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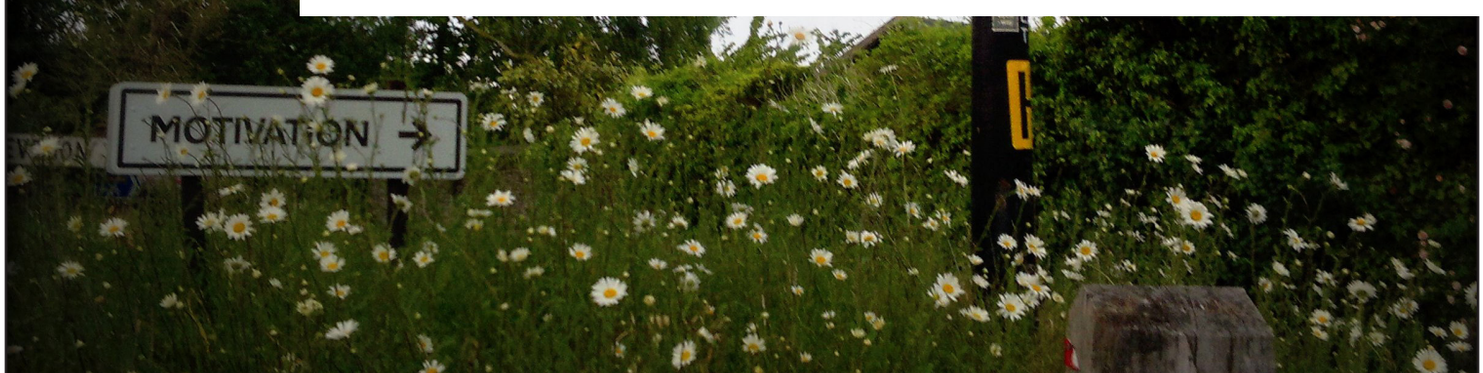

Economic incentives – useful, but not sufficient for meaningful mitigation efforts

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As people and countries around the world wrestle with options to reduce greenhouse gas (GHG) emissions, mitigation efforts must accelerate faster than ever if we want to stabilize the atmospheric GHG concentration at 450 ppm CO_2-equivalents. Economic incentives for achieving this stabilization target have received much attention. However, the effectiveness and efficiency of such measures depends on numerous determinants, including how relevant institutional frameworks can influence the economic behaviour of market agents and people in general, whose decisions and transactions are often based on imperfect information.

Evaluation of economic policy incentives

Economic or fiscal incentives (or disincentives) are widely used policy instruments to achieve a given desired outcome. Examples of such incentives are taxes, subsidies, soft loans, rebates, emission allowances, and public procurement programmes. These kinds of policy means are also used in pursuing the reduction of GHG emissions (e.g. tradable permits combined with an emission cap)..

There is a wide variety of ways to assess how well such instruments perform (both in theory and practice) but a comprehensive picture is often difficult to obtain and a variety of methods is often required. One may consider their cost and environmental effectiveness, distributional equity, and institutional feasibility. The 5th IPCC Assessment Report (AR5) attempts to capture the performance of economic incentives also in terms of economic efficiency (i.e. maximisation of the difference between total social benefits and costs), administrative burden (i.e. the human and financial resources required by policy administrators) and transaction costs (i.e. extra costs – other than the price – to be paid by market actors in order to initiate and complete transactions).

Overall, the evidence shows that economic incentives are not a panacea to reduce GHG emissions. Numerous factors affect their performance. These include the level of ambition (e.g. emission caps), actual incentives for technological and behavioural change, sectorial coverage, the functioning of energy markets, free-riding effects, and pre-existing taxes and subsidies (e.g. fossil fuels subsidies currently amount to around US$ 500 billion/year). The bulk of evidence suggests that there is no 'one best' instrument for climate change mitigation. Instead, a mix of ambitious policy instruments is needed; in particular those that promote long-term clean energy investments (e.g. government grants for research and development). Also, transaction costs and behavioural failures are key limiting factors for mitigation efforts by market agents.

Transaction costs

Transaction costs are the costs that are not directly involved in the production of goods or services, but arise from transactions or 'contracting' activities that are inherent in the trade

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of such goods/services. For example, the economic benefits of climate change mitigation via low-carbon technologies may be outweighed by the costs of searching for information, negotiations, regulatory uncertainty and monitoring of less-proven technologies. In quantitative terms, our research[1] shows that transaction costs for energy-efficient technologies can amount to 5–40% of total project costs. For renewable energy technologies, this can range from 1% (costs of electricity production) to 20% (cost of green certificates). For low-carbon technologies implemented under the Kyoto Flexible Mechanisms, such as the 'Clean Development Mechanism', transaction costs can vary from under one to more than US$ 200 per tonne of avoided CO_2. Here, the complexity of transactions, and the maturity of policy instruments, matter, among some other determinants.

We are not perfect

Behavioural failures also play a role affecting the performance of economic instruments. They can be understood as decision-making by firms or consumers that lead to irrational choices or a departure from utility/profit maximization goals. The economic behaviour of individuals in response to climate policies has received much less attention than technological mitigation efforts. With two notable exceptions – the 'energy paradox' (i.e. slow diffusion of profitable efficient technologies that fail to achieve market success) and 'discounting' (i.e. preferences for short-term gains and incomplete information about costs and benefits) – we do not know well enough the behavioural factors that affect economic decisions and the mechanisms that drive or put the brakes on mitigation options.

Behavioural economics focuses on the cognitive limitations and abilities of people, which affect their economic decision-making processes and lead to apparently irrational choices. In the field of climate change, a key question concerns the effects of social, cognitive and emotional factors on the economic decisions of people affected by climate mitigation policies. Behavioural experiments addressing environmental treaties have found that both incentives and penalties are fundamental to maintain significant cooperation. Nonetheless, cooperation based on positive reciprocity is often delicate and declines in the long run. Introducing strategic options to penalize defectors often stabilizes cooperation, even when reprimands come at a cost to punishers.

[1] Mundaca, L., Mansoz, M., Neij, L. & Timilsina, G. (2013). Transaction cost analysis of low-carbon technologies. *Climate Policy* 13(4): 490–513.

WHAT IS THE QUESTION?

What are economic instruments?

Economic instruments provide incentives or disincentives that aim to affect or prevent social change. They are designed and implemented to alter the economic conditions of target participants (e.g. industry, energy users, car owners) and, in the field of climate change mitigation, provide new economic conditions to drive technological and behavioural options for reducing GHG emissions, for example, taxes or subsidies that promote the manufacturing of more efficient cars, use of cleaner fuels, or reduction of travel distance. In this context, economic instruments can be categorised in different ways. One way to do this is via 'price' vs.' quantity'. Price incentives include both emission taxes and abatement subsidies, because these policies fix the price per unit of pollution and allow the polluter to determine the quantity. In contrast, quantity incentives include both permit systems and quotas, because both fix the total quantity of pollution – whether or not polluters can buy or sell those pollution rights.

ABOUT THE AUTHOR

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KLIMAT I FOKUS is a series of research briefs produced by Lund University Sustainability Forum. The purpuse is to describe and explain current and central concepts in climate research. **SUSTAINABILITY FORUM** connects and supports climate-, energy- and sustainability research at Lund University, and provides a bridge between society and academia within these fields. Sustainability Forum was launched in January 2014 and is coordinated by CEC, Centre for Climate and Environmental Research. **Contact:** hallbarhetsforum@cec.lu.se

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