

Chapter 8

Expenditure for Environment Protection and Its Macro-economics Influence

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1. Meaning and background of SEEA

There is a comprehensive statistical system called the "System of National Accounts" (SNA) whereby the flow and stock of a country's economic activities are systematically recorded using a standard format. Things such as GDP are calculated based on this system.

However, it is difficult to use the SNA to gain an understanding of the deterioration of the environment (external diseconomy) that goes hand in hand with economic activities. Because of this, there is a call to integrate the environment and the economy, and to establish, from the viewpoint of realizing "sustainable development", a statistical system that enables us to understand the interrelationship between the environment and the economy.

The introduction of SEEA in the form of an SNA satellite account was proposed when the United Nations revised the SNA in 1993.

The Economic Planning Agency has been carrying out research and development into the System for Integrated Environmental and Economic Accounting as a medium to long-term project since 1991.

However, This estimation is based on the several assumptions of underling data. Thus, it is necessary to note that it is a stage of trying examination at this time.

2. The trial estimation of the comparison of long-term time series of the Actual Environmental Costs and the Imputed Environmental Costs to the GDP

2.1 Actual Environmental Costs

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Definition

The expenditure actually paid concerning the economic activities related to the environment is said, "Actual Environmental Costs".

Items estimated

In the trial estimation at this time, waste management, recycling, pollution control activity of industry, sewerage, waste management, environmental administration of the government, and other environment, related defensive activities were estimated.

2.2 Imputed Environmental Costs

Definition

"Imputed Environmental Costs" means the assumed deterioration of the environment due to economic activities. It can be said that the Imputed Environmental Costs is the external diseconomy concerning the environment measured in money.

Items estimated

- Discharge of residuals
 - Air pollution (SO_x (sulfur oxide), NO_x (nitrogen oxide))
 - Water pollution (BOD (biochemical oxygen demand), COD (chemical oxygen demand), N (nitrogen), P (phosphorus))
- Use of land and timber etc
 - Land development (degradation), deforestation (depletion)
- Depletion of resources
 - Depletion of subsoil resources (coal, lime stone, zinc)
- Effects on the global environment
 - Global warming caused by CO₂ emissions

Estimation method for Imputed Environmental Costs, and items estimated

The so-called "Maintenance Costs Valuation Method" was used as the basis of the method for estimating Imputed Environmental Costs. The Maintenance Costs Valuation Method is a method whereby an indirect evaluation is made by estimating the costs necessary to maintain the state of the environment, for which qualitative and quantitative changes have occurred, at a certain level.

To rephrase the above, an estimate is made of the cost of hypothetical measures to prevent environmental deterioration that has already occurred. It is important to

note that this estimate does not represent the value of the damage caused by the environmental deterioration.

2.3 Long-term time series estimation

2.3.1 Actual Environmental Costs (Diagram1)

Actual Environmental Costs (the gross value added for environmental protection activities) in 1995 was 5.6 times that of 1970 (7.7 times for industries only, 3.6 times for the government only). The growth in Actual Environmental Costs was particularly large for industries.

2.3.2 Imputed Environmental Costs (Diagram2)

The total Imputed Environmental Costs were highest in 1975 at 6.18 trillion yen, and lowest in 1990 at 4.19 trillion yen. The overall trend is that imputed environmental costs were high in the 1970s, before dropping and then going sideways in the 1980s and the 1990s.

The Imputed Environmental Costs as a percentage of GDP were highest in 1970 at 3.1%. This figure dropped rapidly in the 1970s, reaching 1.5% in 1980. The values for 1990 and 1995 were both 1.0%.

2.4 Conclusion

The Japan economy has grown up steadily though there was time when economy was very confused as the two oil crisis (1973, 1979) after 1970.

During this period, the Actual Environmental Costs had increased steadily, and the Imputed Environmental Costs which means the environment deterioration due to economic activities had decreased.

Therefore it can be said that it is not in the relation that the environment protection conflicts with the economic development.

3. The trial estimation of the Environmental Protection Expenditure Account

“Environmental Protection Expenditures” are those expenditures spent on economic activities for environmental protection, “The Environmental Protection Expenditure

Account” macro-economically summarizes such costs into statistical data.

One effort the Environmental Protection Expenditure Account makes is to calculate an index for the “National Expenditure for Environmental Protection”. Roughly speaking, “National Expenditure for Environmental Protection” is the sum of the consumption of environmental protection services (for example, wastewater treatment and waste treatment services) and of the gross capital formation to produce environmental protection services (e.g., construction costs of wastewater treatment facilities). Hence, national expenditure is constructed in the similar way as Gross Domestic Product. The national expenditure aggregate indicates the amount spent by the nation in a given year for environmental protection. Therefore, the GDP ratio may contribute toward evaluating the relative national efforts for environmental protection.

“Environmental Protection Expenditures” is like “Actual Environmental Costs” mentioned above. The biggest difference is containing the capital outlay in the “Environmental Protection Expenditures”.

3.1 Comparison with Germany and Australia (Table 1, 2)

Germany and Australia are examples of foreign nations estimating the Environmental Protection Expenditure Accounts in 1995. The characteristics of the structural proportion of Environmental Protection Expenditures by domain show that the structural proportions of the protection for nature conservation (18%) in Australia and of protection for ambient air (including noise abatement and other environmental protection; 18%) in Germany are large. The gross amount and per capita amount of the Environmental Protection Expenditure is highest in Japan, but the percentage of the GDP is highest in Germany. Australia shows the lowest figures among the nations.

3.2 Comparison with European Countries (Table1 3)

I compared the European countries with Japan about the Environmental Protection Expenditures though it was not a comparison of the simultaneous point. (Tables 3 and 4)

As well as the case mentioned above, there are differences among the structural proportion of environmental protection expenditures (EPE) of each country, reflecting the differences in the priority of environmental issues in each country. Though there is a wide discrepancy among countries for the range subject to estimation for the environmental protection expenditure, Ratio of EPE to GDP is within the range between 1% and 3%.

3.3 Conclusion

However, this is an evaluation based on monetary units and does not indicate that environmental control measures are sufficient when the GDP ratio is high. On the other hand, this may signify that the social structure of the economy is such that it requires huge environmental control measure expenditures, or that the unit cost required for the environmental control measures is high.

Anyway, the development of physical data related to environmental protection is also required to analyze the cost effects of environmental control measures. However, though there is difference of various condition, it is interesting to note that Ratio of EDP to GDP is within the range between 1% and 3%.

Table 1 Environmental Protection Expenditure - % of GDP

(%)

Domains	Countries		
	Germany	Australia	Japan
Waste water management	1.39 (47.9)	0.59 (35.0)	1.08 (45.5)
Waste management	0.96 (32.9)	0.48 (28.4)	0.86 (36.2)
Protection of ambient air	0.52 (18.0)	0.10 (6.0)	0.19 (7.8)
Protection of biodiversity & landscape	0.03 (1.2)	0.31 (18.5)	—
Other	0.00 (0.1)	0.21 (12.1)	0.25 (10.5)
Total	2.91 (100.0)	1.70 (100.0)	2.38 (100.0)
GDP (million dollar)	2,402,512	364,990	5,137,359

*Figures of GDP were calculated based on GDP of each national currency and on exchange rate for US dollar.

These data were from "National Accounts, Main Aggregates 1960-1997", 1999 Edition, OECD.

Table 2 Environmental Protection Expenditure - dollar per inhabitant

(US dollar)

Domains	Countries		
	Germany	Australia	Japan
Waste water management	409.5	120.1	443.3
Waste management	281.6	97.4	353.1
Protection of ambient air	153.7	20.7	76.2
Protection of biodiversity & landscape	10.1	63.4	—
Other	0.6	41.5	102.5
Total	855.5	343.1	975.1
Population (thousand persons)	81,661	18,072	125,570

*Figures of population are from "National Accounts, Main Aggregates 1960-1997", 1999 Edition, OECD.

Table 3 Comparison of Environmental Protection Expenditure—% of GDP with European Countries

(%)

	European Countries							Japan	
	Switzerland 1993	Germany 1991	French 1994	Holland 1991	Finland 1994	Sweden 1991	England 1994	1990	1995
Waste water management	0.76 (34.9)	1.08 (50.7)	0.73 (50.3)	0.80 (32.9)	0.62 (45.6)	0.56 (35.7)	0.53 (43.1)	0.84 (45.7)	1.08 (45.4)
Waste management	0.64 (29.4)	0.55 (25.8)	0.52 (35.9)	0.56 (23.0)	0.35 (25.7)	0.43 (27.4)	0.38 (30.9)	0.71 (38.6)	0.86 (36.1)
Protection of ambient air	0.48 (22.0)	0.46 (21.6)	0.13 (9.0)	0.52 (21.4)	0.16 (11.8)	0.11 (7.0)	0.15 (12.2)	0.18 (9.8)	0.19 (8.0)
Other	0.29 (13.3)	0.04 (1.9)	0.07 (4.8)	0.55 (22.6)	0.23 (16.9)	0.47 (29.9)	0.17 (13.8)	0.11 (6.0)	0.25 (10.5)
Total	2.18 (100.0)	2.13 (100.0)	1.45 (100.0)	2.43 (100.0)	1.36 (100.0)	1.57 (100.0)	1.23 (100.0)	1.84 (100.0)	2.38 (100.0)

() = % of total national expenditure

Diagram 1 Succession of Environmental Protection Activities and Share of GDP

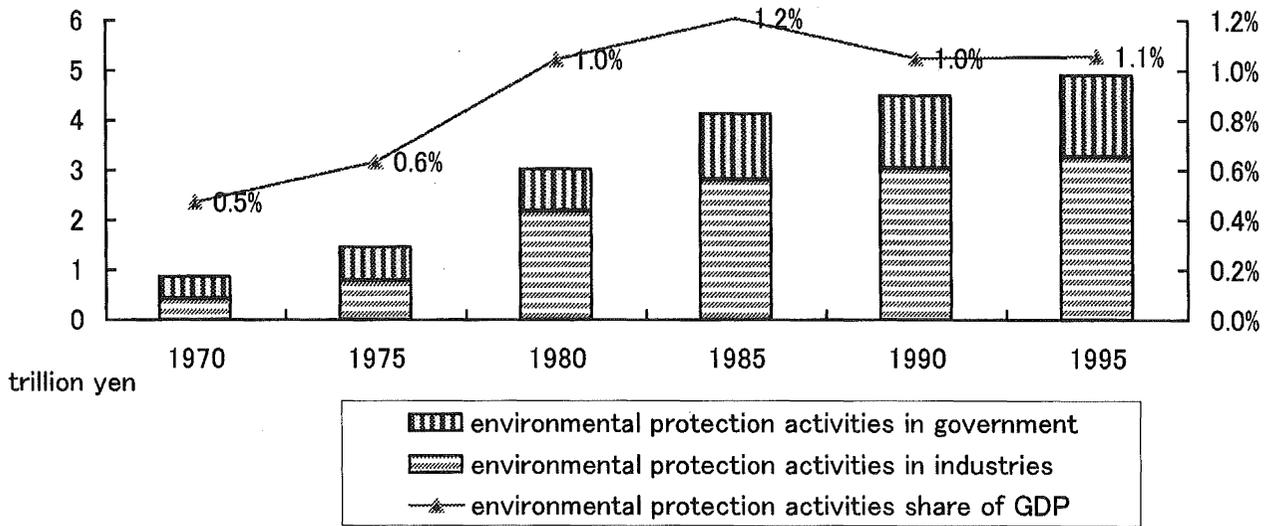


Diagram 2 Succession of Imputed Environmental Costs and Ratio to GDP

