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# Consumers' preferences and environmental tax: results from an experiment with milk

**Maïmouna Yokessa and Stéphan Marette**

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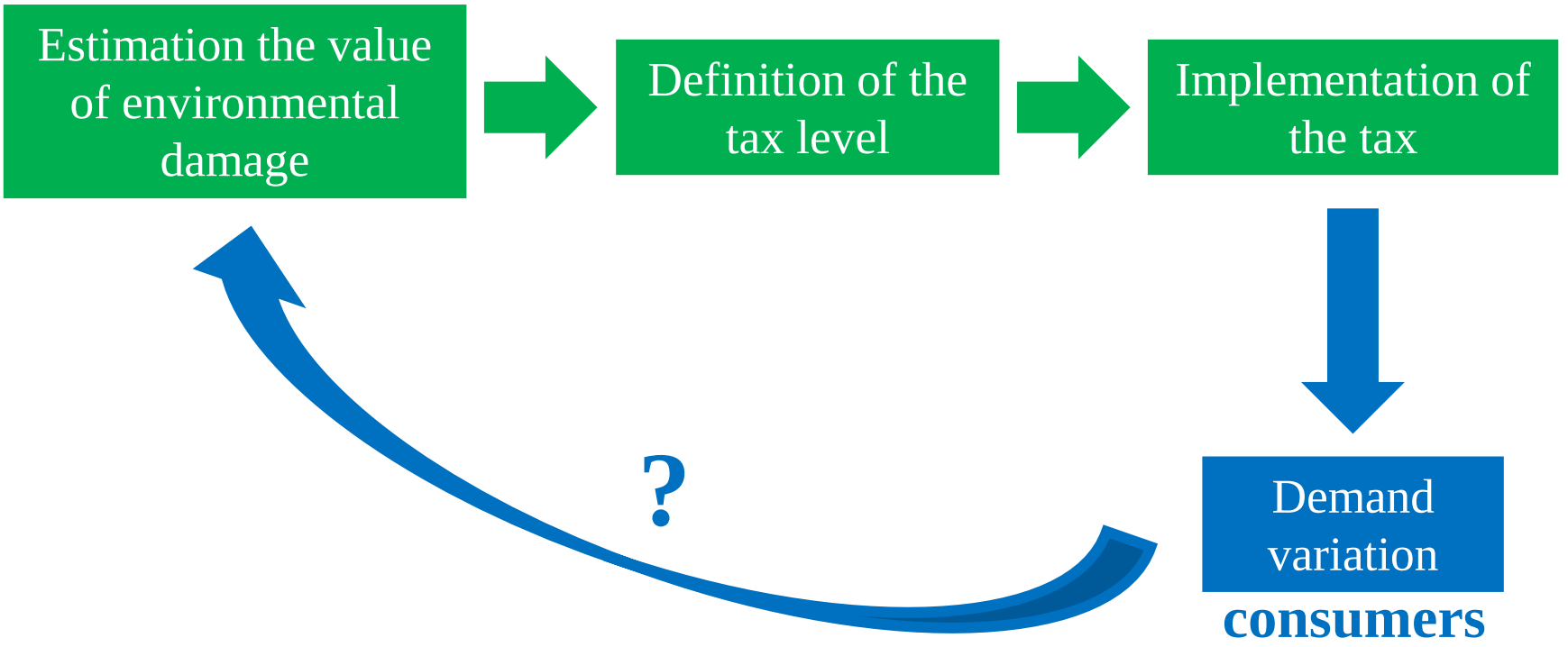
# Summary

1. Introduction
2. Methodological framework
3. Application to milk in France
4. Final remarks

# 1. Introduction



# 1. Introduction

- **Difficulties to estimate a pigouvian tax and its effect on market adjustments** : Borger & Glazer (2017), Gahvari (2014), McAusland & Najjar (2015) and MacKenzie & Ohndorf (2016)

- **Tax aversion and implementation limits** : Kallbekken et al. (2011), Sarr et al. (2016) and Lanz et al. (2017)

# 1. Introduction

- How can we estimate a tax considering **consumers' preferences** and valuation of **environmental impacts?**

- How **experimental methods** can help :
  - to take into account **market adjustment**?
  - to estimate the effect of the **internalization of environmental information?**

# 2. Methodological framework

## 2.1. Internalization of environmental impacts

1. To select **several substitutes of a good**, having different environmental impacts
2. To define a **robust, non-hypothetical** and **incentive-compatible** experiment method
3. To elicit **consumers' willingness-to-pay** (WTP), without and with **information**

# 2. Methodological framework

## 2.2. Consumer's surplus

Initial consumer's surplus (CS) :

$$CS^i = \max\{WTP_{1,i} - P_1, \dots, WTP_{j,i} - P_j, 0\}$$

CS variation with tax and subsidy :

$$\Delta CS(t,s) = \sum_{i-1}^{N} \left[CS^i(\mathrm{t},\mathrm{s}) - CS^i\right]/\mathrm{N}$$

The optimal tax and subsidy scenario is the one **maximizing** $\Delta \boldsymbol{CS}(\boldsymbol{t},\boldsymbol{s})$

# 3. Application to milk in France

## 3.1. Why milk?

- Cattle breeding is responsible **half of total agricultural GHGE** (92% of the methane)
- **High consumption** in France
- **Organic** and **plant-based** substitutes

**2 environmental dimensions :**

- GHG emissions
- Chemical pollution

# 3. Application to milk in France

## 3.2. Experiment

**RCM**


Cow's milk

Regular

**OCM**


Cow's milk

Organic

**RSM**


Soy milk

Regular

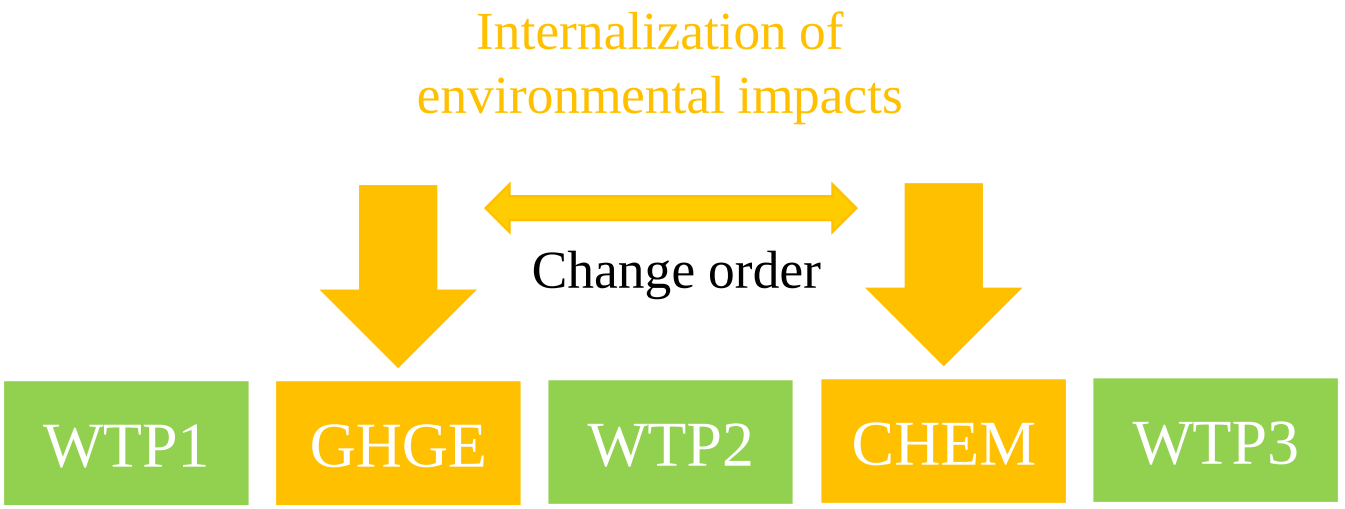
**OSM**


Soy milk

Organic

# 3. Application to milk in France

## 3.2. Experiment



# 3. Application to milk in France

## 3.3. Main results

**Best scenario :**

- **Tax** on RCM and RSM : **0.40€**
- **Subsidy** on OCM and OSM : **0.10€**

➔ **Decrease purchases** of RCM and RSM **:**

- ➔ **lower chemical pollution**
- ➔ **lower GHGE**

# 3.3. Comparison with IPCC carbon prices

Intergovernmental Panel on Climate Change suggests **carbon prices** (IPCC, 2014) :

- 40 dollars/tonCO2eq in 2020
- 140 dollars/tonCO2eq in 2040

**Carbon tax** equivalent for 1liter cow's milk :

- **0.03€** for 40 dollars/tonCO2eq
- **0.12€** for 140 dollars/tonCO2eq

➔ **Too low** to change consumer purchase

# Final remarks

- This method allows to approach an environmental tax based on consumers' preferences, **avoiding bias due to tax aversion** and **considering substitutes** and **market choice**.

- For milk, **taxing chemical contamination** seems to be a better way to decrease GHG emissions, than taxing emission directly.

- Further work need to be done to **higher the robustness** of the method.

# Thank you

## Questions and comments

maimouna.yokessa@inra.fr

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# 3.2 Experiment

**Exemple : Message about GHG emission**

“Cows emit methane, which is a greenhouse gas. In France, they emit 92% of the methane produced by agricultural activities. Greenhouse gases contribute to global warming. The production of soybean in France emits very little greenhouse gas”