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Disagreement on Sustainability Policy within the Social Sciences?

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One can find many proposals for policy responses to global environmental problems. Different disciplines – notably economics, geography, innovation studies, policy and political sciences, psychology and sociology – offer partly inconsistent advice. This undermines the social-political acceptance of policies as voters and politicians are likely to be left confused. To decide about an adequate sustainability policy mix we need to concur on the core problems such a mix has to tackle. I address four of these hereafter. Each one involves important issues of disagreement as well as unresolved questions.

1. Unintended, Preventable Consequences

The following four unintended effects of policy have been identified in different disciplines: rebound in energy studies, carbon leakage in environmental economics, green paradox in resource economics, and shifting environmental problems in life cycle analysis. We need to close each of these 'escape routes' to assure environmentally effective policies.

Rebound denotes that energy conservation or efficiency improvements stimulate new energy uses which reduce net savings.[1] Examples are more intensive use of energy-efficient equipment, re-spending financial savings associated with energy conservation and diffusion of energy-efficient technologies to new applications. One reason for rebound is that solutions to environmental problems generally increase the complexity of technologies, organizations and institutions.[2] While rebound is commonly estimated between 10 and 30%, some studies using general equilibrium analysis arrive at more than 100% rebound, also known as Jevons' paradox.[3] Tradable permits for energy use or CO_2 emissions can minimize rebound, as any tendencies of the economy to generate rebound will automatically translate into a higher price of energy or carbon.[4]

Carbon leakage occurs when a country, region or city implements a more stringent environmental policy than others. Dirty activities then relocate and trade patterns adapt.[5] As a result, the local economy will lose competitive power and employment while CO_2 emissions will hardly drop, or may even increase due to the direct effects of relocation. To avoid these undesirable effects, national, regional and urban policies need to be coordinated through global environmental agreements. The idea that bottom-up solutions are an alternative for such a top-down approach is unfounded. Top-down needs to guide bottom-up. So we have no choice but to fight for a stringent post-Kyoto climate agreement.

Subsidies to reduce the cost and price of clean energy may result in a 'green paradox'.[6] Market competition and the threat of a cheaper and amply available clean backstop technology cause the values of fossil fuel reserves in the earth to decline and their supplies to increase. This lowers their prices and stimulates their demand. The more effective are renewable energy subsidies, the stronger will be this effect. Since renewable energy sources mainly serve electricity generation, coal and gas markets will be most affected, and oil markets to a lesser extent. The paradox can be avoided by a supply measure, notably CO_2 pricing, as it will keep fossil fuels sufficiently expensive. More generally, subsidies make energy just cheaper so that its overall use is encouraged. The solution for both problems is that energy subsidies need to go along with charges on dirty energy.

Finally, while shifting environmental pressure is recognized in LCA studies,[7] it has not given rise to a systematic research program. Possibly, this is due to the complexity and case specificity of the issue. More research is warranted here to avoid overly optimistic assessments of environmental benefits of policies, strategies and technical innovation.

The importance of addressing these various 'escape routes' is evident if one realizes the policy challenge we face: to stabilize atmospheric concentrations of CO_2e at 450 ppm we need to reduce global CO_2e emissions by at least 95% and possibly more than 99%.[8]

2. Assure Complete Systems Control

With millions of products in the world, new ones appearing daily and existing ones altering continuously through innovation, how are we ever able to control all their environmental impacts? Standards or eco-labels for so many products will carry a huge institutional cost. Economics has since long offered a solution, namely pricing environmental externalities at the source. Through cost-accounting systems in firms, all prices will then adapt to proportionally reflect the pollution generated throughout the production cycle of the associated good or service. No other instrument can achieve this level of fine-tuning of the regulatory impact throughout the economy, and thus assure system closure.

Pollution pricing further decentralizes decisions to heterogeneous polluters causing their marginal cost of abatement to be similar, thus approaching a least-cost solution at the national or sector level. Pollution pricing will simultaneously set in motion desirable changes in production, consumption, investment, innovation and renewable energy, and thus help to stimulate a transition to a sustainable economy. Unlike past energy transitions, the looked-for transition to renewable energy makes environmental but no economic sense. So it will not come about spontaneously but only with adequate sustainability policy.

After reading all these arguments, who could be against pollution pricing? Well, it is definitely not enthusiastically supported by the social sciences broadly. Many non-economists resist environmental regulation by prices because they see the market economy as the cause of environmental problems. Instead, sociology and policy sciences give more credit to voluntary action, eco-labels, participatory solutions, grassroots initiatives and local experiments. On tradable permits for CO_2 emissions, the opinions are very strongly divided. Economists emphasize that this represents an institution that fits smoothly with the market economy and, unlike taxes, updates pollution prices automatically to changes in preferences (demand) and technology (supply). Many non-economists have only eyes for the crowding out of moral motivations, unfair rights allocation and windfall profits.

The most frequently raised argument against pollution pricing is inequitable effects. Of course, any effective environmental policy has distributional consequences.[9] One can minimize these with countervailing measures such as income redistribution through recycling of environmental tax revenues, or policy design such as block energy pricing with a threshold reflecting basic energy needs. A more radical proposal is personal carbon trading – equal CO_2 emission rights. But this is politically infeasible as it will overrule existing inequalities in income and wealth: i.e. rich individuals would be unable to benefit from their wealth as the effective constraint on their consumption would be a strict individual CO_2 limit.

Can we perhaps avoid CO_2 pricing because ever scarcer oil will help to solve climate problems? No: resulting higher oil prices signal resource scarcity but not the external cost of CO_2 emissions. Such prices encourage a transition from oil to coal and non-conventional liquid fuels such as tar sands, rather than to low-carbon energy sources. Worse, rising oil prices will complicate adding carbon charges. One will need to explain it very well to citizens/voters. For example, by stressing that carbon pricing through taxes means that the tax revenues are recycled to citizens, unlike resource scarcity premiums, which typically end up in the pockets of rich individuals and companies in control of the resources. An overlooked argument to tax CO_2 may also help: namely, that it will reduce the profit margin on fossil fuels, so that effectively we would also be taxing oil suppliers.

Bounded rationality and social preferences form another reason for doubting price instruments. They do not imply, however, that price instruments are totally ineffective as has been suggested. It is true though that rational agent theory, dominant in environmental economics, overestimates the efficiency of pricing instruments. But evidence for the power of price regulation also comes from empirical studies that do not involve rational agent assumptions. These studies show two things: prices are a very important determinant of economic decisions; and price policies have a significant cost advantage over other instruments. Of course, for environmental problems such as biodiversity and toxic substances, direct regulation through standards and legislation is often warranted. In addition, myopia or impatience in investing in energy-efficient equipment may be reduced by complementing pricing with information provision about net gains.[10]

3. Evade and Avoid Undesirable Technological Lock-in

Many dirty products and technologies enjoy cost advantages due to increasing returns to scale. As a result, economic agents buy the cheaper alternative even if they do not have a strong preference for its intrinsic features. This may then cause market dynamics that start with a historical coincidence, creating unbalanced market shares of alternatives, go through a phase of positive feedback, and result in a lock-in.[11] There is no agreement which policies are best to escape current, and avoid future, undesirable lock-in. A very high environmental tax might make the dominant technology so expensive that the unlocking of the system is easily achieved. However, if such pricing is impossible politically, additional policies are needed. Some proposals are: set a clear future goal (e.g. the ZEV goal by the state of California), public procurement, and creation of semi-protected niches. Less orthodox suggestions are: discourage innovation and learning in the dominant technology, employ status seeking to vend low-carbon technologies (hybrid car, solar PV on roof tops), and restrict advertising aimed at status sensitivity of consumers associated with high-carbon goods.[12] However, the latter policies have not received serious attention in research.

Only pricing 'bads' such as pollution, which many economists favour, is insufficient. It selects the currently most cost-effective option and thus fosters early lock-in that is potentially non-optimal in the long run. To keep promising but expensive alternative options alive, we need to directly support these with subsidies or price guarantees. Yet unresolved is what combination of support to give to R&D and deployment. This is a relevant problem as public funding for subsidies is scarce. In the last decade, Germany has spent about €50 billion on subsidies to solar PV deployment. It has been questioned whether the cost of solar electricity would not have fallen more rapidly if part of this money had used to stimulate R&D.[13] Public R&D on certain renewable energy technologies, such as third generation solar PV, is important as major innovations often have return-on-investment and payback time features that do not match very well the interests and patience of private investors.

A related unresolved question is how much diversity in renewable energy technologies needs to be supported, taking into account all the costs and benefits of diversity over a long period of time, involving spillovers, recombinant innovation, option values and returns to scale. Possibly, international coordination of efforts via an 'environmental technology agreement' could lessen the conflict between diversity and scale benefits, by allowing international diversity and national specialisation.

4. Enhance the Social-political Feasibility of Sustainability Policies

This is the most neglected and heterogeneous topic, which requires input from many disciplines. Psychology might explain climate denial[14] and the pseudo-scientific environmental scepticism of the Lomborg type. Environmental economics identifies the cost-effectiveness of policies, which many non-economists scoff at, even though cheaper policies generally count on more political support.[15] Ethics integrated into social sciences identifies equitable and fair solutions that might count on wide democratic support. Ecological economics undercuts the economic growth paradigm which it regards as a barrier to implementing sustainability policies. Political science helps to spot legal and institutional opportunities that can raise support for sustainability policies.[16] Possibly, on policy feasibility the different social sciences are more complementary than conflictive in their advice.

It is obvious that the social sciences have not converged on their sustainability policy insights. More communication between disciplines, with a clear exchange of insights and arguments, is needed before we can provide more coherent advice about the best policy mix.

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