Preferences and Social Norms in Environmental Regulations.

Thesis defence of Zélie Gankon

Paris Dauphine University - Ecole Doctorale SDOSE

June 27, 2025

Members of the Jury	
Karine Nyborg	Univ. of Oslo – *Referee*
Katheline Schubert	Univ. Paris 1 Panthéon Sorbonne – PSE – *Referee*
Stéphanie Monjon	Paris Dauphine Univ. – PSL – *President of the jury*
Adrien Fabre	CNRS – CIRED – *Reviewer*
Alejandro López-Feldman	Univ. of Gothenburg – EfD – *Reviewer*
Anna Creti	Paris Dauphine Univ. – PSL – *Thesis director*
Ahmed Tritah	Univ. of Poitiers – *Thesis director*

Context

Misalignment between States actions and citizens' acceptance.

Motivation

"Climate change is the greatest market failure we've ever seen, but action can also create growth and jobs."

Nicholas Stern, The Stern Review on the Economics of Climate Change, 2006

→ **Urgent need to find and understand the ingredients for an effective climate transition.**

Motivation

"Climate change is the greatest market failure we've ever seen, but action can also create growth and jobs."

Nicholas Stern, The Stern Review on the Economics of Climate Change, 2006

→ **Urgent need to find and understand the ingredients for an effective climate transition.**

1. **Environmental awareness;**
   - Impressive growth during the last decades
   - Good perception of climate risk
2. **Acceptability of environmental policies by the economic agents;**
   - Willingness to feel concerned about climate challenges.
   - Adjustment of behaviours.

This thesis

Market organisation

Green preferences and votes for environmental quality.

Social Behaviour

Social norms and environmental compliance.

Geographical scale

Climate change opinion.

Chapter 1

Environmental Preferences and Product Quality in Collective Decision-Making.

Single authored

Motivation

- Low acceptability of norms imposed by social regulators,
- But growing environmental pressure,
- A potential solution: collective decisions.

Figure: A collective decision process, "C'est Qui Le Patron?!"

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- But growing environmental pressure,
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Research question

What level of environmental quality individuals are ready to vote on a product market ?

Contribution

1. Green consumption: consumption that ensures the conservation of environmental resources.
   - Increases in environmental awareness and the reactions of the market: García-Gallego and Georgantzís (2011);
2. Voting procedure: democratization of a quality level.
   - Endogenization of the pollution level, then a tax, through a majority voting: **Ambec and De Donder (2022)**

     → Citizens vote for their instrument's level, with production and consumption decisions taking place later on.
   - Vote of a market structure: **Kalhoul et al (2017)**

     → Bi-dimensional characterisation of the individuals

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This chapter:

- Alternative market structure where individuals vote for a continuous quality;
  - Institutional context compared with a no-voting procedure.
- Collective choice of quality, based on individual characteristics of preference for environmental quality.
  - Type of consumer directly linked to their willingness to pay for +/- green products.

Model

Game theory approach

- Consumers, characterised by **preference for environmental quality**;
- Extension: Workers characterised by **sensitivity to effort.**

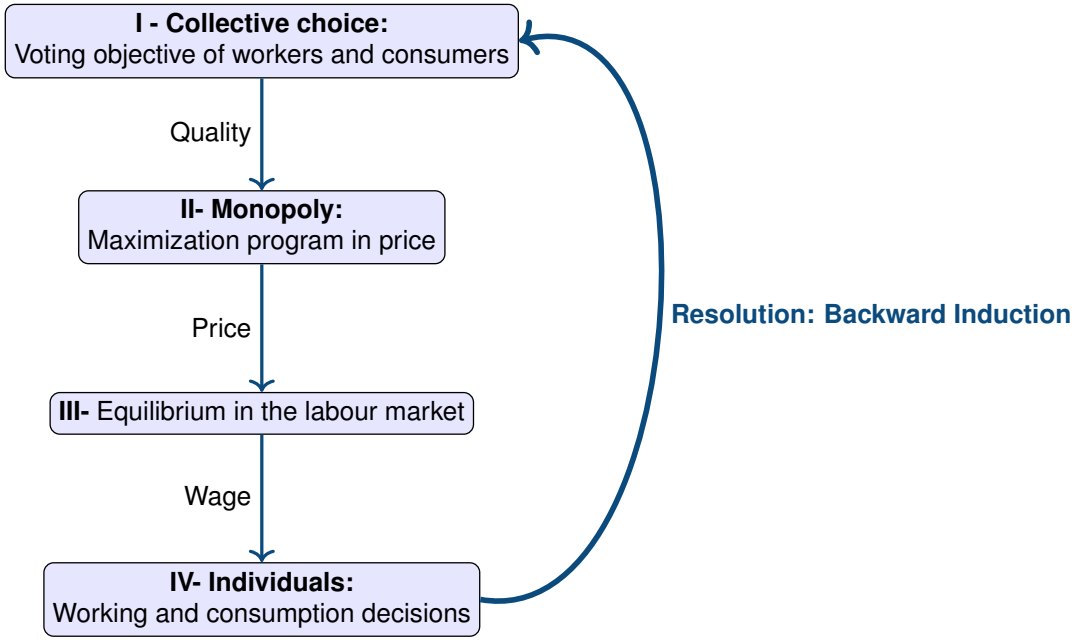

Figure: Steps of the game.

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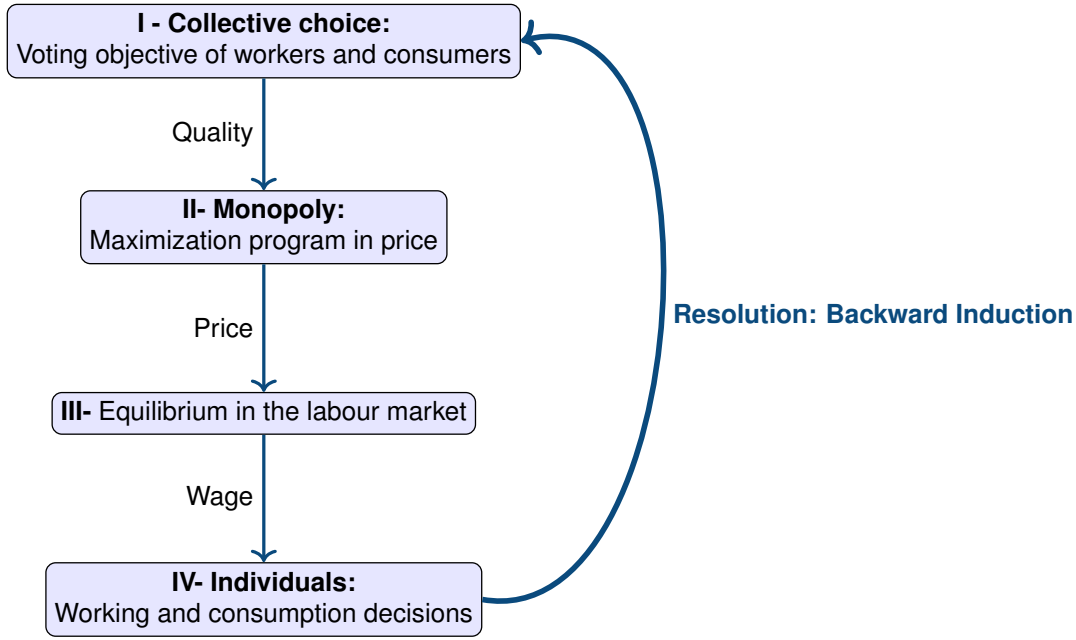

Figure: Steps of the game.

I- On the continuum of the quality variable, citizens signal the level that maximizes their utility: **Trade-off in levels of quality chosen, given the price and the wage.**

II- From the votes, produced quality at the median of what is feasible: coherent with the working and consumption decisions.

Results

Distortion effect of sensitivity

Optimal individual quality

↑ **Increases** with the personal sensitivity to the environmental quality;

↓ **Decreases** with the personal sensitivity to effort.

- In comparison with **Perfect competition.**

Collective choice

- **Median voter:** quality based on the latitude of preference for quality in the population.

⇒ Perspectives for the implementation of accepted production processes.

- Particular fit for single-consumption goods per period: cars, household electricity.

Chapter 2

Environmental Compliance in Fishing Regulations: a Social Norms perspective in Ghana.

Co-written with Anna Creti and Ahmed Tritah.

Motivation

Compliance in environmental regulations

In emerging societies:

- Informal mechanisms
- Behaviours induced by social norms can have substantial environmental impacts.

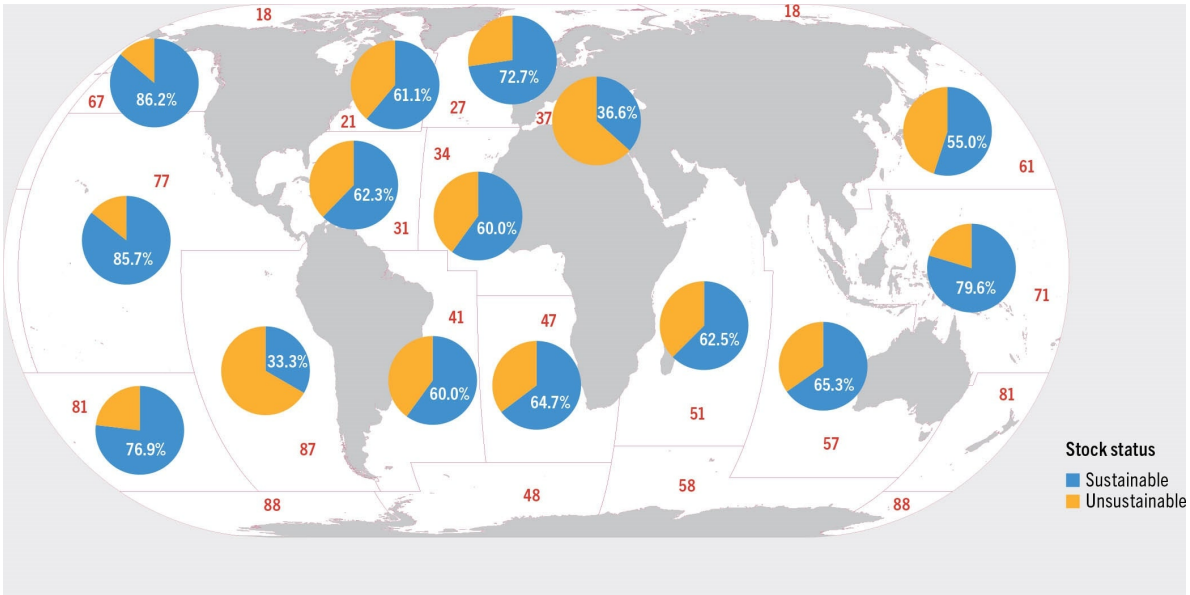

Figure: 37.7% of fishery stocks are unsustainable (FAO, 2021).

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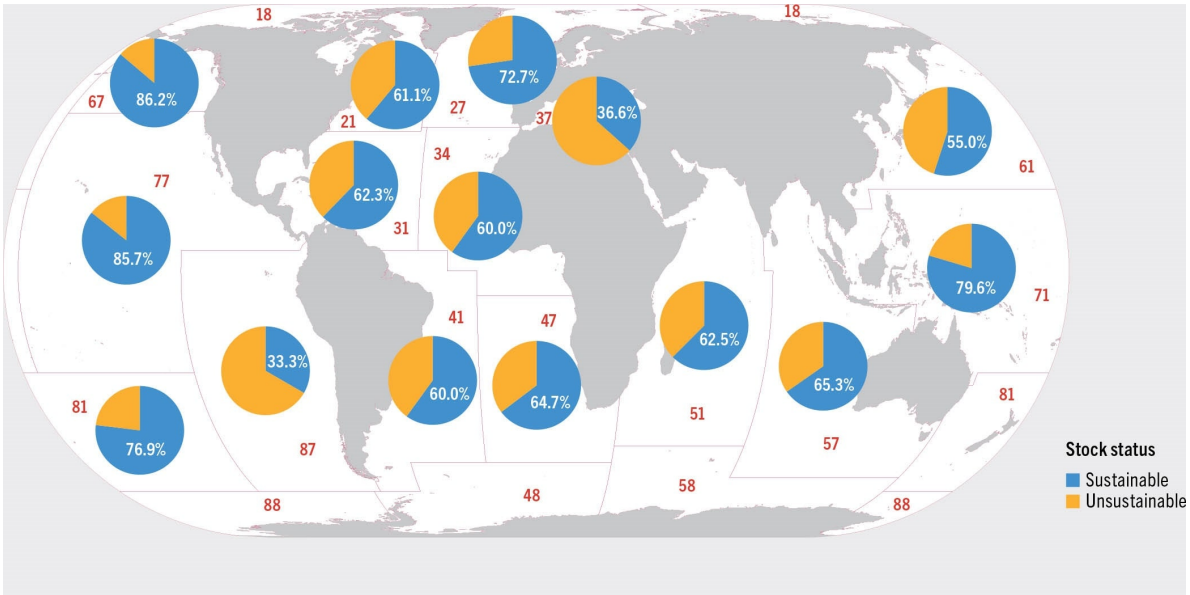

Figure: 37.7% of fishery stocks are unsustainable (FAO, 2021).

Research question

How do social norms affect fishers' decisions to participate in illegal activities?

Contribution

Background:

1. **Compliance in environmental regulations:** first attempts.
   - Burby and Paterson (1993);

2. **Social aspects of pro-environmental behaviour:**
   - Recycling attitude: Czajkowski, Hanley, Nyborg (2017)
   - Fishing activities: Dresdner et al, 2015

Contribution

Background:

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   - Fishing activities: Dresdner et al, 2015

Contribution

A social norms approach to explain environmental compliance in a fishing regulation, using a hybrid choice model.

Data

Artisanal Marine Capture Fisheries in Ghana

- *Saiko* fishing: illegal fishing targeting small fish.
  → **Negative economic and ecological consequences**.

- Surveys conducted in coastal fishing communities in western and central **Ghana between Aug. and Oct. 2020.** *410 fishermen.*

Akpalu, W. (2023). Conspiring to Violate Fishing Regulation: The Case of Saiko Fishing in Ghana (Fishermen) (Version 1) [Data set].

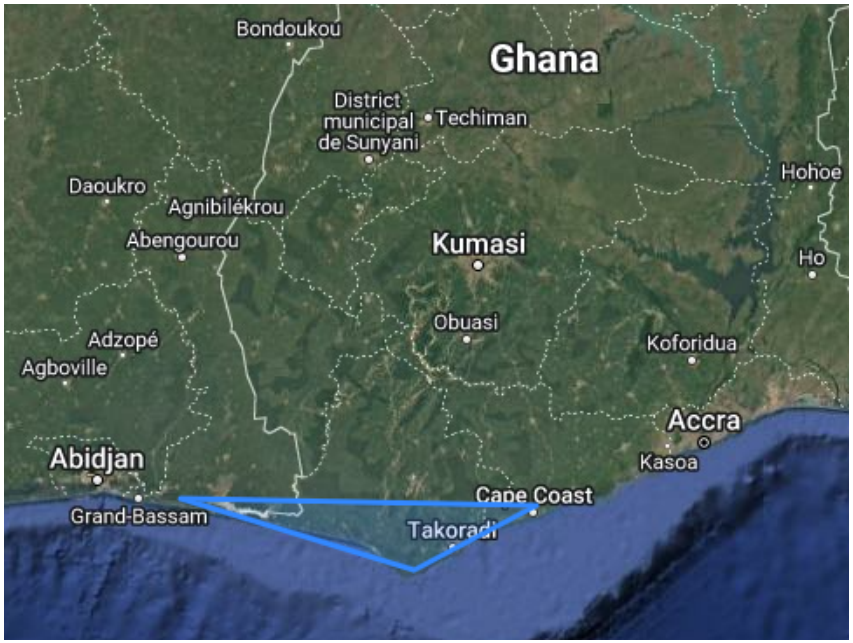

Figure: Surveyed area.

Methodology challenge

How to infer norms.

Assumption: Some unobservable characteristics may affect the decision to comply.

Hybrid Choice Model (Discrete Choice Model with the integration of a Latent Variable)

Structural Equation

Latent variable (social norm)

↓

Observable exogenous characteristics

Measurement Equation

Indicators (responses in survey: guilt, opinion on ban, opinion on others' ban)

↓

Latent variable

Choice Equation

Joint probability of the choice and psychometric indicators.

Results

Social norms identified

Fishing social norm: Relative and perceived behaviour with respect to Saiko activity.

Structural Equation

Definition of the fishing social norm:

- ↑ Age;
- ↓ Years in the community;
- ↓ Education;
- ↓ Important position.

Measurement Equation

Most important indicator to identify the social norm: fishermen's opinion on others' ban

Choice Equation

The fishing social norm ↓ probability of engaging in Saiko fishing.

Uncovering Climate Change Opinion: Weather Events and Economic Factors.

Single Authored

WP Climate Economics Chair, N°2025-09

Job Market Paper

Motivation

- **Globalised aspect of concerns on climate change**

- Importance of understanding and integrating public behaviour (and support),
  - For the acceptability of costly adaptation and mitigation activities,
  - For the scaling up of actions to limit global warming.

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Research question

How do exposure to extreme weather events and socio-demographic characteristics affect climate change opinion?

Contribution

- **Attitude and climate change policies:** Tjernström and Tietenberg (2008).
- Importance to **better understand citizens attitude** towards climate policies, in order to achieve ecological transition: Dechezleprêtre et al (2025) in 20 countries;
- **Role of extreme climate events in shaping opinion on climate**: repeated drought events (Zappalà, 2022).

In this chapter:
Extensive dataset (192 countries) to explore the global aspect of climate change opinion.

Awareness
Declared knowledge on climate change.
e.g. How much do you know about cc ?

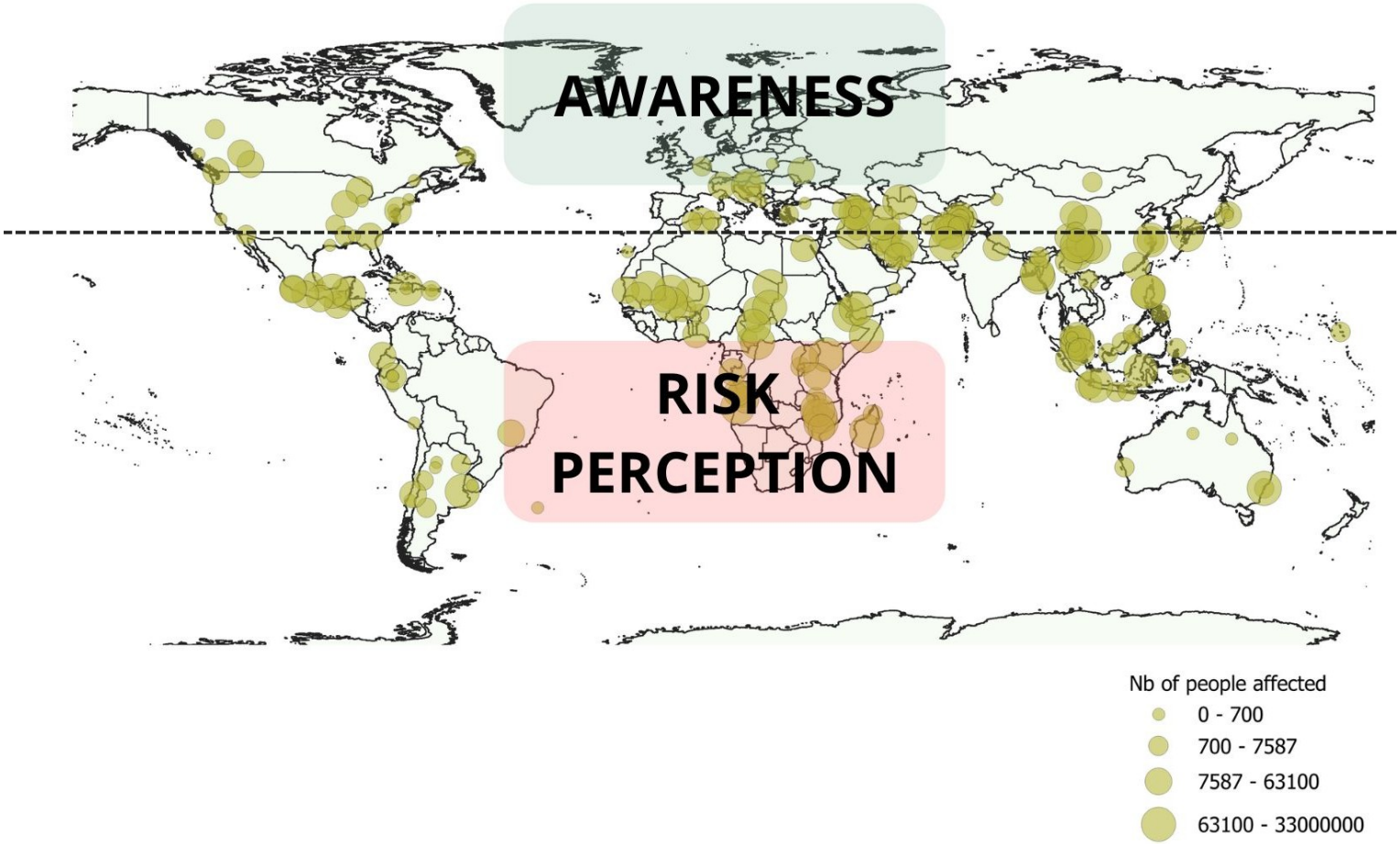
Risk perception
Perceived harm of climate change.
e.g. How much to do you think cc will harm you personally ?

Data

1. **Climate Change Opinion Survey**
   - *By Meta & YCCC on Facebook*
   - 192 countries, 108946 individuals.
   - Climate awareness, economic impact, gvmt priority, country responsibility, etc.
2. **EM-DAT**
   - Climatic events: Drought, flood, storm, earthquakes, extreme temperatures, landslides, glacial lake outburst, mass movement, wildfire.
3. **Macro data - World Bank**
   - Agriculture, forestry, and fishing, value added (% of GDP); food insecurity; Political Stability; GDP per capita; Population growth.

Results

The North/South divergence



Results

Awareness

- Higher recurrence of weather events, higher awareness;
- Stronger effect for Middle and High Income Countries, and Individuals aged below 30;
- Higher level of education, higher awareness.

Risk perception

- Effect of weather events depending on the measure used;
- Positive effect for Low and Middle Income countries, and areas with high frequency of weather events;

General conclusion

This thesis aimed at exploring **various economic and social aspects of climate change.**

1. **Collective choice of an environmental quality**
   $\Rightarrow$ Democratization process
2. **Environmental compliance** in the specific case of the marine ecosystem
   $\Rightarrow$ Important role of social norms in the decision to comply and in the intensity of illegal activities.
3. **Climate change opinion around the world**
   $\Rightarrow$ Extreme weather events in shaping behaviour.

$\rightarrow$ **Multiplicity of topics and methods.**

Policy implications

Preferences and Social Norms in Environmental Regulations: What now ?

⇒ **Considering more extensively bottom-up approaches**.

Collective choice of quality

- Democratization of production processes;
- Enlarge environmental preference;
- Narrow sensitivity to effort.

Informal approach of compliance

- Monitoring inside of communities,
- Training the leaders;
- Closer look on the marine ecosystem.

Climate Change communication

- Improving knowledge and informing on the risks attached;
- Climate sciences in school curricula.

Future research avenues

Chapter 1

- **Try different distributions** of the main parameters in the population.

Chapter 2

- **Panel data** to capture the evolution of norms and the exploitation of marine resources.

Chapter 3

- Geolocalised survey data;
- Differentiation of climate events.

Preferences and Social Norms in Environmental Regulations $\rightarrow$ **Root to questions of Climate Justice.**

Thank you for your attention.

Discussion.

Discussion (1)

1 Market structure

- Parameters of sensitivity to effort and preference for environmental quality independent in their definition.
- People can adopt a pro-environmental behaviour or status-quo;
  $\Rightarrow$ Absence of other alternatives in consumption.

2 Collective choice

- Vote of the environmental quality: direct power on the consumers side
  $\hookrightarrow$ Alternative, vote of the producer between two different level of qualities.
  - Change from a continuous quality variable to a discrete one : restriction of the possibilities in terms of quality.
  - Exercise done here and mentioned in previous papers, but attempt here to explore interior solutions.
- Consumers who don't purchase the good choose a quality level that is not achievable by the firm(s).
  $\hookrightarrow$ Vote restricted.

3 Examples

- Private goods: cars, sustainable fuels

Discussion (2)

1. **Climate Change Opinion Survey (Meta, YPCCC)**
   - 192 countries (including 83 gathered in regions)
   - Representativeness of the survey
   - Comparison with other surveys (World Values Surveys, Afrobarometer): Nb of observations; distribution rural - urban areas, age.
2. **Interpretation of the results**
   - EWE and Risk perception: internalised differentiation between *man-made* climate change and *natural* climate change
   - Temporal effect
     $\Rightarrow$ Frequency of the events per country as driver of opinion
     $\Rightarrow$ Control for the memory of the respondents
   - Spatial effect
     $\Rightarrow$ Need for geolocation data or data at a smaller level of stratification (India case study).