

Environmental Economics and Environmental Policy No. 10

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. Economic Valuation on Environmental Policy-COI, SP and RP

1.1 Cost Assessment

Social cost = Government Cost (monitoring cost, information cost, emission research cost, and policy implementation cost, and evaluation cost) + Private Cost (abatement cost of firms)

Civil society's damage cost → benefit

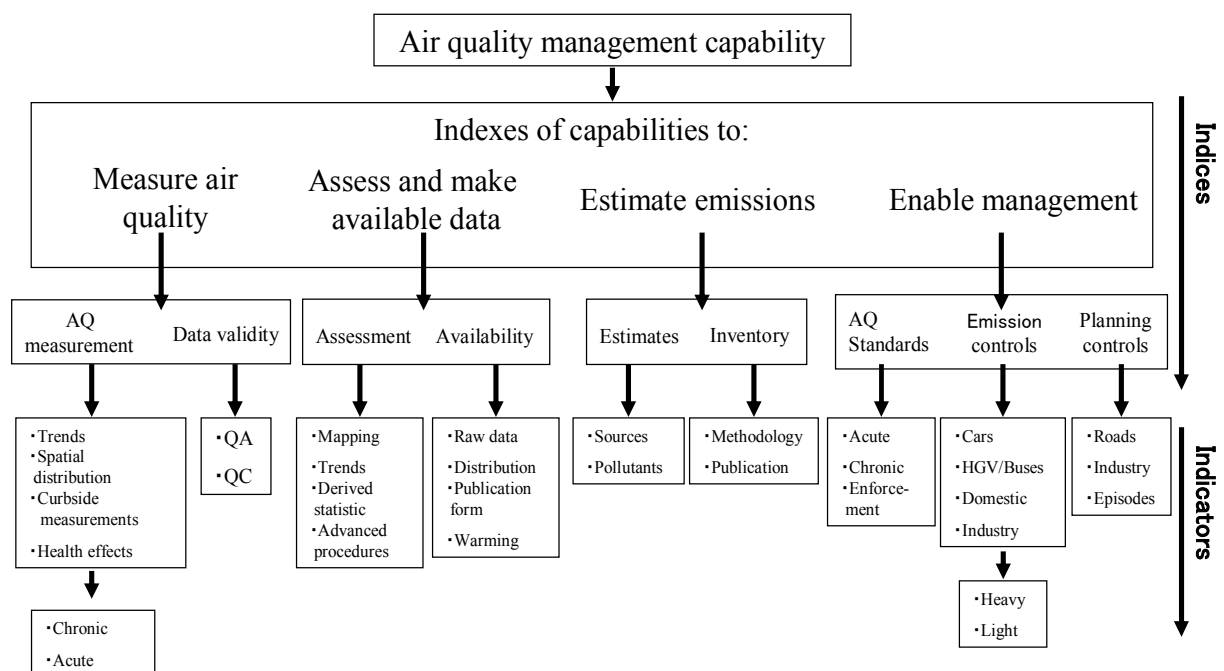


Fig. 1 Air Quality Management Capacity: GEMS Report

Source: UNDP/WHO (1996) , Matsuoka (2007)

1.2 Benefit Assessment

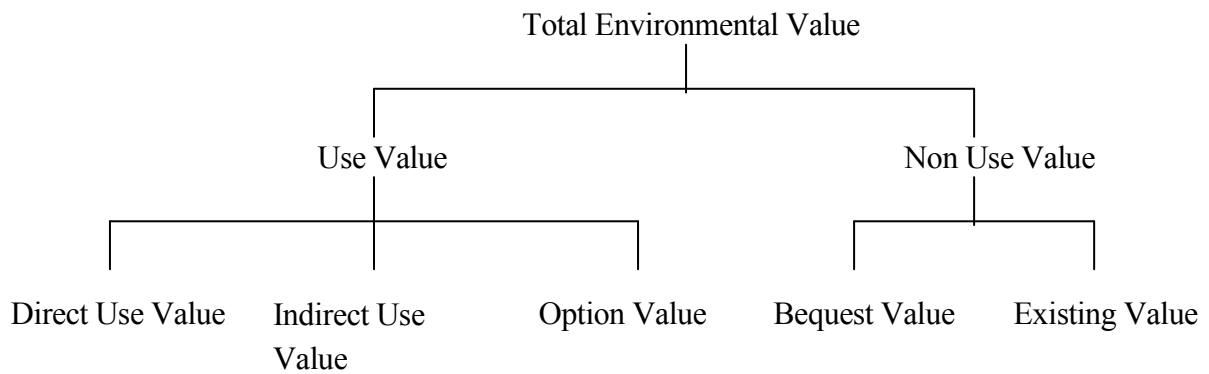


Fig. 2 Classification of Economic Value of Environment

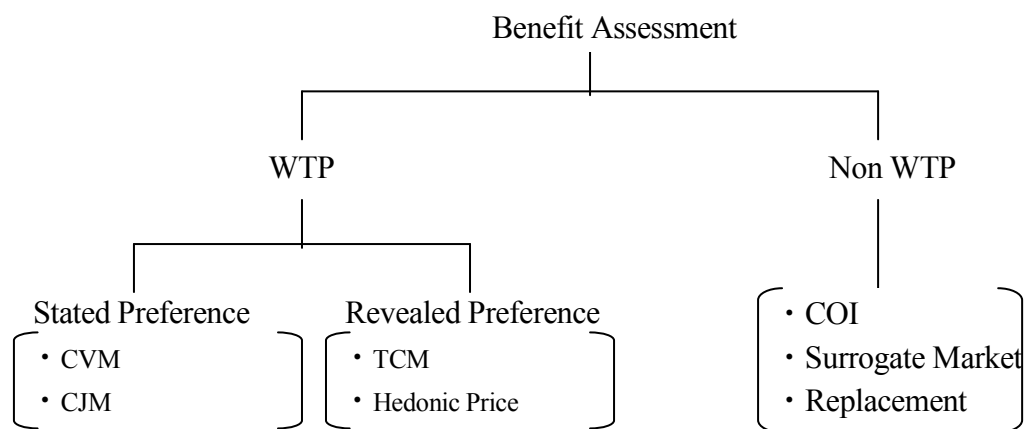


Fig. 2 Methodology of Economic Valuation of Environmental Benefit

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

$$\Delta \text{Cases} = b \times \Delta \text{SO}_2 \times \text{POP} \quad (1)$$

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

$$\text{Benefit} = \sum M_t / (1+r)^t - \sum L_t / (1+r)^t \quad (2)$$

Table 3

$$M_t = P_a, c \times m \quad (3)$$

$$L_t = \text{hospital visit} [\quad] + \text{hospital admission} [\quad] \quad (4)$$

Table 4

4.4 Estimated benefit values

Table 5

5 Cost estimations

$$\text{Cost} = \sum C_t / (1+r)^t \quad (6)$$

Table 6, Table 7, Table 8

6 Cost-benefit ratio

Table 9, comparison to previous studies

7 Conclusions

$$\text{Benefit} = \sum_{t=0}^e \text{BM}_t / (1+r)^t + \sum_{t=0}^l \text{BL}_t / (1+r)^t \quad (1)$$

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

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

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

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

- 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 <http://www.f.waseda.jp/smatsu/>
- Pearce, D, G. Atkinson and S. Mourato (2007), Cost-Benefit Analysis and the Environment, OECD
- Memon, A. M. and S. Matsuoka (2002), "Validity of contingent valuation estimates from developing countries: scope sensitivity analysis", *Environmental Economics and Policy Studies*, 5(1), pp.39-61

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