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Environmental Economics and Environmental Policy
No. 9

Part 3: Economic Evaluation on Environmental Policy and Project

In this part, we will discuss policy evaluation and economic evaluation of environmental policy, focusing on Cost of Illness (COI), Stated Preference (SP), and Revealed Preference (RP).

1. Cost Benefit Analysis in Environmental Policy

Market failure, public goods, nonexcludable and nonrivalrous, jointness in supply
Policy (program and project) evaluation criteria and policy selection criteria

$$B/C = \Sigma \ (B_n / (1+r)^{n-1}) \ / \ \Sigma \ (C_n / (1+r)^{n-1})$$
$$NPV = \Sigma \ (B_n / (1+r)^{n-1}) \ - \ \Sigma \ (C_n / (1+r)^{n-1})$$

Net benefit criterion: Kaldor-Hicks criterion: Those who will gain could fully compensate those who will lose.

Efficiency: Pareto Optimum or Pareto Efficiency
 "An allocation of goods is Pareto efficient if no alternative allocation can make at least one person better off without making anyone else worse off."

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.

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

Lifetime: Benefit stream and Cost stream
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)

2. Cost benefit analysis of the sulfur dioxide emissions control policy in Japan

$$\text{Benefit} = \sum_{t=0}^{e} BM_t /(1+r)^t + \sum_{t=0}^{l} BL_t /(1+r)^t \qquad (1)$$

$$\left[\begin{array}{l} BM_t : \text{social medical expense} \quad e : \text{remaining lifetime} \quad r : \text{SDR} \\ BL_t : \text{social labor loss} \quad l : \text{remaining working life-years} \end{array} \right]$$

$$\text{Cost} = \sum_{t=0}^{e} C_t /(1+r)^t \qquad (2)$$

$$\left[\; C_t : \text{social cost}, \; e : \text{remaining lifetime}, \; r : \text{SDR} \; \right]$$

SDR＝0%　(Unit：1 billion yen, 1993 price)

		1968～1973	1974～1983	1984～1993
Cost		9215	27233	16248
Benefit	Medical Expense	20759	12687	2639
	Labor loss	2071	1742	343
	COI Total	22830	14428	2982
	WTP	45660	28856	5964
B/C		4.96	1.06	0.37

SDR＝2.5%

		1968～1973	1974～1983	1984～1993
Cost		5576	15991	9354
Benefit	Medical Expense	13626	8228	1695
	Labor loss	1404	1181	233
	COI Total	15029	9409	1927
	WTP	30058	18818	3854
B/C		5.39	1.18	0.41

SDR＝9%

		1968～1973	1974～1983	1984～1993
Cost		2387	6632	3811
Benefit	Medical Expense	6809	4078	829
	Labor loss	682	573	133
	COI Total	7490	4652	942
	WTP	14980	9304	1884
B/C		6.29	1.40	0.49

Source: 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

3. References

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.

Field, B. and M. K. Field (2009), *Environmental Economics: an Introduction, 5th ed.*, McGraw-Hil

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

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Pearce, D, G. Atkinson and S. Mourato (2007), Cost-Benefit Analysis and the Environment, OECD

4. Schedule of Course Work

1. Introduction: Theory and practice of Environmental Economics and Environmental Policy (9/28)

Part 1: Historical Development of Environmental Policies

    We will review the history of pollution and combating against pollution in Japan.

2. Air Pollution and Policy (10/5), (10/12 will be closed)
3. Water Pollution and Policy (10/19)
4. * Students have to make a short report and presentation about the situation of major pollution issues (air and water) and ambient standards in your home country. (10/26)

Part 2: Theory of Environmental Policies

    We will see three basic types of environmental policies, Command and Control (CAC), Market Based Instruments (MBIs), and Voluntary Approach (VA) and their efficiency.

5. CAC and MBIs and the comparison of their efficiency (1) 11/2
6. CAC and MBIs and the comparison of their efficiency (2) 11/9
7. Voluntary Approaches and theory of Policy Mix 11/16
8. Climate Change Policy 11/30
9. * Students have to a short report and presentation about the pollution control policy (air, water and climate) in your home country. 12/7

Part 3: Economic Evaluation on Environmental Policy and Project

    In this part, we will discuss policy evaluation and economic evaluation of environmental policy, focusing on Cost of Illness (COI), Stated Preference (SP), and Revealed Preference (RP).

10. PDCA Cycle and Policy Evaluation 12/14
11. Cost Benefit analysis in Environmental Policy 12/21
12. Economic Valuation on Environmental Policy-COI, SP and RP 1/11
13. Contingent Valuation Method (CVM) and Travel Cost Method (TCM) 1/18
14. The Design of Environmental Policy 1/25
15. * Students have to a short report and presentation about Policy Evaluation of the pollution control policy (air, water or climate) in your home country. Concluding remarks 1/25