

Fiscal Policy and Environment: Green taxes in Croatia

*Sanja Tišma, Anamarija Pisarović, Krešimir Jurlin**

Original paper
UDC 336.2:504(497.5)
Received in July 2003

Environmental regulations offer a useful instrument for raising revenue. Governments are using charges or taxes for activities that generate environmental damage. Experiences of green taxes in Croatia and in the countries of OECD, EU and CEE show that they are desirable through more detailed concerns relating to the design and quality/quantity issues. What would an ideal, theoretical environmental tax look like? What is the actual experience of applying green taxes: the case of Croatia. Analysis of taxes implemented in the Croatian environmental policy in the field of environmental protection financing. What are conclusions and recommendations in design and implementation of green taxes in Croatia as useful fiscal instrument in achieving the sustainable development and environmental protection.

Key words: Croatia, environment, fiscal policy, "green taxes"

1. Introduction

In the past two decades there has been increased concern about environmental problems in all countries, and governments are requiring their citizens to commit significant resources to its protection. Views about the ways in which such resources are to be committed have also been changing significantly in the past seven or eight years. Policy makers have become aware that the costs of direct regulations (on what technology is to be used and what pollution releases are to be permitted) can be very high both for industry and for the administrative body. Furthermore, environmental regulation offers a useful instrument for raising revenue, either for general public finance purposes or for environmental protection. Thus governments are

increasingly turning to indirect methods of control, the main one being the use of charges or taxes related in some way to an activity that generates environmental damage.

This paper provides a review of experiences with green taxes in Croatia and in selected group of countries (OECD, EU, CEE) with the different start up positions and different approaches in design and implementation of green taxes. According to the situation in Croatia, some conclusions are drawn and recommendations prepared having in mind the circumstances under which some form of environmental taxation is desirable through more detailed concerns relating to the design and quality/quantity issues.

In the first part of this paper the principles of green taxation are reviewed. It begins with what an ideal, theoretical environmental tax would look like, outlines the reasons why such a tax is almost never feasible, and concludes with an examination of the alternatives that could be implemented. In addition, this part examines a number of general issues that

* Sanja Tišma, Anamarija Pisarović, Resource Economics and Environmental Policy Department, Institute for International Relations, Zagreb, Croatia; Krešimir Jurlin, International Economic and Political Relations Department, Institute for International Relations, Zagreb, Croatia

arise in connection with the design of a green environmental tax as the question of 'earmarking', fiscal neutrality and fiscal restructuring, value versus quantity based taxes, possible combination with other forms of regulation or creation of a stable fiscal regulatory framework.

The second part of the paper reviews the actual experience with the process of implementation and application of green taxes in OECD countries and some European countries in transition, especially emphasising the case of Croatia.

Part three consists of the analysis of taxes and other economic instruments implemented in the Croatian environmental policy in the field of environmental protection financing and the level of state budgetary funds based on collected green taxes during the fiscal year.

Finally, part four offers a conclusion and recommendations for further activities in design and implementation of green taxes in Croatia as useful fiscal instruments in achieving the sustainable development and environmental protection.

2. Principles Of Green Taxation

The Ideal Model The point of departure for the discussion on environmental taxes has to be the economic rationale for such taxes. The basic argument is that, in the absence of any regulation, the environment is used or degraded excessively, i.e., to a point where the costs of reducing that degradation to some degree are less than the benefits in terms of an improved environment. The point is illustrated in Figure 1 where, to fix ideas, one can think of air pollution emanating from several sources of fossil fuel. The total level of emissions within an air shed is measured on the horizontal axis. The vertical axis measures, in monetary terms, the additional costs of reduc-

ing emissions by one unit, assuming that the reduction at each stage takes place from the least costly source. This could involve changes in technology, or relocation within the air shed, or reductions in outputs that generate the emissions. The curve representing the additional (also called marginal) cost of abatement is given by MAC in Figure 1. Its shape follows from the above assumptions. In the absence of any controls it would pay polluters to keep emissions at a level of OA, because that is the level at which there are no costs incurred for abatement. Also, at that point the marginal costs of abatement would be very small. In Figure 1 they are given by the area ABC.

The other curve in Figure 1 is a measure of marginal damages caused by the emission. These would consist of increased incidence of respiratory diseases, damage to property, crops, water bodies etc. The marginal damage curve MD is drawn assuming that, at each stage, individuals respond to any increase in the emissions so as to minimize the impact it has on them. The shape of this curve is less clear but it is commonly assumed that, as the environment improves (i.e., emissions are reduced), the marginal value of further improvement declines. Hence the shape drawn in Figure 1.

The "optimal" level of emissions is given by OE, which is the point at which the marginal cost of abatement and the marginal damage are equal. An increase in emissions from that point would entail damage to the environment greater than the savings in abatement cost; and a decrease in emissions would imply a cost of abatement in excess of the damage reduced. The economically optimal position would be obtained by imposing a green tax of EE^* on each unit of emissions. With such a tax, each polluter would reduce emissions to the point where its MAC was equal to EE^* , and thereby achieve the optimal reduction at the least cost. There would also be a continuing incentive to reduce emissions, as savings in tax

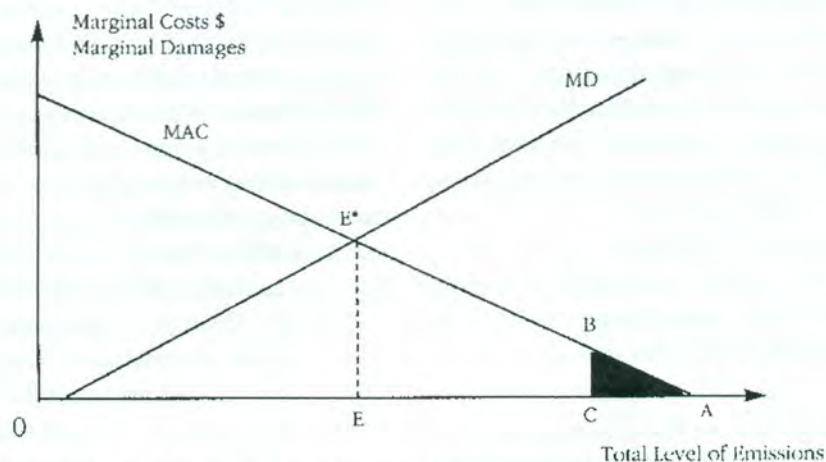


Figure 1. Marginal Costs, Damages and Optimal Pollution Control

Source: *Environmental Taxation*, OECD, 1993, pp.4.

would reward these. The same solution could also be achieved by giving a subsidy to each polluter of EE' for each unit of pollution reduced from the present level or if the authority issued emissions permits equal to OE and allow them to be traded in a competitive market which would ensure that each polluter purchased permits to the point where the price was equal to its MAC, which is then also equal to MD.

Generally, the choice between green taxes and subsidies is resolved in favour of taxes especially because the subsidies need an assessment of the level from which reductions will be paid for, which is complex and raises issues of equity and have a different effect on the profitability of the operations and thereby on entry and exit from the industry. In the similar market situation green taxes generate revenues whereas subsidies require revenues, which have to be raised elsewhere in the system, thereby generating inefficiencies.

The choice between green taxes and permits depends largely on how one perceives the uncertainty associated with these instruments. Since neither the MAC nor the MD curves are known with any precision, a green tax would require estimating the value of EE' while a permit system would require estimating the value of OE. If the tax is estimated wrongly, the level of pollution reduction will be "incorrect" – too high or too low. Permits require fairly sophisticated market structures where prices are fixed and trades made, which is not always set up especially in developed countries.

Other forms of environmental instruments

In practice, the kind of green tax outlined above is almost impossible to implement. The reason for this is that the basis for calculation is almost immeasurable environmental "quality" and serious problems in measuring "emissions" with involvement of an impossible amount of data for many polluters. In view of these constraints, application of green taxes will be quite far removed from the ideal model outlined above and there are other economic instruments, which would obviously cover the gap between fiscal measures and environmental goals.

Economic instruments can be classified in a number of ways. One of the well-known classifications is OECDs classification where all instruments are classified into five groups (OECD, 1992):

- **Charges** may be considered as a "price" to be paid for pollution (e.g. effluent charges, product charges, administrative charges).

- **Subsidies** are various forms of financial assistance, which must act as an incentive for polluters to alter their behaviour towards the environment (e.g. grants or non-repayable forms of financial assistance, soft loans, etc).

- **Deposit-refund systems** based on the price of potentially polluting products. When pollution is avoided by returning these products or its residuals to a collection system, a refund of the surcharge follows.

- **Artificial market** as a system of possibility to buy "rights" for actual or potential pollution or where they can sell their "pollution rights" or their process residuals.

- **Enforcement incentives** as a legal instrument based on "punishment" for pollution either by requiring a payment returnable upon compliance or by charging a fine when non-compliance occurs.

3. Green Taxes – Global Past Experience

Economic instruments including green taxes have been introduced as one way to implement the Polluter Pays Principle (PPP), which has become widely accepted as the general framework for internalising environmental externalities. In 1972, the principle was adopted by the OECD Council as an economic principle for allocating the costs of pollution prevention and control (OECD 1972). The primary concern of the Council in 1972 was to address the international economic and trade implications of environmental policies.

During the 1980s, the idea of market-based instruments for environmental policy was accepted and gradually implemented. An early indication of this change was the emphasis given to economic instruments in environmental policy by the report of the World Commission for Environment and Development in 1987. In 1991, OECD countries endorsed the use of economic instruments to implement the PPP. The Rio Declaration on Environment and Development (1992) also discussed economic instruments, and in particular green taxes and their role in achieving the future sustainability.

By the mid-1990s the use of economic instruments in OECD member states had increased by approximately 50 percent compared to the data from 1989, and this trend is still recognisable in Western European countries.

The main instruments in use for environmental protection are green environmental taxes but there are also a significant number of other instruments being used on a daily basis (e.g. charges, tradable permit systems, deposit refund systems, non-compliance fees, performance bonds, liability payments, and subsidies for environmental protection.)

At the European level, interest in green taxes as a part of environmental instruments became visible in 1989 with the European Commission's Task

AIR EMISSIONS															
Sulphur dioxide tax					+	+		+	+		+		+		
Nitrogen oxides tax					+	+		+	+		+		+		
Emission non-compliance fee			+	+	+	+	+	+	+		+	+	+		+
TRANSPORT RELATED TAXATION															
Excise tax			+	+		+		+	+	+	+	+			
Annual vehicle tax	+		+	+e		+f	+	+	+		+	+	+g		
Highway toll				+	+		+				+		+		+
Road tax				+	+					+h					+
Sales tax		+	+	+			+								+
Import duty	+	+	+	+			+		+	+	+	+	+	+	+
Registration charge	+	+	+			+		+	+		+	+	+	+	+
Company car tax											+				
Instrument	Alb	BiH	Bul	Cro	CR	Est	H	Lat	Lit	Mac	Pol	Rom	Sla	Sle	Yug
AIR TRANSPORT															
Landing/flight taxes	+					+									+
Noise tax/charges etc.							+					+			
AGRICULTURE															
Pesticides										+i	+i				
Fertilisers											+i				
Soil protection charge							+								
WASTE RELATED PRODUCT CHARGES															
Ozone depleting substances					+			+				+	+		
Batteries/accumulators					+		+	+	+				+	+	
Carrier bags															
Disposable containers/packaging						+j	+	+	+		+k				
Tyres			+		+		+	+	+						
Light bulbs								+							
Lubricants								+							
Refrigerators							+								
WASTE															
Municipal waste user charges	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Waste disposal charge/tax				+	+	+	+	+		+	+	+l	+	+m	

Waste non-compliance fees			+	+		+	+n	+	+		+	+	+		+o
Deposit refund schemes	+		+	+	+		+		+		+	+	+		+
Levy on nuclear energy			+		+		+	+					+		
INSTRUMENTS FOR MANAGING WATER QUALITY															
Water user charge	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sewage charge		+	+	+	+	+	+	+	+	+	+	+	+	+	+
Water effluent charge/tax		+		+	+	+		+	+		+	+	+	+	+
Water pollution non-compliance fee	+		+	+		+	+	+	+	+	+	+	+		
Instrument	Alb	BiH	Bul	Cro	CR	Est	H	Lat	Lit	Mac	Pol	Rom	Sla	Sle	Yug
INSTRUMENTS FOR MANAGING WATER QUANTITY															
Water extraction charge/tax		+	+	+	+	+	+	+	+	+	+	+	+	+	+
NATURAL RESOURCE AND MINING															
Mining charges/taxes	+	+	+	+	+	+	+	+	+	+	+		+		+
INSTRUMENTS FOR BIODIVERSITY AND NATURE PROTECTION															
Charges for conversion of agricultural and forest land				+	+								+		
Hunting charges			+	+		+	+		+		+	+		+	
Fishing charges			+	+		+		+	+		+	+			
Natural park entrance charges				+							+	+			
Nature protection non-compliance			+	+		+	+		+		+	+	+		+
Tree cutting charge/taxes ^p		+	+	+			+	+	+		+	+			
Tree cutting non-compliance fee									+		+	+			

Source: Environmental Taxes in an Enlarged Europe, REC, 2001, pp.23.

Notes:

- a. Ad valorem tax
- b. Emission charge, based on the power of combustion plants using fossil fuels
- c. Part of the excise tax
- d. Sulphur content non-compliance charge
- e. Tax on road motor vehicles
- f. Tax of the city of Tallinn
- g. Applied to commercial vehicles only
- h. Taxes for the use of roads by foreign vehicles and taxes for the use of roads by the vehicles exceeding standard dimensions are levied in Lithuania in addition to the road tax
- i. Reduced VAT rates for agricultural inputs
- j. Excise tax
- k. Excise tax on plastic packaging materials
- l. Introduction of waste disposal charge is under discussion
- m. Introduction of waste disposal charge is under discussion
- n. Only for hazardous wastes
- o. Only for industrial/hazardous wastes
- p. A variety of charges is levied in different countries ranging from tree cutting charges to charges on exports of wood, forest protection charges, etc.

4. Green Taxes In Croatia

Current Croatian economy is based primarily on the known matrix consisting of: agriculture, tourism, industry and transportation. Tourism has become an important economic activity in Croatia, responding to actual market demands on one hand and indicating the future in which tourism complex will be dominant economic activity and the complementing activities will be agriculture, commerce, services and transportation. In the transitional period Croatia has directed development strategies predominantly to tourism.

In current economic activities, especially those based on the development of industry, agriculture and transportation, certain conflicts occur between development and natural resources. Another type of conflicts is caused by excessive urban sprawl and it is manifested primarily in irrational use of valuable agricultural land for other uses. The conflicts occurring between economic activities and the environment result from excessive migration from the hinterland to developed coastal cities so they are facing not only congestion but also social behavioural problems and low quality of urban living.

The analysis of the application of all kinds of economic instruments in Croatia has shown that economic instruments have been widely applied in practice in the short period of time. Most frequently applied economic instruments are green taxes and charges since they have proven to be practical and efficient. Economic instruments are widely applied in the fields of water protection, land, industry, solid waste, i.e. in the fields with most apparent environmental problems.

Green taxes as a part of the State budget income and income of extra-budgetary funds The State budget covers the significant part of revenues from public charges related to products that pollute the environment or from the use of the environment (green taxes on oil derivatives, passenger cars, motor vehicles, vessels and aircrafts, tobacco products, then charges for concessions and other charges in maritime affairs, agriculture, fishery and hunting as well as charges in road traffic). The revenue of the State budget planned for 2001 from these sources was EUR 942.48 mil. or 12.2 per cent of its total revenues.

Within the framework of other sources of financing in the environmental protection one should highlight special earmarked charges that provide revenues for the extra-budgetary fund of the Croatian Water Resources Management and the Croatian Company for Managing Forests, such as water protection charge paid on the basis of Water Act and the Water Management Funding Act and their related implement-

ing regulations, or rather the charge for the use of non-timber forest functions paid on the basis of the Forests Act. While the water protection charge is completely intended for the protection of waters, the charge for non-timber forest functions has a multipurpose character that includes environmental protection and improvement. By collecting water protection charges from legal and physical persons who discharge wastewater and other substances that pollute water or deteriorate their quality and usability, a revenue of EUR 20.8 million was raised in 2000. At the same time the charges for utilization of non-timber forest functions paid by legal persons involved in business activities in compliance with the Commercial Companies Act account for EUR 24 million of the revenues (Table 2).

The economic instruments applied in Croatia can be characterized as fiscal rather than environmental measures, since their main objective is to generate revenues. The rates are generally still too low to have an incentive effect, i.e. to change polluter behaviour. Revenues generated by environmental levies are regularly earmarked for new environmental fund.

The expectation from the green taxes as well as the charges in Croatia as economic instruments for financing sustainable development and environmental protection are designed to offer a permanent inducement in order to develop more efficient clean-up of preventive technologies and to support pollution control processes, have quick effects in pollution prevention and quick rehabilitation of different eco-systems and raise the funds necessary for environmental programmes which are also to be invested in maintenance and improvement of environmental quality. In other words, they are expected to be effective, promotional, stimulating and restrictive, or they help to achieve quick change of actual situation.

Although the green taxes have already been implemented a lot of work should be done to make them successful in environmental protection, make them easy to use, properly organized and easily adaptable to new environmental requirements.

Once the green taxes are properly established in Croatia, their future efficiency should be measured and evaluated with a set of performance indicators based on their effects on revenue raising, pollution reduction, rational use of natural resources, change of polluters' technology, change of people's behaviour, improvement of environmental quality and support to integrated planning. According to this criterion, green taxes in Croatia are expected to help reduce pollution, regardless of whether they have a restrictive or incentive function. Pollution reduction is expected to be the most important effect of economic instrument in environmental protection practice.

Table 2 Chosen budgetary and extra-budgetary revenues in relation to natural resources usage and environment pollution mil EUR

	User	1998	1999	2000
STATE BUDGET REVENUES				
Charges				
1. Charge for fishery	State budget	1,06	1,06	0,8
2. Charge for hunting concession	State budget	0,26	0,4	0,4
3. Charge for maritime goods concession	State budget	0,4	0,4	1,46
4. Charge for water and public water good concession	State budget	2	2,8	7,06
5. Charge for public road concession	State budget	0	0	0
5. Charge for agricultural land utilization in state ownership (concession charge)	State budget	0,13	0,12	0,6
6. Hunting rental	State budget	1,86	2,26	0,8
Special taxes				
7. Special tax for utilization of passengers cars, other motor vehicles, vessels and aircrafts	State budget	14,8	11,46	13,3
8. Special tax for oil derivatives	State budget	422,53	457,6	617,6
9. Special tax for cars, other motor vehicles, vessels and aircrafts	State budget	4	24,53	13,46
10. Special tax for tobacco products	State budget	264,4	262,53	276,4
TOTAL		711,3	763,18	931,93*
EXTRA-BUDGETARY REVENUES				
11. Charge for water usage	Croatian Water Resources Management	33,3	33,3	20
12. Charge for water protection	Croatian Water Resources Management	31,3	30,6	20,8
13. Charge for sand and gravel exploitation	Croatian Water Resources Management	0,06	0,026	0,053
14. Charge for ceded and limited authority on forest and forest land	Croatian Company for Managing Forests	0,66	0,53	0,4
15. Charge for non-timber forest functions usage	Croatian Company for Managing Forests	18,6	16,6	24
16. Charge for purpose altering of the agricultural land	Ministry of Agriculture and Forestry	1,73	1,73	0,76
TOTAL		85,8	82,96	66,01
GRAND TOTAL (mil kuna)		797,13	846,14	997,95

Source: Payment bureau, Croatian Company for Managing Forests, Ministry of Agriculture and Forestry, Ministry of Environmental Protection and Physical Planning, Department for economic stimulation, Zagreb, 17. 01. 2001.

*931,93 mil EUR makes 14,86% of total State budget for 2000.

The change of people's attitude towards the environment is a long-term process; however, it is often possible to speed up this process by applying adequate system of green taxes/charges, particularly those with educative function. The most important objective to be achieved by the application of green taxes and other types of economic instruments is the improvement of environmental quality. This is of significance in the efficiency evaluation of economic instruments and together with the idea of the role of

taxes through state budgets funds for integrated planning shows the necessity of natural resources management, which is the basic institution responsible for the preparation, creation and implementation of economic instruments in practice.

5. Conclusion And Recommendations

A move towards greater and more consistent use of economic instruments as a complement or a substitute for other policy instruments, such as regulation, can be found in environmental policies in CEECs. Levies are charged on a range of air pollutants, solid and hazardous waste streams, discharges of wastewater, surface and ground water extraction, and in addition, the consumption of energy products is subject to taxes. A major driving force for this development is the EU accession process and the situation in OECD countries, where similar trends are exhibited (EEA 2001). These experiences from a range of OECD countries and EU member states, such as Denmark, the Netherlands and Sweden, should be transferred in the case of Croatia respecting the specific characteristics of the country such as natural resources to be protected in respect to cur-

rent economic conditions in the transitional period.

Green taxes and user charges in Croatia will certainly continue to play a key role in implementing domestic environmental policy and in adopting the requirements of the *acquis*. More recently, green taxes on fuels have been increased and are in some cases already in line with EU directives.

The integration of environmental taxes with other fiscal measures has been quite limited so far, and the coordination between the Ministry of Environmental Protection and Physical Planning and the Ministry of Finance is generally seen as an area where further improvements are both possible and necessary through improved dialogue between environmental and fiscal policymakers. Also, rising prices and increasing green tax rates will not be efficient without cooperation with legal, administrative, and domestic authorities.

Nevertheless, the challenge of financing the necessary investments in the environmental sector remains a top concern. External financing via EU programmes, international financial institutions (WB, EBRD, IBRD, UNEP), and bi- and multi-lateral cooperation will also play an important role. However, foreign sources will be limited and should be channelled to leverage domestic public and private revenue sources.

NOTES

¹ At the EU level, one of the key measures for protecting nature and biodiversity is the establishment and implementation of the Natura 2000 network. The accession countries are therefore expected to focus on the identification of areas and eco-systems that need special protection and management regimes,

and on the preparation of management plans and monitoring systems for each of the sites. Further policy measures (as stipulated in the 6th EAP) include sectorial biodiversity action plans, and actions aimed at better protection of landscapes through agricultural and regional policies.

BIBLIOGRAPHY

- Agenda 21, Report on Environmental State in the Republic of Croatia, MEPPP, Zagreb, 1997.
- An Introduction to Ecological Economics, ISEE, 1997.
- Annual Report on Croatian Competitiveness 2002, National Committee on Competitiveness and Institute for International Relations, Zagreb, 2003.
- Cost-Benefit Analysis and the Environment, Hanley&Spash, Edward Elgar (Ed.), 1993.
- Economic Instruments in Environmental Policy: Lessons from the OECD Experience and their Relevance to Developing Economies, OECD, 1994.
- Environmental Protection Financing, State Directorate for the Protection of Nature and Environment, Proceedings, Int. Conf., Mljet, 1998.
- Environmental Taxation, A Review of OECD Country Experience and Prospects for Economies in Transition, REC, 1993.
- Environmental Taxes in an Enlarged Europe, REC, 2001.
- Improving Environment and Economy, REC, 1999.
- Innovation zwischen Oekonomie und Oekologie, Faix, Kurz, Wichert (Ed.), 1995.
- Inventory of Taxes levied in the Member States of the European Union, EC, 1996.
- Metodološka primjerenost i praktična iskoristivost metode cost-benefit analize u eko-šumskom gospodarstvu Hrvatske, Benc. S., Disertacija, Ekonomski fakultet Sveučilišta u Zagrebu, 1997.
- National Strategy of Environmental Protection and National Action Plan, MEPPP, Zagreb, 2002.
- Negotiating Environmental Change: New Perspectives from Social Science, Berkhout, Scoones, Leach (Ed.), 2003.
- Oekonomie und Oekologie, Simonis (Ed.), Heidelberg, 1994.
- Outline of National Environmental Report, MEPPP, Zagreb, 2002.
- Primjena ekonomskih instrumenata u zaštiti okoliša u Republici Hrvatskoj, MEPPP, Zagreb, 2000.
- Project Portfolio – Croatia, The World Bank Group, Zagreb, May 2003.
- Report on the Environment and the Internal Market and the European Council's Dublin Declaration, 1990.
- Rio Declaration on Environment and Development, World Summit on the Environment and Development, Rio de Janeiro, 1992.
- Statistical yearbook of the Republic of Croatia, Central Bureau of Statistics, Zagreb, 2002.
- Strategic Action Program in Pollution Reducing in the Mediterranean through Activities on the Mainland (SAP/MED), Development of economic instruments for sustainable implementation of SAP-a, UNEP, PAP-RAC, Split in cooperation with MEPPP, Zagreb, 2003.
- The Economics of Sustainable Development, OECD, 1995.
- White Paper on Growth, Competitiveness and Employment, EC, 1993.