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Environmental Economics and Policy: Memo 9

1. Cost Benefit Analysis in Environmental Policy

$B/C = \Sigma\ (Bn / (1+r)^{n-1}) \ / \ \Sigma\ (Cn / (1+r)^{n-1})$

$NPV = \Sigma\ (Bn / (1+r)^{n-1}) - \Sigma\ (Cn / (1+r)^{n-1})$

・Ex ante CBA and ex post CBA
・Social Cost vs. Social Benefit

・Social Benefit: WTP: willingness to pay (vs. WTA)
・Social Cost: Opportunity cost: The opportunity cost of using an input to implement a policy is its value in its best alternative use.
・SDR: Social Discount Ration: Social time preference and Marginal return of capital

5 main steps:
①List of alternatives (counterfactual)
②Items of cost and items of benefit (Time framework and Impact)
③Technical measurements of cost items and benefit items
④Monetary assessments of technical cost and benefit items
⑤Comparison CB ratio (B/C) or NPB (Net Present Benefit)

・Political characteristics of CBA: Supporting technology for policy (selection) decision making from a viewpoint of efficient social resource allocation

2. Cost Benefit Analysis of the Sulfur Dioxide Emissions Control Policy in Japan

Contents

1 Introduction

p.220; Setting the research question based upon the assessment of previous studies

2 SO2 emission control policy in Japan

p.222; First stage; 1968-1973 (6ys), Second stage; 1974-1983 (10ys), Third stage; 1984-1993 (10ys)

3 Methodology

3.1 Cost and benefit categories

Table 1

Benefit; Health benefit; morbidity effect of chronic bronchitis and asthma

Cost; private sector cost

3.2 Social discount rate

0%, 2.5%, 9.0%

4 Benefit estimation

4.1 Human health effects of SO2 emission control

$\Delta \text{Cases} = b \times \Delta SO2 \times POP \qquad (1)$

b; D-R function, children

Table 2

4.2 Monetary values of avoided health damage

COI; medical expenditure and lost earnings

WTP > COI, WTP/COI = 2.0

4.3 Model for health benefits estimation

Benefit = Σ Mt / $(1+r)^t$ − Σ Lt/ $(1+r)^t$ (2)

Table 3

Mt = Pa, c × m (3)

Lt = hospital visit 〔 〕+ hospital admission 〔 〕 (4)

Table 4

4.4 Estimated benefit values

Table 5

5 Cost estimations

Cost = Σ Ct / $(1+r)^t$ (6)

Table 6, Table 7, Table 8

6 Cost-benefit ratio

Table 9, comparison to previous studies

7 Conclusions

References

＊Kochi, I., S. Matsuoka, M. A. Memon, and H. Shirakawa (2001), "Cost benefit analysis of the sulfur dioxide emissions control policy in Japan", *Environmental Economics and Policy Studies*, 4(4), pp.219-233

＊Boardman, A.E., D. H. Greenberg, A. R. Vining, and D. L. Weimer (2006), *Cost-Benefit Analysis: Concept and Practice (3rd ed.),* Person Prentice Hall.

Schedule

1. Introduction 9/26

Part1: Theory of Environmental Economics and Environmental Policies

2-6. CAC and MBIs and the comparison of their efficiency 10/6, 10/13, 10/27, 11/10, 11/17

7. Voluntary Approaches, Water Pollution Policy, Climate Change Policy 11/17, 11/24

Part2: Economic Evaluation on Environmental policy and Policy Analysis

8.9.10. Cost Benefit analysis in Environmental Policy 12/1, 12/8, 12/15

11. Economic Valuation on Environmental Policy-COI, SP and RP 12/22

12.13. Contingent Valuation Method (CVM) and Travel Cost Method 1/12, 1/19 (close)

14. The Design of Environmental Policy 1/26

15. Concluding remarks 2/2 (supplements)