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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Table of Contents

Title i

Abstract ii

Dedication iii

Author's Acknowledgements iv

Table of Contents v

List of Figures vi

List of Tables viii

Chapter 1: A Study of the Statistical Evidence for Global Warming 1

References 35

Appendix A: More Recursive Plots 39

Appendix B: Linear vs. Nonlinear Trending Component from the Static and Dynamic Models for the Jones and Lugina Series 41

Chapter 2: An Analysis of Overcompliance with Effluent Standards among Wastewater Treatment Plants 42

References 126

List of Experts 131

Appendix A: Residual Plots 132

Vita 133

List of Figures

Chapter 1: A Study of the Statistical Evidence for Global Warming

Figure 1: T-plots of residual from the static model using the Jones and Lugina datasets 19

Figure 2: CUSUM (a) and CUSUMSQ (b) graphs for the static model using the Jones dataset 21

Figure 3: CUSUM (a) and CUSUMSQ (b) graphs for the static model using the Lugina dataset 21

Figure 4: T-plot of residuals from the dynamic model using the Jones and Lugina datasets 27

Figure 5: CUSUM and CUSUMSQ graphs for the dynamic model using the Jones datasett 28

Figure 6: CUSUM and CUSUMSQ graphs for the dynamic model using the Lugina dataset 28

Figure 7: The actual (---•---) series vs. the predicted (-------) trend component of the regression model using the Jones series to estimate the static and dynamic models 31

Figure 8: The actual (---•---) series vs. the predicted (------) trend component of the regression model using the Lugina series to estimate the static and dynamic models 32

Chapter 2: An Analysis of Overcompliance with Effluent Standards Among Wastewater Treatment Plants

Figure 9: Observed choice of effluent level 54

Figure 10: Observed choice of effluent level with a shift in the MEP curve 56

Figure 11: Observed choice of effluent level with a shift in the MAC curve 58

Figure 12: Plot of mean (over plants) monthly BOD output over the year for Connecticut 86

Figure 13: Plot of mean (over plants) monthly BOD output over the year for Maryland 86

Figure 14: Typical graph of excess capacity for the selected twenty plants in Connecticut 88

Figure 15: Graph of excess capacity for a selected plant in Connecticut 89
Figure 16: Plots of standard deviation (across plants) of monthly BOD output over the year in Connecticut 91
Figure 17: Plots of standard deviation (across plants) of monthly BOD output over the year in Maryland 91

List of Tables

Chapter 1: A Study of the Statistical Evidence for Global Warming

Table 1: Comparing the static and dynamic Normal regression models 10
Table 2: Summary statistics and p-values on global temperature anomalies 14
Table 3: Static Normal model estimation and misspecification testing results 16
Table 4: Comparison between reported and estimated trend 17
Table 5: Dynamic Normal model estimation and misspecification testing results 24

Chapter 2: An Analysis of Overcompliance with Effluent Standards Among Wastewater Treatment Plants

Table 6: Curvature restrictions 52
Table 7: Wastewater treatment plants grouped by BOD permit limit 79
Table 8: Nitrogen target levels amongst plants in Connecticut and Maryland 82
Table 9: Incidence of noncompliance with monthly BOD permit limits in Maryland and Connecticut 83
Table 10: Monthly variation in BOD output for Connecticut 84
Table 11: Monthly variation in BOD output for Maryland 85
Table 12: BOD and Nitrogen output summarized within BNR groupings 94
Table 13: Prefixes and their meaning 98
Table 14: Variable Definitions used in Empirical Model 99
Table 15: The Normal Linear Regression model 100
Table 16: Summary Statistics for Connecticut data 102
Table 17: Estimation and Misspecification Test Results for Connecticut data 103
Table 18: Sensitivity analysis on mean BOD discharge using Connecticut data 107
Table 19: Sensitivity analysis on mean overcompliance ratio using Connecticut data 108
Table 20: Summary Statistics for Maryland data 110
Table 21: Estimation and Misspecification Test Results for Maryland data, Part I 111
Table 22: Sensitivity analysis on mean BOD discharge using Maryland data 113
Table 23: Sensitivity analysis on the mean overcompliance ratio using Maryland data 115
Table 24: Estimation and Misspecification Test Results for Maryland data, Part II 116