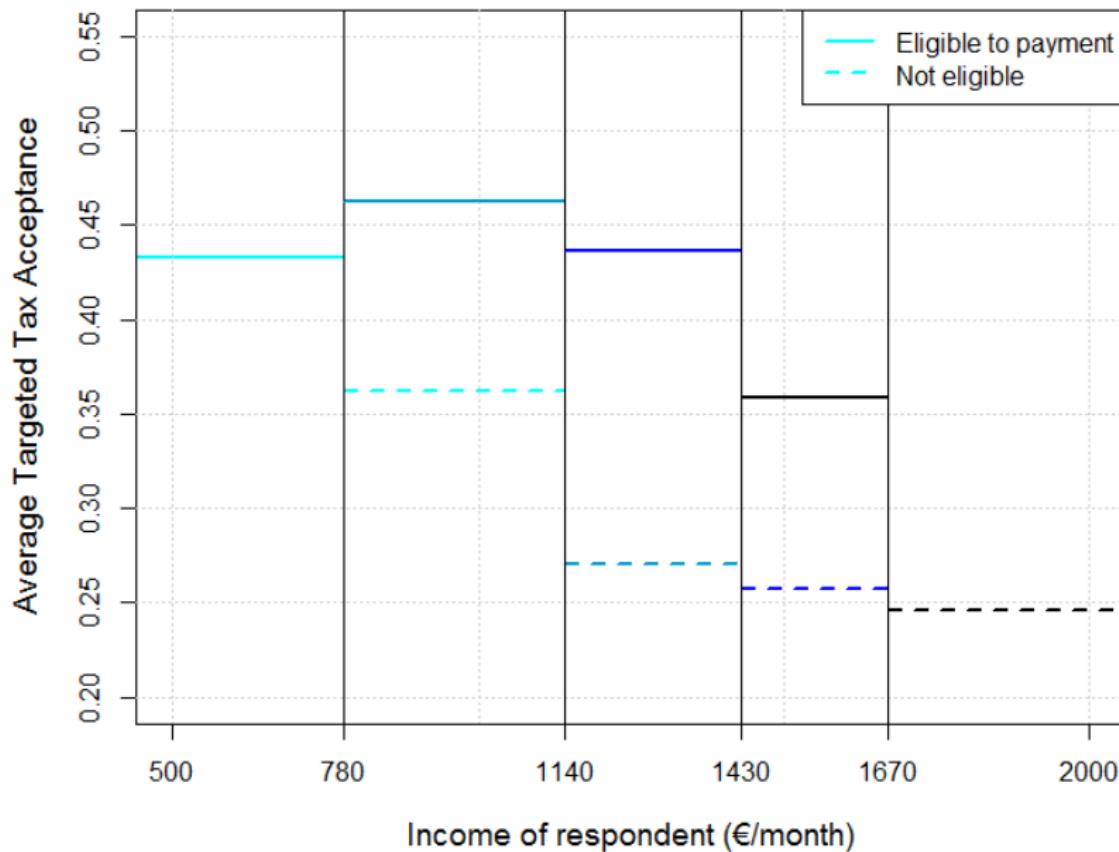
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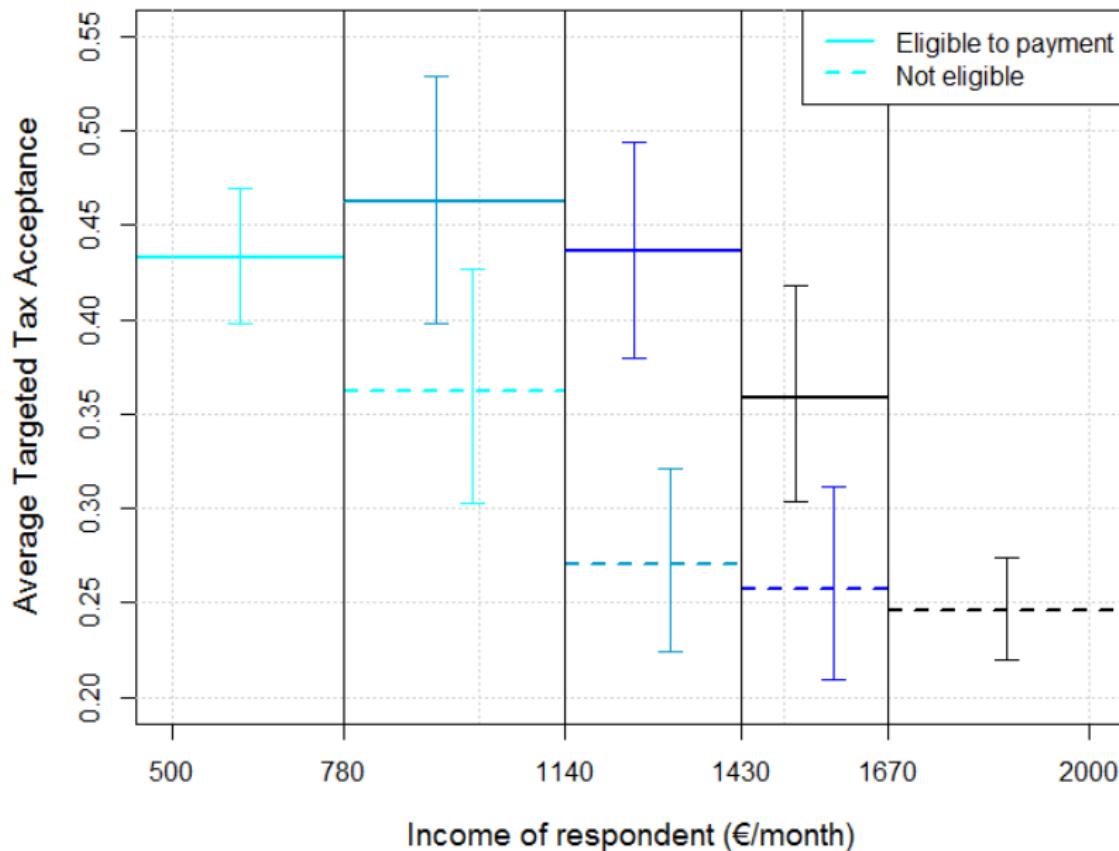
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Self-interest - Main identification strategy

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.

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	0.571*** (0.092)	0.567*** (0.092)	0.443*** (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 ²	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"	0.479** (0.230)	0.515 (0.344)	0.391*** (0.015)	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 ²	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 ²	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

Question: do these effects complement or substitute?

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Effects of beliefs on approval (strict definitions):

- Three motives: +97 p.p.
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- 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:

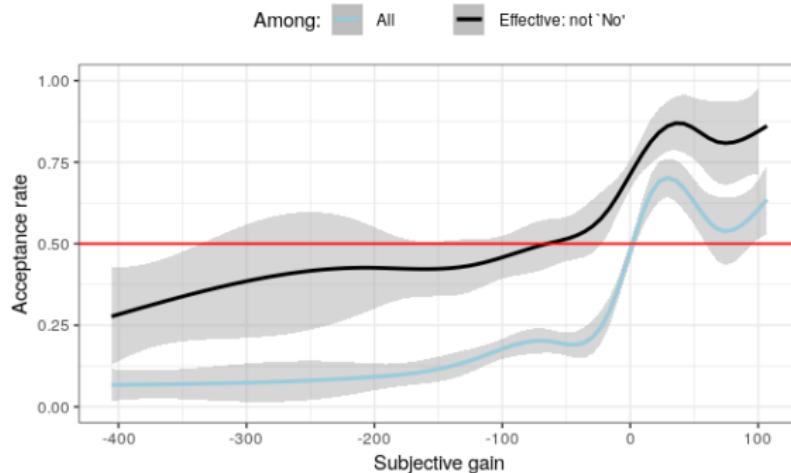


Figure: Acceptance rate by subjective gain, informing on the willingness to pay for climate mitigation.

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

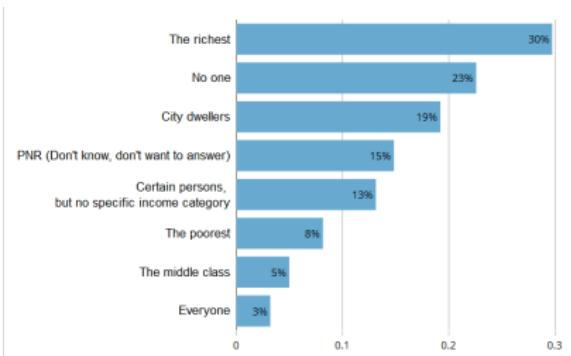


Figure: winners

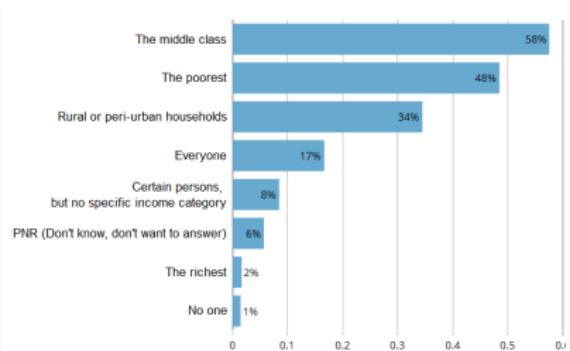


Figure: losers

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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 ²)	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 ²	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

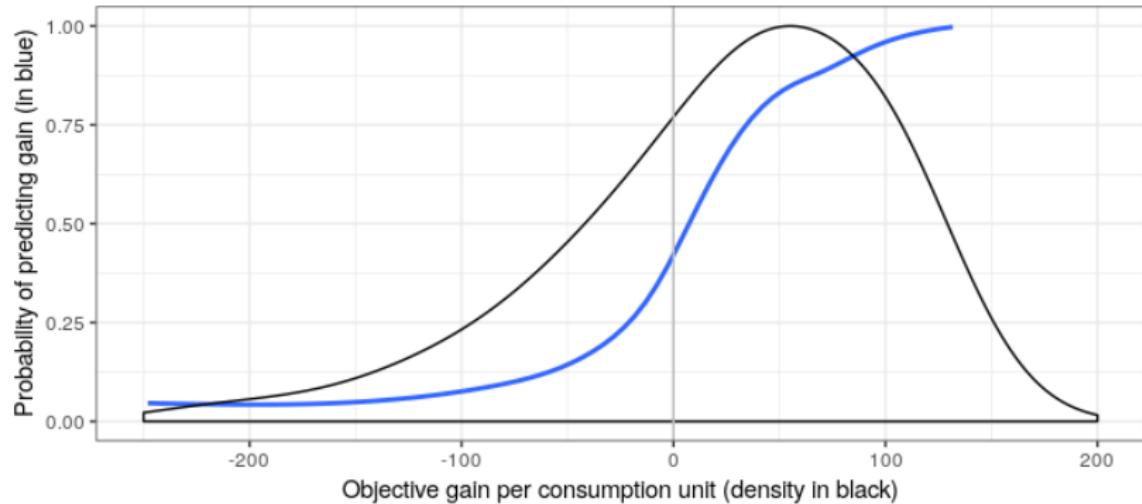


Figure: Probability that our estimation of net gains correctly predicts the winning category.

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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 ²	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

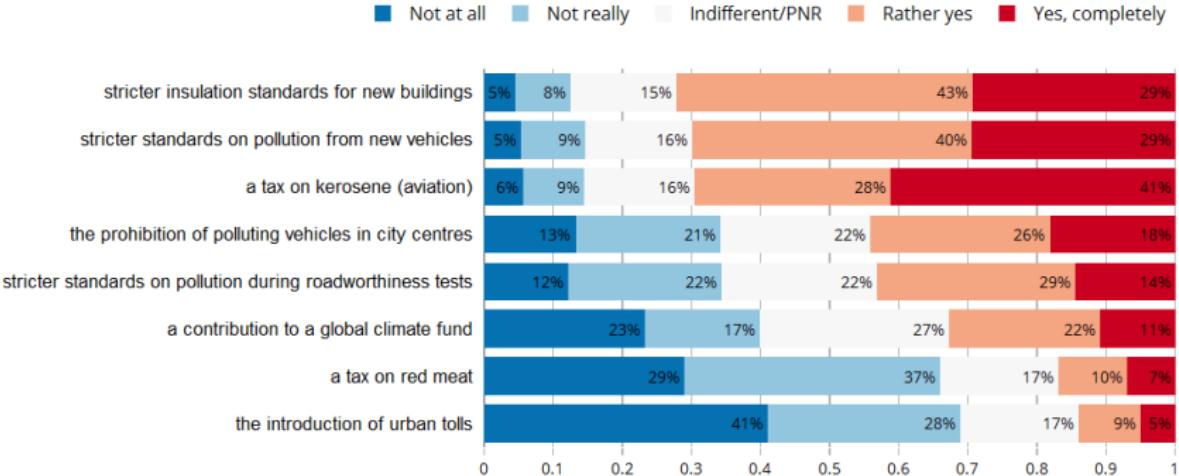
Table: First stage regressions results for environmental effectiveness

	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 ²	0.121	0.003	0.123

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

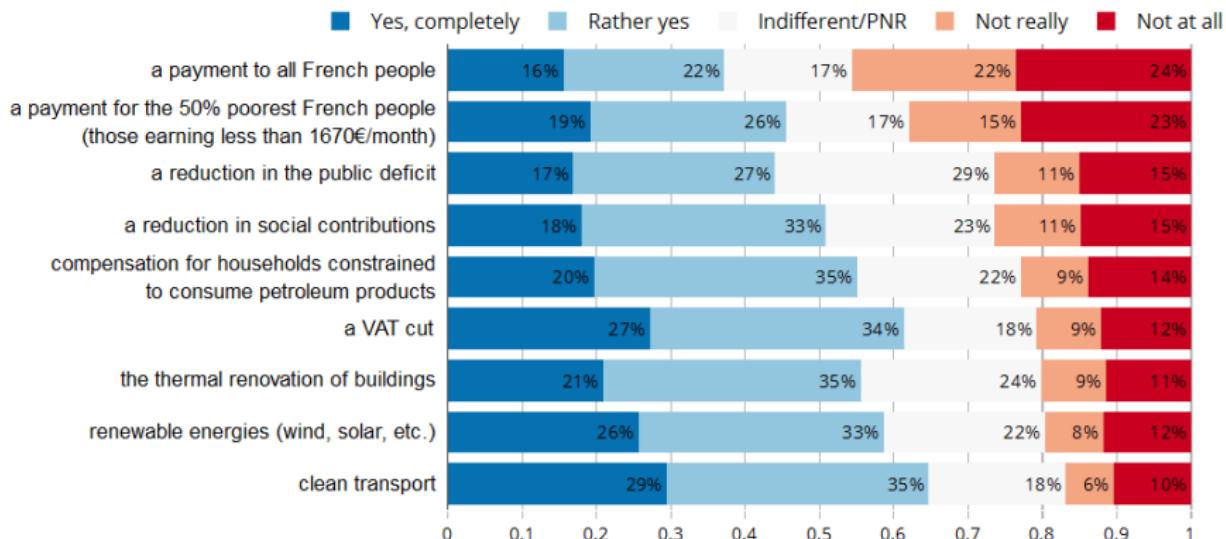
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French favored environmental policies



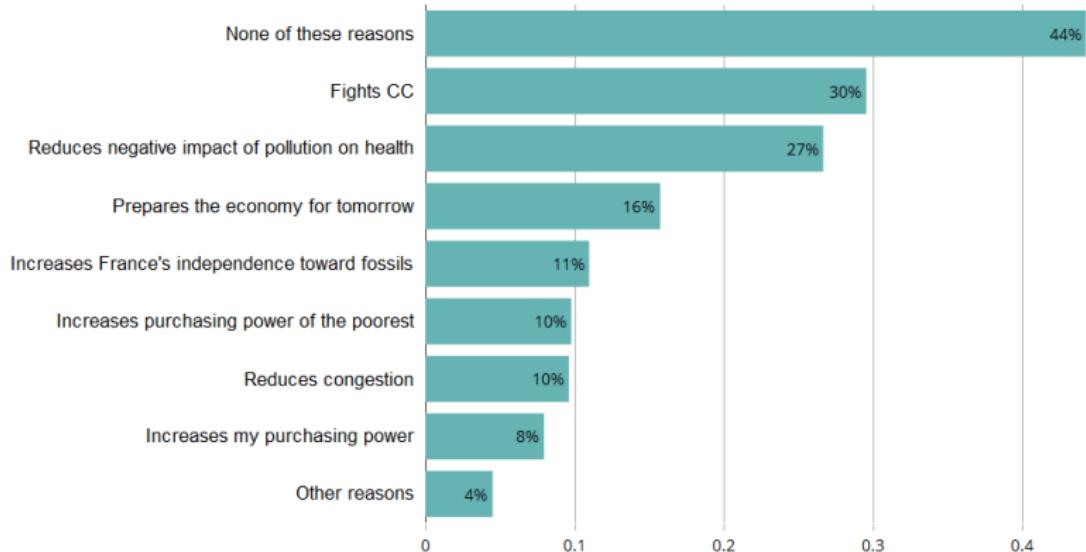
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French favored redistribution of tax carbon revenue



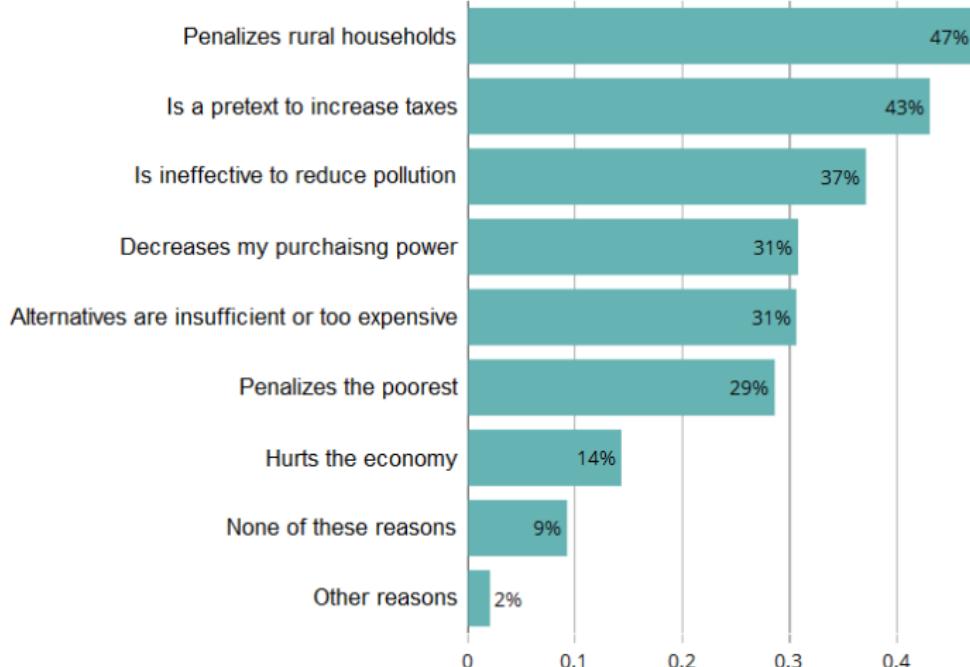
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Benefits of a Tax & dividend



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Problems of a Tax & dividend



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