Reconciling the Pigovian and Sandmo Principles of Emission Pricing

Highlights:

- The Sandmo second-best rule for emission pricing yields some policy paradoxes
- The Pigovian emission tax rule only holds in economies with no taxes
- Optimal emission taxes may vary by country even if marginal damages do not
- Regulation may reduce welfare even when marginal damages are positive
- The welfare ranking of marginal regulations and taxes must reverse at some point

Abstract: The classical Pigovian rule is attractively simple: polluters should pay the marginal damages ($MD$) of emissions, computed at the point where $MD$ equals marginal abatement costs ($MAC$s). In the context of climate policy this implies using the Social Cost of Carbon (SCC) as the marginal benefit criterion in regulatory cost-benefit analysis and in emission charge-setting. But beginning with Sandmo (1975), numerous economists have shown that in second-best economies the Pigovian rule is sub-optimal, and the optimal tax rate should be adjusted by a factor related to the marginal welfare cost of the tax system. While this point is theoretically well-established and has major implications, it is generally ignored in practice, which may be due to its apparent conflict with the intuitive Pigovian principle. Here I show that the two principles can be unified by noting that tax distortions drive a wedge between firms’ private $MAC$s and the social costs of abatement, and the Sandmo rule compensates for the difference. I provide a graphical exposition then present a formal derivation in general equilibrium. I also discuss some of the practical implications and surprising paradoxes created by the Sandmo rule. For instance the optimal emission tax will typically differ
between jurisdictions even when $MD$ is constant, which has important implications for carbon border tax adjustments. It also helps explain why cost-benefit analysis might conclude emissions should remain unregulated even when the optimal emission tax is positive, and why regulations can sometimes be marginally less costly than taxes.