

Optimal Environmental Regulation in the Presence of Other Taxes: The Role of Non-separable Preferences and Technology^{*}

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by

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Abstract

This paper is intended as a step toward the development of theoretically founded and operational environmental taxation formulas in a second-best world. Recent studies find that environmental taxes typically exacerbate pre-existing tax distortions and, therefore, the optimal pollution tax should lie below the Pigouvian level (social marginal damages). Taking account of a non-separable structure of preferences and technology, this paper extends previous models to evaluate the welfare implications of environmental taxes and quotas that apply to polluting intermediate inputs in the presence of other distortionary taxes. Relative to the literature, it also explicitly establishes more generalized second-best rules regarding how the presence of prior distortionary taxes affects the optimal configuration of environmental regulation. In this setting, the analysis clarifies that there is no general theoretical presumption for the answer to the question about whether the second-best pollution tax is less than the first-best Pigouvian level. Sharply contrary to the impression given by the prior literature, the answer, surprisingly, does *not* depend on the degree of pre-existing tax distortions. Moreover, it depends not just on the difference between the two goods' cross-price elasticities with leisure, but on that difference compared to the elasticity of demand for the polluting intermediate input. Finally, the paper shows that under plausible parameter conditions, a greater pre-existing tax distortion can increase the optimal level of environmental regulation.

JEL classification: Q28; H21; H23; J22

Key words: optimal environmental regulation; second-best world; pre-existing tax distortions; non-separable preferences and technology; emissions taxes; emissions quota

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