



**When the point of departure matters
the case of prevention vs. mitigation in management of invasive species**

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When the point of departure matters
– *The case of Prevention vs. Mitigation in management of Invasive Species*

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Cost-benefit analysis (CBA) provides an important support for prioritizing environmental policies. For a number of environmental issues effects on human health represent a dominant cost, both directly (e.g. caused by impact on general health due to exposure to air pollution) and indirectly (e.g. as nature may be a resource in developing new medical drugs). Thus, the measurement of benefits or avoided costs from reduced health effects provide an important input for environmental *ex ante* and *ex post* policy evaluation. In this presentation we depart from a CBA of the potential introduction of Ragweed in Denmark. The main impact of introduction of this invasive species is a substantial increase in the number of allergy cases, and we address the question if the policy should aim at avoiding introduction (prevention) or mitigate the damages after introduction (mitigation). In the case of avoidance of introduction benefit transfer are applied for measuring benefits whereas the avoided cost method are used in the case of mitigation. For both policy actions the benefits are significant and the benefit/cost ration is considerable above one showing that policy intervention is desirable irrespectively of the policy chosen. However, results indicate that the net benefit of mitigation is larger than with prevention leading to the policy recommendation that the mitigation is the preferable policy if the decision is based on the CBAs. Somehow this seems contra-intuitive since it imply that we should let Ragweed be introduced and grow to its full potential and then simply treat the allergy symptoms, i.e. we prefer to get ill and then get treatment rather than avoid getting ill. This result is familiar from health economic studies and may reflect methodological issues rather than actual differences in preferences and here information externalities and altruistic preferences provide possible explanations. First, people tend to underestimate the benefits from preventive actions¹². This argument can be linked to the fact that people tend to underestimate small probabilities of uncertain events to occur leading to an information externality³⁴. These effects represent an information externality: people simply underestimate the discomfort of getting ill due to lack of insight in the true effects and probability of getting the disease. Secondly, it has been described that people have altruistic preferences with respect to other people health⁵⁶. The occurrence of altruistic preferences means that the “altruistic” citizen receives utility from helping others, thus reflecting the utility of other persons in her or she’s own utility function. Such preferences are not included in CBAs with both prevention and mitigation and including altruistic preferences will tend to make prevention more desirable and mitigation less desirable. This is because people who are not affected by allergy symptoms may have a preference for not experiencing that other people get ill. Last, this analysis

departs from the UN definition of invasive species where introduction of an invasive species are exclusively negatively from a societal point of view⁷. However, this may be disputed as a number of species considered as part of the native biodiversity today was originally introduced. Therefore, introduction may in time also lead to positive utility of Ragweed which should be taken in the CBAs. This will lead to results more favorable to the mitigation strategy.

¹ Mant, J., Hobbs, F.D.R., Fletcher, K., Raalfe, A., Fitzmaurice, D., Lip, G.Y.H. and Murray, E. (2007). Warfarin versus Aspirin for Stroke Prevention in an Elderly Community Population with Atrial Fibrillation: An randomized Controlled Trial. *Lancet*, 370, pp. 493-503.

² O'Connell, M.E. (2009). *Preventing Mental, Emotional and Behavioral Disorders among Younger People: Progress and Possibilities*. National Academic Press, Washington.

³ Havert, C. and Doebeli, M. (2004). Spatial Structure Often Inhibits the Evaluation of Cooperation in the Snowdown Game. *Nature*, 428, 643-646.

⁴ Hertwig, P., Barron, G., Weber, E.U. and Ereu, I. (2004). Decisions from Experience and the Effect of rare Events in a Risky Choice. *Psychological Science*, 15, pp. 534-539.

⁵ Olson, J.A., Kidholm, K., Donaldson, C. and Sharkley, P. (2004). Willingness to Pay for Public Health Care: A Comparison of Two Approaches. *Health Policy*, 70, 217-228.

⁶ Jacobsson, F., Carstensen, L. and Borgquist, L. (2005). Caring Externalities in Health Economic Evaluation: How are They Related to Severity of Illness? *Health Policy*, 73, 172-182.

⁷ UN. 2014. Convention on Biological Diversity. <http://www.cbd.int/invasive/>