ENDOGENOUS PREFERENCES AND CLIMATE POLICY

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Overview

The standard approach in economic models assumes exogenous preferences of a utility function of households regardless the introduction of the policies in the analysis. Whereas the arguments in the utility function change with the policies, the functional form and its parameters remain constant. The assumption of a constant utility function is arguably at odds with our intuition that preferences and current decisions depend on previous experiences and choices, which will be affected by the policies.

In this paper we investigate climate policy in the presence of endogenous preferences. Endogenous preferences have a substantial impact on the model dynamics, because change in current actions influence future preferences and thereby utility. Results in this paper indicate that models used to derive optimal paths towards the low-emission society, without taking into account endogenous preferences, recommend too high emissions. This is relevant because most (if not all) numerical simulation models for climate policies, including the integrated assessment models (IAM) used by the Intergovernmental Panel on Climate Change (IPCC), assume exogenous preferences (Rogelj et al., 2018).

This paper is relevant in the case where current consumption affects future preferences (e.g., habit formation or changes in tastes). Whereas this is arguably the case for, e.g., food consumption, drugs, leisure activities, health and musical tastes, it may be less important for other issues. To fix thoughts, parts of the analysis are framed in a setting where red meat consumption decline over time to reduce emissions of greenhouse gases. This is arguably an important example: A recent UN climate change report (IPCC, 2019) estimate that, by 2050, dietary changes involving less red meat consumption could free up several million square kilometres of land and reduce global CO_2 emissions by up to eight billion tons per year, relative to business as usual. Another good example could be the choice between polluting leisure activities (e.g., shopping or long-distance travel) and other less polluting leisure activities (e.g., music or outdoor life). The issue of endogenous preferences may be particularly relevant in contexts where the time horizon is long, like the case of climate change.

While framed in a very different setting, the model mechanisms discussed in the present paper relates to the literature on rational addiction; see, e.g., Becker and Murphy (1988). There are many differences between the present paper and the rational addiction literature. In particular, the present paper features an environmental externality and models markets for several goods that are linked by the utility function and the budget constraint. The interaction between the different markets is important for the results. Moreover, whereas the rational addiction literature tends to focus on the case where the consumer rationally internalizes the addiction caused by consumption of drugs, the present paper focus on the case where the consumer fails to internalize the endogenous preference formation.

Gorman (1967) examines conditions for stability when preferences are endogenous. Bowles (1998) review models and evidence concerning impact of economic institutions on preferences, and discuss some implications for economic theory and policy analysis. Mattauch and Hepburn (2016) discuss normative issues with regulation and climate policy in a setting where policy measures influence people's preferences. Interestingly, they find that the cost of environmental policy may be lower when preferences are endogenous. They also provide some evidence why endogenous preferences matters for climate policy.

Endogenous preference formation has so far not been a hot topic in the literature on environmental regulation and climate change, but somewhat similar mechanisms occur in the case of convex investment costs and long-lived capital (see, e.g., Storrøsten, 2020). A contribution to the environmental economics literature given by the present paper is that the optimal carbon tax is above the social cost of carbon in the case where preferences are determined by earlier consumption and experiences. In other words, the Pigouvian level of carbon pricing (i.e., set to the social cost of carbon) leads to more emissions than the optimal level.

Methods

In the first part, we consider a simple theoretical model with two goods to demonstrate the mechanisms. In the second part, we use a numerical simulation model to quantify the impact when we consider endogenous preferences, and the base data is the GTAP (Global Trade Analysis Data) 10 data base (Aguiar et al., 2019).

Results

The theoretical model shows that the optimal time trajectory is achieved if and only if the consumer is perfectly time-consistent. The reason is that endogenous preferences put a shadow price on consumption, and these shadow prices depend on the valuation of the future. The suboptimal trajectories do not only differ from the optimal path during the transition phase between two equilibria, but also the consumption levels in the new stationary states differ. A key difference is more pollution in the suboptimal equilibrium. Regarding the results from the numerical simulation model, we are still working on them to quantify the impact of endogenous preferences in the context of climate policies.

Conclusions

We have examined the effects of endogenous preferences in a model with climate policy. We show that without incorporating endogenous preferences, we will end up larger emissions than the optimal level or overestimate the cost of abatement.

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