

Uncertainty of Air Pollution Cost Estimates: To What Extent Does It Matter?

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How large is the social cost penalty if one makes the wrong choice because of uncertainties in the estimates of the costs and benefits of environmental policy measures? For discrete choices there is no general rule other than the recommendation to always carefully compare costs and benefits when introducing policies for environmental protection. For continuous choices (e.g., the ceiling for the total emissions of a pollutant by an entire sector or region), it is instructive to look at the cost penalty as a function of the error in the incremental damage cost estimate. Using abatement cost curves for NO_x, SO₂, dioxins, and CO₂, this paper evaluates the cost penalty for errors in the following: national emission ceilings for NO_x and SO₂ in each of 12 countries of Europe, an emission ceiling for dioxins in the UK, and limits for the emission of CO₂ in Europe. The cost penalty turns out to be remarkably insensitive to errors. An error by a factor of 3 due to uncertainties in the damage estimates for NO_x and SO₂ increases the total social cost by at most 20% and in most cases much less. For dioxins, the total social cost is increased by at most 10%. For CO₂, several different possible cost curves are examined: for some the sensitivity to uncertainties is greater than for the other pollutants, but even here the penalty is less than 30% and in most case much less if the true damage costs are twice as high as the ones estimated. The paper also quantifies the benefit of improving the accuracy of damage cost estimates by further research.

Keywords:

Uncertainty, social cost, damage cost, air pollution, climate change

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