Yellow Vests, Pessimistic Beliefs, and Carbon Tax Aversion

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Are French people ecologist?

Motivations

How to avoid regressivity of carbon tax?

→ **Tax & Dividend**: redistributing equally the revenues. Makes it:

- progressive *(e.g. West & Williams, 2004; Bento et al., 2009; Williams et al., 2015; Douenne, 2020)*.
- supported by 3,354 economists in *The Wall Street Journal (2019)*, "To maximize the fairness and political viability of a rising carbon tax".

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With a design ensuring desirable properties, a policy should be supported.

But is it really sufficient?

This paper

Based on a large survey representative of the French population, we show that:

1. Most people oppose a Tax & Dividend
2. They hold pessimistic beliefs about it
   - e.g. 70% expected to win, only 14% think they would
3. These beliefs may be partially formed through distrust and/or motivated reasoning
4. Rejection is driven by pessimistic beliefs: convincing people of the true incidence and environmental effectiveness would suffice to generate large majority approval

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→ *Example of a welfare-improving policy rejected due to pessimistic reasoning.*

Contributions

- **Political economy of the carbon tax:**

  Three key motives for acceptance:
  (See review by Carattini et al. (2018) or synthesis by Klenert et al. (2018))
  - self-interest *(Thalmann, 2004)*
  - environmental effectiveness *(Bristow et al 2010; Brannlund & Persson 2012)*
  - progressivity *(Kallbekken & Sælen, 2011; Baranzini & Carattini, 2017)*

  → We are the first to:

  1. Estimate objective net gain from the reform
  2. Acknowledge and quantify biases in perceptions
  3. Estimate causal effects of motives on acceptance

- **Beliefs formation:**

  1. Add new evidence on link between beliefs and preferences for policies *(e.g. Alesina & Angeletos, 2005; Bénabou & Tirole, 2006; Alesina et al., 2018)*
  2. Bi-directional causality through directional motivated reasoning *(e.g. Kunda, 1990; Kahan, 2013; Bénabou & Tirole, 2016; Druckman & McGrath, 2019; Little, 2019)*

Tax & Dividend: *ex ante*

- Description of our Tax & Dividend reform:
  - $+13\%$ on gas (resp. $+15\%$ on domestic fuel) redistributed
  - $+0.11$€/L on gasoline (resp. $+0.13$€/L on diesel)
  - 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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- 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

Biased perception of net gain

PDF of subjective vs. objective net gains from Tax & Dividend (in € per year per consumption unit).

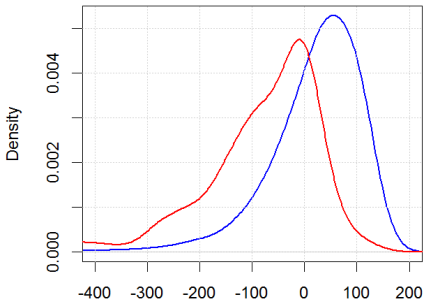


Figure: Net gain. Mean: −89/+24

- 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€.

Beliefs over environmental effectiveness

Reform effective to "reduce pollution and fight climate change"?
17% 'Yes', 66% 'No' and 18% 'PNR'.

▸ See subjective elasticities

Those can be due to low objective impact of the reform: –0.8% of *French* GhG emissions, vs. official goal of *carbon neutrality*.

Beliefs over progressivity

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

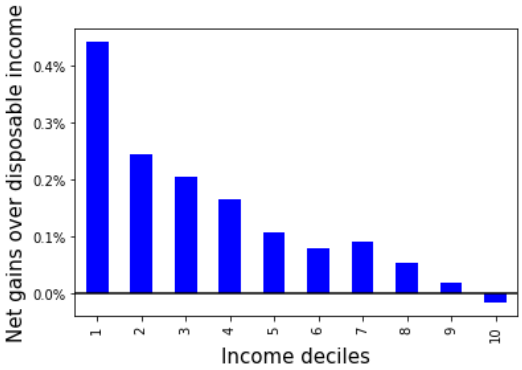


Figure: Average gain of Tax & Dividend by income decile as a share of disposable income

Tax & Dividend: after feedback

- Feedback (2/3 of respondents): "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^2; [distance] km traveled with an average consumption of [fuel economy] L for 100 km.)"
- Would you lose, win or be unaffected by the reform?
- Would you approve this reform?

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 do not trust what we present to them.
- Respondents are uncertain and loss-averse: they don't report the expected outcome but something more pessimistic.
- Motivated reasoning: respondents revise less their beliefs when new information is in favor of the tax, due to their skeptical prior attitude against it.
- Respondents intentionally mis-report their beliefs, due to uncertainty or to justify their opposition to the tax.

Determinants of correct updating

See prediction's precision

Table: Asymmetric updating of winning category

	Correct updating (U)		
	(1)	(2)	(3)
Winner, before feedback ($\dot{G}$)	0.695***	0.685***	0.646***
	(0.078)	(0.080)	(0.080)
Initial tax: PNR (I don't know)			0.163***
			(0.031)
Initial tax: Approves			0.158***
			(0.046)
Retired		0.143*	0.146*
		(0.080)	(0.079)
Active		0.165***	0.175***
		(0.055)	(0.054)
Student		0.249***	0.234***
		(0.076)	(0.075)
Yellow Vests: PNR		−0.048	−0.043
		(0.047)	(0.047)
Yellow Vests: understands		−0.090***	−0.063*
		(0.034)	(0.034)
Yellow Vests: supports		−0.101***	−0.059*
		(0.035)	(0.036)
Yellow Vests: is part		−0.172***	−0.137**
		(0.062)	(0.062)
Among invalidated	✓	✓	✓
Controls: Socio-demo, politics, estimated gains		✓	✓
Observations	1,365	1,365	1,365
R^2	0.055	0.111	0.133

*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"
	OLS		*logistic*	*OLS*
	(1)	(2)	(3)	(4)
Info on Environmental Effectiveness (Z_E)	0.043**	0.063***	0.052***	0.059***
	(0.017)	(0.018)	(0.018)	(0.014)
Info on Climate Change (Z_{CC})	0.044*	0.041*	0.043*	0.029
	(0.024)	(0.024)	(0.024)	(0.018)
Info on Particulate Matter (Z_{PM})	0.039	0.029	0.037	0.017
	(0.024)	(0.024)	(0.024)	(0.019)
$Z_{CC} \times Z_{PM}$	−0.040	−0.033	−0.042	−0.005
	(0.035)	(0.034)	(0.033)	(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 over progressivity

- Random information on Progressivity: "this reform would increase the purchasing power of the poorest households and decrease that of the richest, who consume more energy" (1/2 of respondents)
- Is the reform beneficial to the poorest?
- No effect of the info (correlation: -0.006)

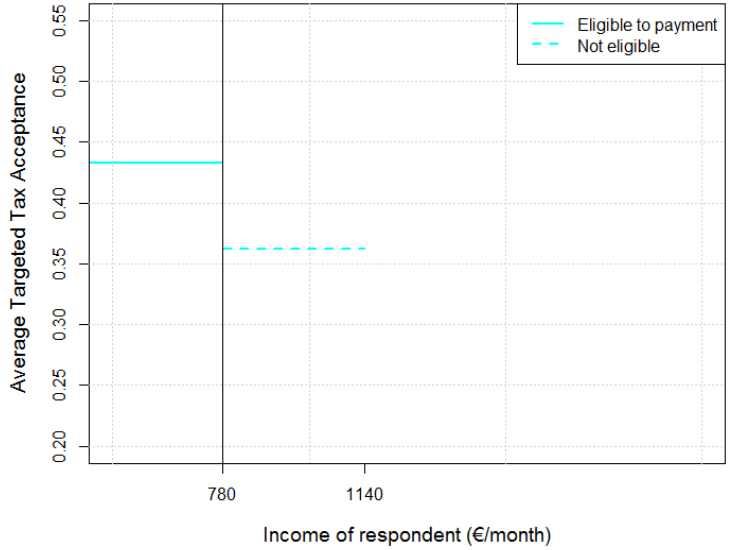
More on this

Tax & Targeted Dividend: questions

- $+50€/tCO_2$
- 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?

▸ Descriptive stats

Tax & Targeted Dividend: a primer



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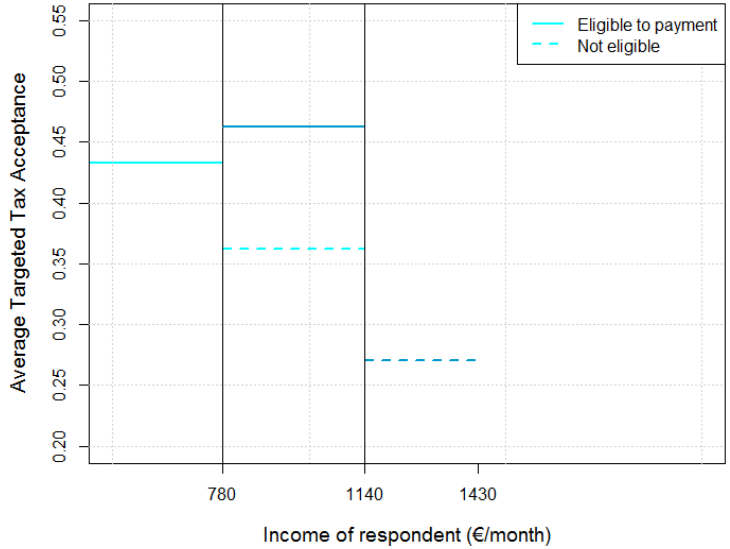

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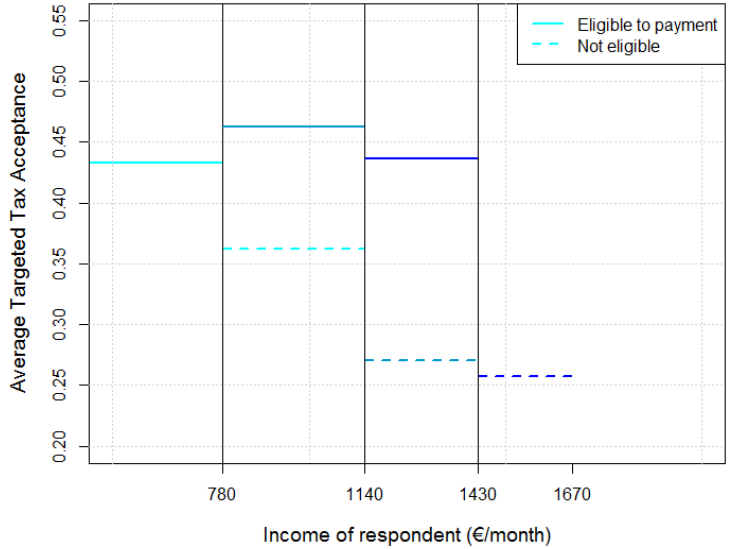

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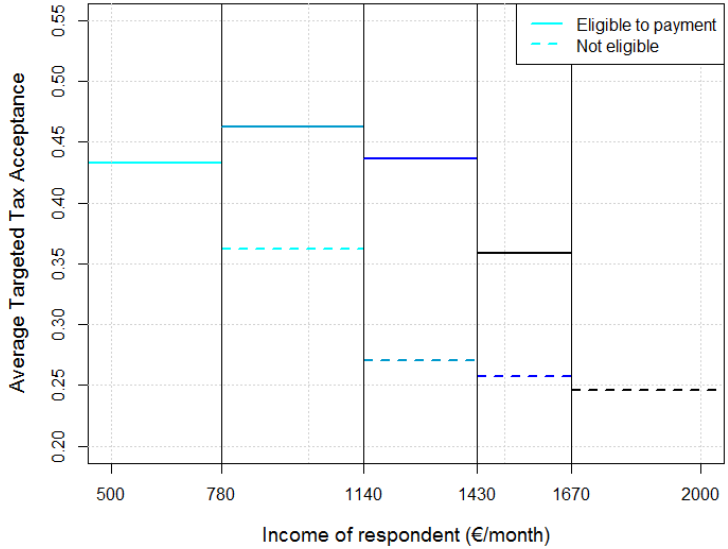

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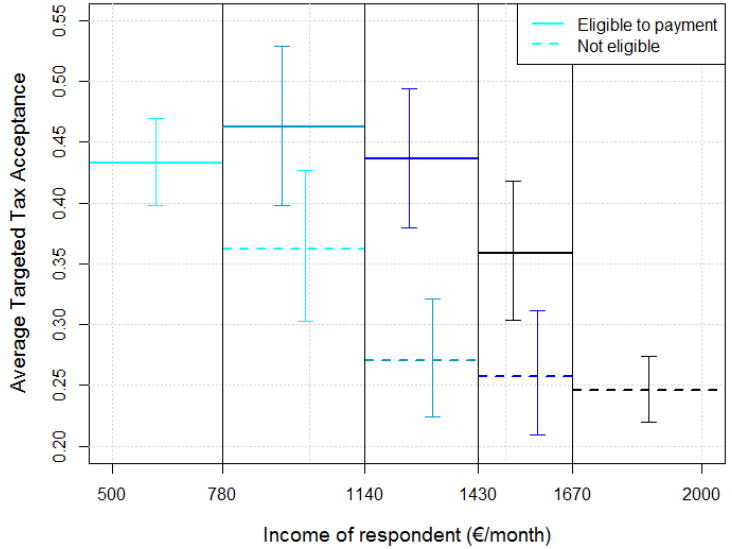

Self-interest - Results

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***	0.567***	0.443***	0.431***	0.517***	0.434***
	(0.092)	(0.092)	(0.014)	(0.018)	(0.170)	(0.135)
Initial tax Acceptance (A^I)		0.339***	0.360***	0.342***		0.428***
		(0.033)	(0.026)	(0.034)		(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.

$\Rightarrow$ LATE around 57 p.p. $>$ ATE around 44 p.p.

▸ First stage results

Environmental effectiveness - Results

Table: Effect of believing in environmental effectiveness on acceptance

	Tax Acceptance (A^I)					Tax Approval ($\dot{A}^I$)
	IV	*IV*	*OLS*	*logit*	*IV*	*IV*
	(1)	(2)	(3)	(4)	(5)	(6)
Environmental effectiveness: not "No"	0.479**	0.515	0.391***	0.370***		
	(0.230)	(0.344)	(0.015)	(0.018)		
Environmental effectiveness: "Yes"					0.505**	0.416**
					(0.242)	(0.168)
Instruments: info E.E. & C.C.	✓	✓			✓	✓
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.

$\Rightarrow$ LATE around 50 p.p. $>$ ATE close to 40 p.p.

▸ First stage results

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

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 ($\dot{A^P}$) on *"Yes"*	
	OLS			*logit*	*OLS*	
	(1)	(2)	(3)	(4)	(5)	(6)
Progressivity (P)	0.223***	0.237***	0.560***	0.544***	0.228***	0.482***
	(0.038)	(0.044)	(0.023)	(0.019)	(0.041)	(0.023)
Winner (G^P)	0.332***	0.332***			0.303***	
	(0.020)	(0.020)			(0.019)	
Effective (E)	0.258***	0.259***			0.244***	
	(0.023)	(0.023)			(0.020)	
($G^P \times E$)	0.127***	0.127***			0.126***	
	(0.034)	(0.034)			(0.037)	
Interaction: winner ($P \times G^P$)	0.183***	0.183***			0.098**	
	(0.050)	(0.050)			(0.048)	
Interaction: effective ($P \times E$)	0.172***	0.172***			0.281***	
	(0.057)	(0.057)			(0.059)	
Income (I, in k€/month)	0.017	0.018			0.037**	
	(0.022)	(0.022)			(0.018)	
Interaction: income ($P \times I$)		−0.008			−0.019	
		(0.013)			(0.014)	
$P \times G^P \times E$	−0.400***	−0.399***			−0.314***	
	(0.072)	(0.072)			(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

Key results

1. French people would largely reject a carbon tax policy with uniform lump-sum transfer
2. They have pessimistic perceptions of the properties of the scheme:
   - they over-estimate the negative impact on their purchasing power;
   - they do not think it is environmentally effective;
   - they wrongly perceive it as regressive.
3. 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.
4. Nonetheless: if one could convince them, the scheme would reach majority acceptance.
   - Self-interest and environmental effectiveness are critical motives of acceptance: each $\simeq +$ 50 p.p. in likelihood to accept.
   - Suggestive evidence shows motives are complementary: 90% approval among those who share the three beliefs, 65-75% for two beliefs

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Thank you !

bit.ly/carbon_tax_aversion

6 Appendix

Categories of winners and losers

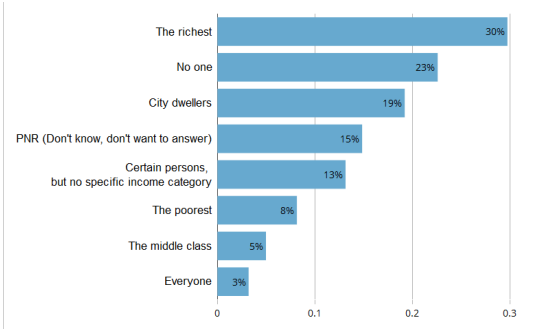


Figure: winners

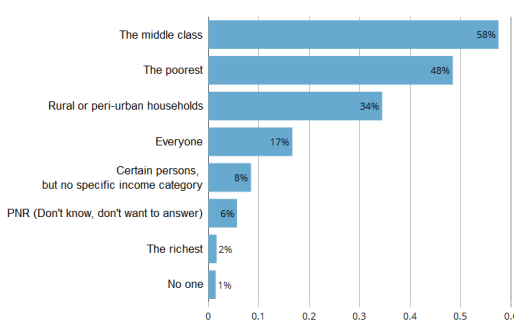


Figure: losers

Go back

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***		−0.634
	(1.237)		(1.489)
Housing energy: Gas	124.6***		1.173
	(1.037)		(2.323)
Housing energy: Fuel oil	221.1***	129.8***	130.4***
	(1.719)	(3.752)	(4.002)
Accommodation size (m^2)	0.652***		0.024
	(0.012)		(0.015)
Accommodation size × Gas		1.425***	1.397***
		(0.007)	(0.024)
Accommodation size × Fuel oil		0.945***	0.922***
		(0.029)	(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

Go back

Prediction's precision

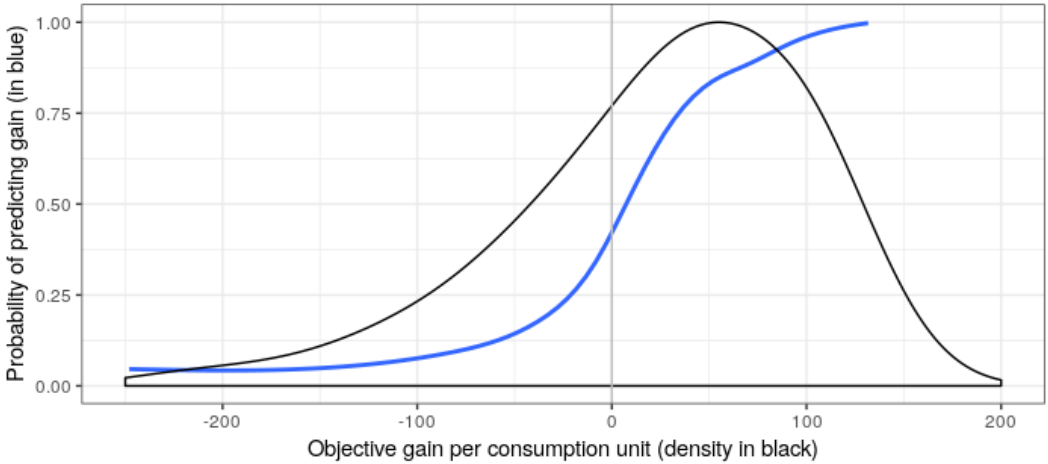


Figure: Probability that our estimation of net gains correctly predicts the winning category.

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***	0.227***		
	(0.028)	(0.027)		
Transfer to spouse (T_2)	0.180***	0.174***		
	(0.031)	(0.030)		
$T_1 \times T_2$	−0.190***	−0.161***		
	(0.038)	(0.037)		
Initial tax Acceptance (A^I)		0.163***		0.333***
		(0.033)		(0.038)
Simulated winner ($\widehat{\Gamma}$)			0.217***	0.210***
			(0.036)	(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

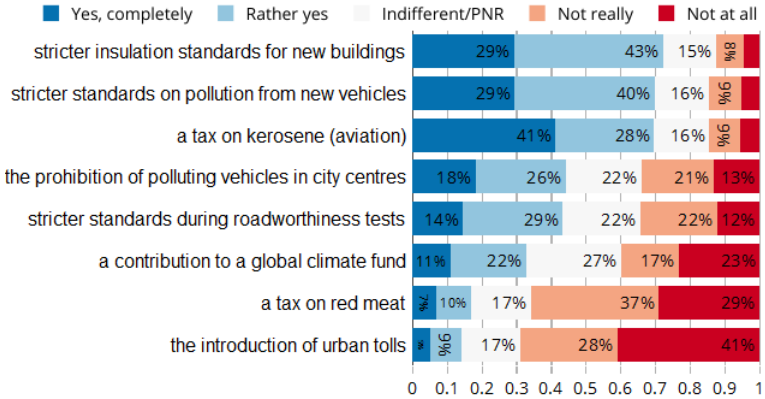
Table: First stage regressions results for environmental effectiveness

	Environmental effectiveness		
	not "No"		"Yes"
	(1)	(2)	(5,6)
Info on Environmental Effectiveness (Z_E)	0.062***	0.043**	0.059***
	(0.017)	(0.017)	(0.014)
Info on Climate Change (Z_{CC})	0.030*	0.024	0.028**
	(0.017)	(0.017)	(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

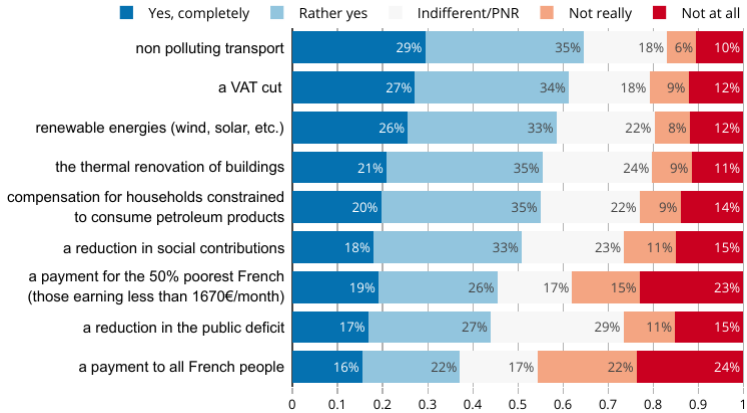
Go back to second stage

French favored environmental policies



Go back

French favored redistribution of tax carbon revenue



Go back

Subjective elasticities

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

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 small to explain the beliefs.

Go back

Table: Share of respondents with new beliefs aligned with feedback

	Aligned with feedback: $G^F = \hat{\Gamma}$	
	$\hat{\Gamma} > 0$ (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%]

Persistence of belief over progressivity

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

$\Rightarrow$ 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***	0.435***	0.386**
	(0.022)	(0.033)	(0.186)
Information on progressivity (Z_P)	−0.021	0.050	0.014
	(0.027)	(0.040)	(0.239)
Large bias ($\left\|\widehat{\gamma} - g\right\| > 110$)		−0.028	−0.019
		(0.045)	(0.045)
Interaction $Z_P \times (\left\|\widehat{\gamma} - g\right\| > 110)$		−0.130**	−0.126**
		(0.055)	(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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Descriptive statistics on income targets

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

Targeted percentiles (c)	≤ 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
Expected proportion of respondents	*.349*	*.156*	*.156*	*.339*

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