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 (MACs). 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 MACs 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.