

The Effects of European type Environment (Carbon) Tax and A Proposal of Tax Aiming to Achieve GHG's Reduction in Japan

Yoshiki Ogawa

Professor, the Department of Policy Studies,
the Faculty of Economics, Toyo University

5-28-20 Hakusan, Bunkyo-ku, Tokyo 112-8606 Japan

Tel: 81-3-3945-4736, Fax: 81-3-3945-7667

E-Mail: y-ogawa@ toyo.jp

(1) Overview

Several European countries introduced environment tax (carbon tax) from early 1990s up to now. The Ministry of Environment in Japan has also discussed eagerly about the introduction of environment tax since early 1990s. Now the first period of Kyoto Protocol has just finished, and Japan needs to cope with the 25% reduction of GHGs toward 2020 as a next target. For this purpose, new additional measures would be required to be adopted, and the environmental (carbon) tax would be an important candidate option. In this paper, we would like to analyze actual effects of introduced European type environment tax and we also would like to make a appropriate environment tax aiming to achieve GHG's reduction in Japan.

(2) Method

First, we made an analysis on factors affecting CO₂ emission for 9 countries such as Finland, Sweden, Norway, Denmark, Netherland, United Kingdom, Germany, Italy and Switzerland which introduced environment tax (carbon tax) already in Europe.

Second, we surveyed historical discussions of environment tax in Japan centering the proposals of environment tax made by the Ministry of Environment.

Third, we compared the three different types of environmental (carbon) tax from the viewpoints such as the size of tax rate, the size of tax revenue and the size of GHGs' reduction.

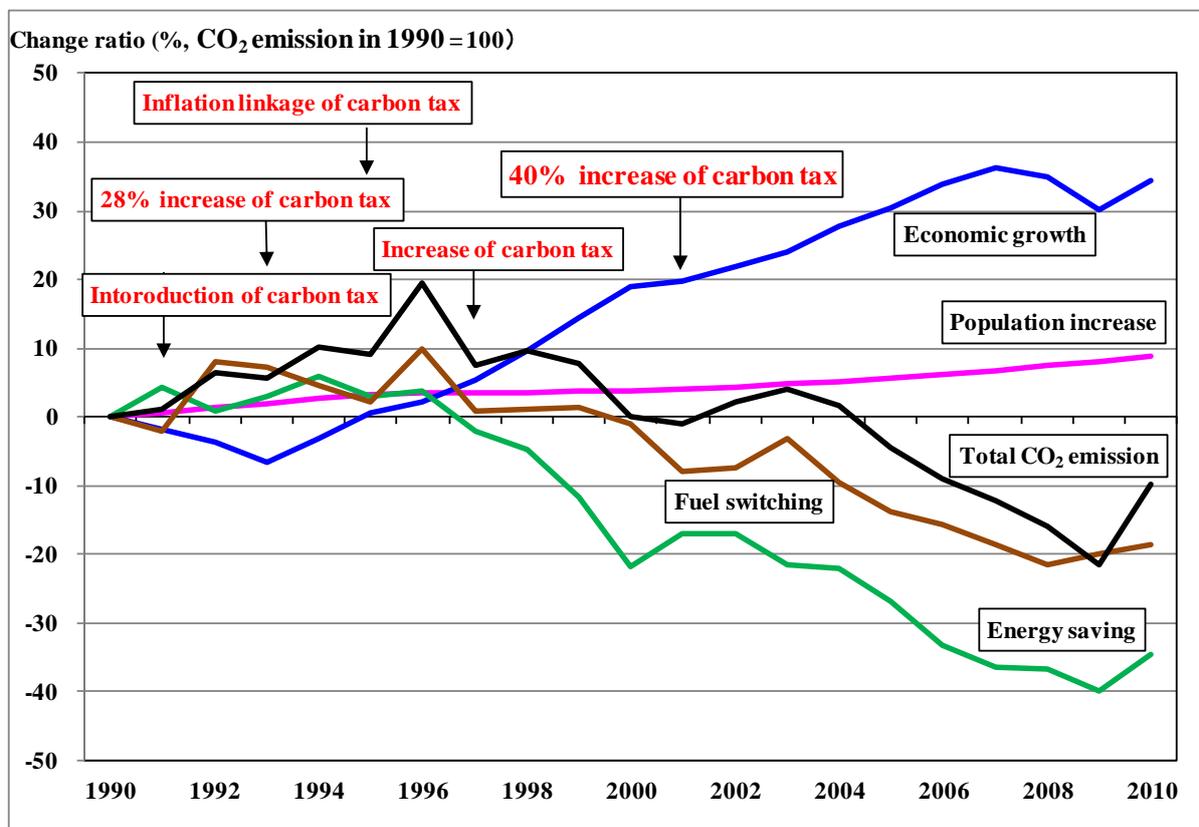


Fig. 1 Factors affecting CO₂ emission in Sweden and movements of carbon tax

(3) Results and conclusions

As an example, Figure 1 shows changes in factors affecting CO₂ emissions from 1990 (the base year of Kyoto Protocol) through 2010 in Sweden with movements on the introduced carbon tax. The similar analyses were also made other eight countries. We could find several partial effects for the reduction of CO₂ emissions in several countries, but we could not find the full-scale reduction effects by carbon tax to achieve the target of Kyoto Protocol in the investigated European countries.

Next, the analyzed results of three different types of environmental (carbon) tax are shown in Table 1. We defined three different types such as (1) European type, (2) domestic measures type, and (3) overseas measures type.

Table 1 Comparison of Three Different Types of Environmental (Carbon) Tax

		Carbon Tax (European type)	Carbon Tax (Domestic measures type)	Carbon Tax (Overseas measures type)	
				Credit Price (US\$ / t-CO ₂)	
				17 US\$: 1,445 Yen	30 US\$: 2,550 Yen
Carbon Tax Rate	(Yen / t-CO ₂)	38,259.6	11,392	554	958
Reduction by price	(1,000 t-CO ₂)	361,250	170,559	10,374	17,664
Reduction by revenue	(1,000 t-CO ₂)	0	190,691	350,876	343,586
Total reduction	(1,000 t-CO ₂)	361,250	361,250	361,250	361,250
Carbon Tax Revenue	(Billions Yen)	27,138.0	8,080.5	506.8	876.1

In the case of European type of environmental (carbon) tax, the necessary CO₂ reduction is achieved only by the price effects of taxation. The carbon tax rate is reached to the quite high level and the revenue of carbon tax is also reached to the quite huge size, as shown in Table 1.

In the case of domestic measures type of environmental (carbon) tax, the necessary CO₂ reduction is almost evenly shared to that caused by the price effect of taxation and to that caused by the revenue effect of covering the necessary cost of domestic reduction measures. The carbon tax rate is still high and the size of tax revenue is also still large, also as shown in Table 1.

Finally, in the case of overseas measures type of environmental (carbon) tax, the necessary CO₂ reduction is mainly made by the revenue effect of covering the necessary cost of CO₂ reduction credit acquisition under the quite low tax rate. The small part of CO₂ reduction is also made by the price effect of taxation and the size of tax revenue also remained to the low level.

(4) Concluding remarks

Several European countries introduced environment (carbon) tax in the past. In almost all of these countries, the tax revenue is used for the burden reduction of social welfare and pension cost or the establishment of tax neutrality. Thus, CO₂ reduction is mainly made by price effect of taxation.

Based on the analyses on factors affecting CO₂ emission in above-mentioned European countries, we could not find full-scale CO₂ reduction effects by the introduction or strengthening of environment (carbon) tax. Thus, from the viewpoint of CO₂ reduction, the good results are not always obtained in European countries.

Based on the results of tax simulations, we conclude that the overseas measures type of environment (carbon) tax would be reasonable and desirable as an additional measure for the 25% GHGs' reduction required in the next step toward 2020 in Japan, because both sizes of carbon tax rate and tax revenue are considered to be quite suitable.

(5) References

- [1] A. Amano [2011], "CO₂ Reduction Effects by Introducing Carbon Tax and Utilizing Its Tax Revenue," Environmental Economics and Policy Research, No.1, pp. 41—54, 2011.
- [2] The Ministry of Environment [2006], "The Estimation of Cost Curve for Domestic GHGs Reduction Measures," <http://www.env.go.jp/council/06earth/r062-01/2-5.pdf> (referred on Jan. 14, 2013), 2006.
- [3] World Bank [2012], "State and Trends of the Carbon Market Report 2012," http://siteresources.worldbank.org/INTCARBONFINANCE/Resources/State_and_Trends_2012_Web_Optimized_19035_Cvr&Txt_LR.pdf (referred on Jan.14, 2013), 2012.
- [4] IEA, "CO₂ Emissions from Fuel Combustion," (2012)