Two Essays on Resource Economics:
A Study of the Statistical Evidence for Global Warming and
An Analysis of Overcompliance with Effluent Standards
Among Wastewater Treatment Plants

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Two Essays on Resource Economics: A Study of the Statistical Evidence for Global Warming and An Analysis of Overcompliance with Effluent Standards Among Wastewater Treatment Plants

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(Abstract)

These papers analyze two issues in resource economics that are currently debated in academic and policy arenas: global warming and overcompliant behavior amongst regulated sources of water pollution.

The first paper examines the evidence for global warming in particular, the published estimates of the rate of global warming. The paper reproduces published results using the same data, provides evidence that the statistical model used to obtain these estimates is misspecified for the data, and re-specifies the model in order to obtain a statistically adequate model. The re-specified model indicates that trends in the surface temperature anomalies are highly nonlinear rather than linear and that currently published estimates of the degree of global warming are based on a misspecified model. It argues for caution in interpreting linear trend estimates and illustrates the importance of model misspecification testing and re-specification when modeling climate change using statistical models.

The second paper examines recent evidence for overcompliant behavior amongst wastewater treatment plants whose pollutant discharges are regulated under the Clean Water Act. The historical evidence suggests that many regulated facilities do not comply with permit regulations. This behavior has been attributed to inadequate monitoring and enforcement by the regulatory agencies as well as to an institutional structure that penalizes noncompliance but that does not reward overcompliance. Against this backdrop, the evidence for significant and widespread overcompliance appears puzzling. The paper examines overcompliance with a widely-regulated pollutant, biochemical oxygen demand (BOD). The testable hypotheses are: whether jointness in pollution control between nitrogen and BOD can explain overcompliance and whether variation in BOD output can explain BOD overcompliance. These hypotheses are examined by developing a conceptual model of BOD overcompliance and estimating a model of BOD control. The results indicate that jointness in pollution control plays a significant role in explaining BOD overcompliance. Variation in BOD output is not a significant factor in explaining BOD overcompliance. The paper explores plausible reasons for this result and proposes significant modifications to the traditional marginal analysis of BOD overcompliance/compliance decisions.
Dedication

I dedicate this work to my parents, Dr. and Dr. (Mrs.) I. O. Akobundu, because they are the wind beneath my wings.
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