The European Transport Research Alliance - ETRA

Session II: Transport mitigation issues

Ariane Dupont-Kieffer

EVALUATION FRAMEWORK OF GREENHOUSE GAS REDUCTION MEASURES IN THE TRANSPORT SECTOR:

How much? How soon? How to decide?

Outline

I. Why Economic Evaluation on Climate Change?
II. Challenges to Economics when dealing with Climate Change
III. Equity and Adaptation as solutions?

PHARE-University Paris 1 Panthéon-Sorbonne. DEST/Ifsttar

Part I

WHY ECONOMIC EVALUATION ON CLIMATE CHANGE?

Thinking outside the market

GHG emissions = External effects: private decisions may lead to inefficient allocation of resources with a huge impact on the welfare function

AND

Climate change and its consequences are

- Public Goods

– Are neither excludable nor rival.

- Common Resources

– Are rival but not excludable.

  - Something of value with no price attached to them, like externalities.

Thinking outside the market

Estimating the cost of climate change and the cost of strategies aiming to reduce negative externalities of transport systems allows

1. evaluating their feasibility and acceptability, in the short and long terms,
2. discriminating and prioritizing among measures within the transport sector, but also among sectors and among nations and regions, especially with a climate change focus

A focus today on methodological and empirical issues when tackling with the economic evaluation GHG reduction strategies in the transport sector

- TO GIVE A MEANING TO SOMETHING THAT HAD NOT A PRICE AND THAT IS PRICELESS

Part II

CHALLENGES TO ECONOMICS WHEN DEALING WITH CLIMATE CHANGE

The Magnificent 7

1. time scale and spatial scale
2. rebound effects
3. discrepancy in price elasticities between the short and the long term
4. end-user or societal perspective
5. discount rate
6. methodology to monetize externalities on environment, human capital and economic growth
7. price dynamics of energy and carbon

New approaches

- A cost effectiveness framework and abatment costs
  - ABT COST = *Invt* – NPV (lifetime fuel cost savings)/lifetime CO_2 emission reduction

Numerator can be
$I^{an} + \Delta_{O\&M} - \Delta_{fuel\ costs}$ – secondary benefits
(Invt+ added maintenance-fuel costs--secondary benefits) (Bloch, 2001)

- The target consistent approach

> > > Need to define the baseline scenario

New approaches

- Abatement costs to be then balanced with economic and political factors: energy independency, road safety, and strategic industrial stakes (especially in the national economies relying on cars production)
- Sensibility to parameter variation in abatement computation
- Need for indicators of annual evolution of GHG emissions
- Implementing strategies: identify actors, barriers + tools

PART III

EQUITY AND ADAPTATION AS SOLUTIONS?

Introducing Adaptation

- Combination of mitigation and adaptation policies
  - Think maintenance of infrastructure as Investment
  - Set innovative in relation of mobility plans
  - Favour adaptation measures that drive to reduction of GHG emissions > > > > Conditionnal Approach

Introduction Equity

- To think about:
  - the common good to share
  - the rule to aggregate and compare individual welfare
  - the rule of sharing and re-allocating
  - > > > **GOAL = TO INCREASE THE WELFARE OF THE SOCIETY**

- **Example of common good**:
- Ex. in ***health economics*** >>>>>>>>
  - 2 dimensions = Quality of life and duration of life = Criteria of utilitarism
- Ex. in ***transportation***>>>>>>>>
  - 2 dimensions= accessibility and low carbon
  - **DEFINITION**:
    - A transport project= benefits **IF** it increase the welfare of the society i.e. **IF** it produces a certain positive amount of dimension 1, adjusted by the dimension 2, for the lowest cost possible.

Equity imposes

- 4 types of equity approaches:
  - Harsanyi: Utilitarism
    - utilitarist and teleologic values=
  - > > > > > > **EFFICIENCY**
  - Sen and Rawls: Egalitarism
    - deontological values=
  - > > > > > > **DUTY**

+ + + Prioritism and sufficientarism: deontological values

Equity solves

1. The relevant discount rate: uncertainty framework + the societal one or the end-user perspective

2. Monetize the indirect impacts

3. Time horizon, and taking into consideration fossil energy disappearance time horizon, Greenhouse cycle. Dynamics of fossil energy prices

4. Definition of the baseline case or reference case, especially when combining technological and behavioural levers

Thank you !

ariane.dupont-kieffer@univ-paris1.fr

http://www.teacost.eu/