

Returns to Scale, Environmental Regulation and Ambient Charges in a Cournot  
Duopoly

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Abstract:

Environmental regulation under conditions of imperfect competition in the presence of nonpoint sources (NPS) of pollution has not been well analyzed in the literature. This paper models strategic firm interaction and the effect of ambient charges on total NPS pollution in an imperfectly competitive, Cournot type duopoly under constant and decreasing returns to scale (CRTS & DRTS). We identify two distinct and often opposing effects. Under CRTS, the primary effect of a higher ambient charge is to increase pollution abatement (and thus decrease pollution) while the secondary effect is to lower output. Higher pollution abatement and lower output reinforce each other so that a higher ambient charge results in an unambiguous decrease in NPS pollution. Under DRTS, a higher ambient charge decreases output but the effect on abatement is ambiguous. Moreover, the marginal effect of a change in the ambient charge is larger under CRTS than DRTS. Our results indicate that, in general, pollution control mechanisms such as ambient charges tend to be more effective under CRTS.