

SUSTAINABLE DEVELOPMENT

OECD WORKSHOP ON ENVIRONMENTALLY HARMFUL SUBSIDIES

A STOCKTAKING OF OECD WORK ON SUBSIDIES

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The views expressed in this paper are those of the author and do not necessarily reflect those of the IEA/OECD or its Member countries.

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1. Background

1. The OECD Ministers asked the OECD Secretariat to initiate work on environmentally harmful subsidies in 2001. This year they renewed their long-standing commitment to reduce trade distorting and environmentally harmful subsidies. Environmentally harmful subsidies were also debated at the World Summit on Sustainable Development and the adopted Plan of Implementation includes several references to them. While the OECD is internationally recognised as a leading organisation in the field of subsidy measurement and analysis, especially for agriculture, fisheries and coal, the work is characterised by a range of methodological approaches, patchy and incomplete data, and non-comparable subsidy estimates across the various sectors.

2. This paper provides an overview of subsidies¹ in OECD countries. It is based on the work carried out by the Directorate for Food, Agriculture and Fisheries, the Environment Directorate, International Energy Agency, the Directorate for Science, Technology and Industry, the Trade Directorate and the European Conference of Ministers of Transport. It draws heavily on the background papers prepared for the OECD Workshop on Environmentally Harmful Subsidies.

3. In some sectors work has been carried out to assess the environmental impacts of subsidies. While most of this work consists of ad-hoc studies, work on agricultural subsidies has been more systematic in identifying the relative impacts of support on the environment. The approach used in agriculture could provide a possible way forward to identify environmentally harmful subsidies in the other sectors. The approach, however, does not help to assess the extent to which subsidies accomplish other policy objectives and, consequently, cannot be used to identify which specific subsidies should be phased out. It would nevertheless appear that a lot of the existing subsidies are potentially harmful to the environment and reforming or phasing them out would benefit the society as a whole.

1. This paper uses the term “subsidies”, although in OECD work it is more common to refer to them as transfers, payments, support, assistance or protection associated with governmental policies. Sometimes these terms are used interchangeably, but often they are associated with different methods of measurement and thus different economic indicators. The 1995 OECD Workshop on Subsidies/Tax Incentives and the Environment defined subsidies as “economic and fiscal measures that have both clear budget impacts and negative side-effects on environmental quality” (OECD, 1996). Although the definition is pragmatic, it excludes market transfers (market price support in particular) and consequently is too narrow for the purposes of this report. Subsidies have also been defined to “comprise all measures that keep prices for consumers below market level or keep prices for producers above market level or that reduce costs for consumers and producers by giving direct or indirect support” (see, for example, De Moor and Calamai (1997) or De Moor (2001)). This definition is consistent with the definition used in the 1998 OECD report on “Improving the Environment through Reducing Subsidies”, where subsidies and tax concessions were defined to include “all kinds of financial support and regulations that are put in place to enhance the competitiveness of certain products, processes or regions, and that, together with the prevailing taxation jurisdiction, (unintentionally) discriminate against sound environmental practices”. It is not necessary to make a distinction between subsidies and tax concessions as the latter can be regarded as implicit subsidies.

2. Overview of subsidies in OECD countries

4. Many OECD countries are committed to reducing subsidies in the different sectors of the economy, but they have made only limited progress in this over the past ten years. Although the methodologies and coverage differ and consequently the subsidies data are not directly comparable across sectors, the figures do give an indication of the relative importance of the different sectors in this regard. Agriculture is the sector with the most complete data in terms of coverage and methodology. It is also the sector with the highest subsidy figures. Subsidies measured for the other sectors, such as transport and energy, amount to only a fraction of the figure for agriculture (Table 1).

5. Support to agriculture is high. In 2001, total support estimate to agriculture amounted to USD 311 billion (OECD, 2002d), which represents 1.3% of GDP in OECD countries. During the 1990s many OECD countries began to take steps to reduce and restructure their support policies in an effort to reduce overproduction and trade distortions, and to encourage more environmentally sound use of land, soil, and water. The pace of these developments has been modest and subsidies remain high in many OECD countries and for some commodities, causing production and trade distortions as well as adverse effects on the environment. In 2001, support to farmers represented 31% of the value of their farm receipts, compared with 38% in the mid-80s.

6. Some OECD countries have restructured their agricultural support policies and shifted from price support to less production and trade distorting payments. Nevertheless, by 2001, price support (market price support and output payments) still accounted for nearly 70% of producer support, which is about ten percentage points lower than in the mid-80s. To the extent that support is necessary, support provided through targeted budgetary measures is preferable to price supports or subsidies tied to the use of inputs (OECD, 2002d). The former are generally more transparent, potentially less distorting of product markets, less environmentally damaging, and might be more effectively targeted. In implementing the Agricultural Agreement of the Uruguay Round of Multilateral trade negotiations, the OECD countries also started to increase access to their domestic markets and reduce export subsidies for agricultural products.

7. Both explicit and implicit subsidies are found in the transport sector. Subsidies for road and rail transport in the European Union, Hungary and Switzerland amounted to about USD 40 billion in 1998 (Nash et al., 2002). The estimate is based on a broad definition of subsidies that compares total revenues with total *social* costs for each mode of transport (in other words internalises externalities)². In nearly all countries, revenues from road transport cover the total social cost, whereas other modes of transport are heavily subsidised. Thus phasing out transport subsidies would divert traffic from other modes, especially rail, to road. Although there might be some reduction in the total amount of transport, the increase in road transport would have negative effects on the environment. According to Nash et al. (2002), passenger and freight revenues cover, on average, 36 % of rail system costs.

2. It is worth emphasising that non-internalised external costs related to air, water or noise pollution, accidents or environmental damage are generally not included in the definition of subsidy. In theory governments should intervene in these cases and internalise the external costs by introducing taxes. Some have argued that a failure to do so can be regarded as an implicit subsidy. Transport is the only sector studied in this paper that defines subsidies this way. External costs are generally not included in the definition of subsidy for two reasons. First of all, subsidies arise from active government intervention, where as non-internalisation of external costs refers to the lack of government policy. Measurement issues are the second reason; external costs are difficult to estimate, generalise and involve considerable uncertainties, while figures on budgetary payments are more reliable. Similar arguments for excluding external costs have been used by other authors, such as van Beers and de Moor (2001).

Table 1. Subsidies in OECD countries

	Billion USD		Coverage	Comments
	1990	Most recent data [year]		
Agriculture	351	311 [2001]	Total support estimate; includes market price support, budgetary payments and support for general services; covers all OECD countries.	Equivalent to 1.3% of GDP.
Transport (road and rail)		40 [1998]	Subsidies estimated as the difference between total revenues and total social costs; includes the European Union, Hungary and Switzerland.	Nash et al. (2002) estimated that revenues cover on average 36 % of rail system costs.
Energy production	n.a.	20-30 [1999]	Aggregate estimate.	
<i>of which</i> - Coal production	11	5 [2000]	Includes market price support, budgetary payments and support for general services; includes France, Germany, Japan, Spain, Turkey and UK.	Equivalent to USD 68 per tonne of coal produced.
Manufacturing	44 [1993] 49 [1992]	22 [EU]	Net government expenditures to industry. Figures in <i>italics</i> cover the EU only and include grants, interest subsidies, tax exemptions, equity participation, soft loans, tax deferrals and loan guarantees, converted into cash grant equivalents.	Figures in <i>italics</i> from the EU State Aid Survey.
<i>Of which</i> - Shipbuilding	.. 2.5 [1995]	0.75 [2000] 1 [2000]	Figures in italics cover the EU only and include grants, interest subsidies, tax exemptions, equity participation, soft loans, tax deferrals and loan guarantees, converted into cash grant equivalents	Figures in <i>italics</i> from the EU State Aid Survey.
- Steel	2.2 [1995]	- [2000]	Includes grants, interest subsidies, tax exemptions, equity participation, soft loans, tax deferrals and loan guarantees, converted into cash grant equivalents; EU only.	Figures from EU State Aid Survey.
Fisheries	n.a. [9 in 1996]	6 [1999]	Government financial transfers to the marine capture fisheries; includes direct payments, cost-reducing transfers and general services. The 1999 figure excludes Australia, Belgium, Mexico, the Netherlands, Poland and Turkey	Equivalent to 20% of landed value.
Water	..	10	Aggregate estimate.	
Forestry	..	6	Aggregate estimate; includes only Canada and the United States .	

Notes: Data and calculation methods not comparable across sectors.

Sources: OECD (2001b; 2001c; 2002d), EU (2002), IEA (2001), ECMT (2000), Nash et al. (2002), Myers and Kent (1998, 2001).

8. Subsidies to energy producers in the OECD countries are estimated to be around USD 20-30 billion per year (IEA, 2001). A third of these energy subsidies support coal production, which has

decreased dramatically in OECD countries along with the subsidies. Consequently, there has been no major reduction in coal subsidies measured in USD per tonne of coal produced over the past ten years (IEA, 2001, 2002)³. Subsidised production is expected to decline further over the next few years, as coal production is expected to decrease further and several OECD countries plan to phase out their remaining subsidies.

9. Manufacturing subsidies have decreased significantly over the past ten years. In the European Union, state aid to manufacturing amounted to about USD 22 billion in 2000. Industry subsidies are increasingly directed to horizontal causes such as regional development, R&D and SMEs rather than to specific sectors such as steel and shipbuilding.

10. Fisheries subsidies in OECD countries amounted to around USD 6 billion in 1999, representing 20% of the total value of landings (Cox, 2002). The figure refers to government financial transfers to the marine capture fisheries, which includes direct payments, cost-reducing transfers and general services. Most transfers go to general services devoted to fisheries infrastructure, research, management and enforcement. Although the transfers are aimed at ensuring the sustainable use of fish stocks and the aquatic ecosystem, they have contributed to over-capacity in fishing fleets and to over-fishing of some fisheries. Many of these transfers still persist, and are preventing or inhibiting necessary structural adjustments. In recent years, OECD countries have increasingly been directing transfers towards removing capacity. In 1997, they spent USD 350 million to decommission vessels and retire licenses (OECD, 2000c). In the absence of adequate harvest and participation controls, however, payments aimed at reducing fishing effort have not improved the sustainability of resource use, as vessels that remain are both more efficient at harvesting fish and are employed for longer hours. Ensuring coherence between transfer policies and resource management policies can reduce the negative environmental impacts of some types of transfers. Furthermore, some of the incentives for vessel retirement in OECD countries have led to an export of this excess fishing capacity to non-OECD countries, contributing to over-exploitation of resources in their fisheries as well.

11. There are only anecdotal estimates on subsidies in the forestry and water sectors. Forestry subsidies in the Canada and the United States are estimated to be around USD 6 billion and water subsidies in the OECD countries around USD 10 billion (Myers and Kent, 1998, 2001). According to Myers and Kent (2001), the figures are uncertain, but they claim that at least in forestry this is less important as the subsidies in the sector are relatively small. There are all too few data on water subsidies in almost all OECD countries. Irrigation subsidies are included in the figures for agricultural subsidies, although the information on these is often patchy and data gaps remain.

3. Methodological differences

12. Although the focus of this paper is not on the different methodologies used to estimate subsidies, it is important to highlight the extent to which methodological differences and data gaps limit the comparability of subsidy figures across sectors (or as the case may be, within a sector). The strengths and weaknesses of the main approaches used in domestic and international subsidy assessments are summarised in Table 2. In a programme specific approach, subsidies are measured by adding the value transferred to market participants from particular programmes. In price gap approach subsidy is measured as the difference between the observed and the “world-price” for a commodity. Producer and consumer support estimates are based on a methodology that captures both pricing differences financed by consumers (market transfers) and transfers financed by taxpayers (budgetary transfers).

³ Calculated using producer subsidy equivalents.

13. The approaches used to estimate subsidies differ in the amount of data required to calculate them and in the degree to which budgetary payments and market transfers are measured accurately. Programme-specific approach captures the value of government programmes benefiting (or taxing) a particular sector, whether these benefits end up with consumers (as lower prices), producers (through higher revenues), or resource owners (through higher rents). Unless integrated into a macroeconomic model, this information tells little about the ultimate incidence of the subsidy programmes and their effect on market prices. By definition, the price-gap approach highlights observed price distortions, though it misses the often substantial budgetary support that does not affect consumer energy prices but does effect the structure of supply. The producer and consumer support estimates provide insights into both.

14. The OECD calculates producer and consumer support estimates for agriculture and coal production. Programme-aggregation approach is used for fisheries and manufacturing. Marginal social cost approach is used for transport. Consequently, the extent to which subsidy estimated produced by the three different methodologies can be compared is very limited.

Table 2. Overview of subsidy measurement approaches

Approach/Description	Strengths	Limitations
Programme-aggregation: Quantifies financial transfers associated with various government programmes. Aggregates programmes into overall level of support.	Captures transfers whether or not they affect end-market prices. Can capture intermediation value (which is higher than the direct cost) of government lending and insurance.	Does not address questions of ultimate incidence of pricing distortions. Sensitive to decisions regarding inclusion of programmes. Requires programme-level data.
Price-gap: Evaluates positive or negative “gaps” between the domestic price and the world price. Also known as Market Price Support.	Can be estimated with relatively little data. Useful for multi-country studies. Good indicator of pricing and trade distortions.	Sensitive to assumptions regarding “free market” and transport prices. Understates full value of support by ignoring transfers that do not affect end-market prices.
Resource rent: Estimates the difference between the full economic rent and the price paid for exploiting a natural resource.	Relevant for natural resource sectors such forest and water.	Data intensive. Sensitive to assumptions.
Marginal social cost: Estimates the difference between the marginal social cost (that internalises all externalities) and the price paid.	Most comprehensive approach. Used for transport.	Data intensive. Requires a significant amount of modelling. Sensitive to assumptions and has a wide range of uncertainty.
Producer/consumer support estimate: Systematic method to aggregate budgetary transfers and consumer transfers (through market price support calculation) to specific industries.	Integrates budgetary transfers with market price support into holistic measurement of support. Distinguishes between support to producers and consumers.	Data intensive. Currently calculated for agriculture and coal production, but not for other sectors.

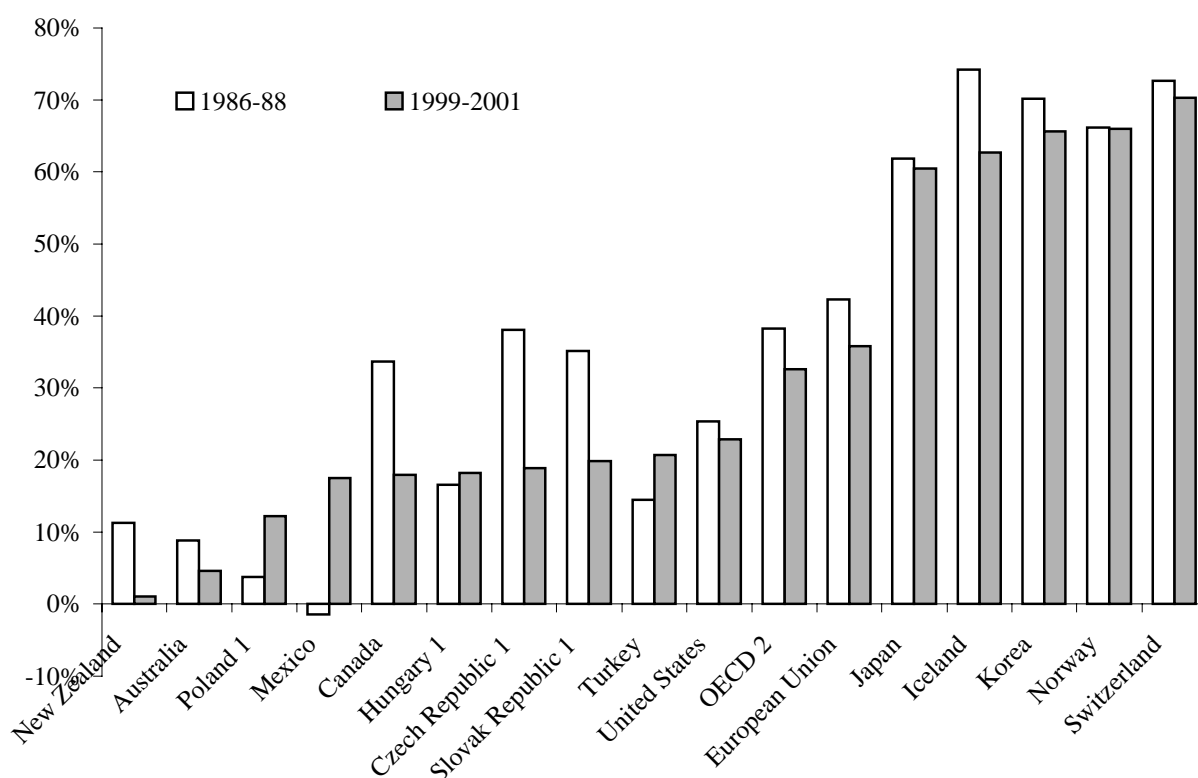
Based on Koplou & Dernbach, 2001.

4. Agriculture

15. The OECD Producer Support Estimate (PSE) measures the annual monetary value of gross transfers from consumers and taxpayers to support agricultural producers, measured at the farm-gate level, arising from policy measures that support agriculture, regardless of their nature, objectives or impacts on farm production or income (OECD, 2002d).

16. The OECD calculates PSEs a for the EU as a whole, the other OECD countries, and a number of non-member countries. In the case of the EU they cover policy transfers from the EU, national and sub-national budgets, while only the latter two budget levels are relevant and covered in all other countries. The calculations cover the period starting in 1986 and are updated every year in light of the most updated information available in the Secretariat. The calculation for the year on which the calculations are made is always preliminary or provisional. Although results are presented in a calendar year basis, they generally cover crop season for crop specific data, and budget year for other data, which often cover parts of two consecutive calendar years.

Figure 1. Producer support as a share of farm receipts (Percentage)



Notes:

Countries are ranked according to 1999-2001 levels. For more detail, see Table III.3.

1. For the Czech Republic, Hungary, Poland and Slovakia 1986-88 is replaced by 1991-93.

2. For 1986-88, the Czech Republic, Hungary, Poland and Slovakia are excluded.

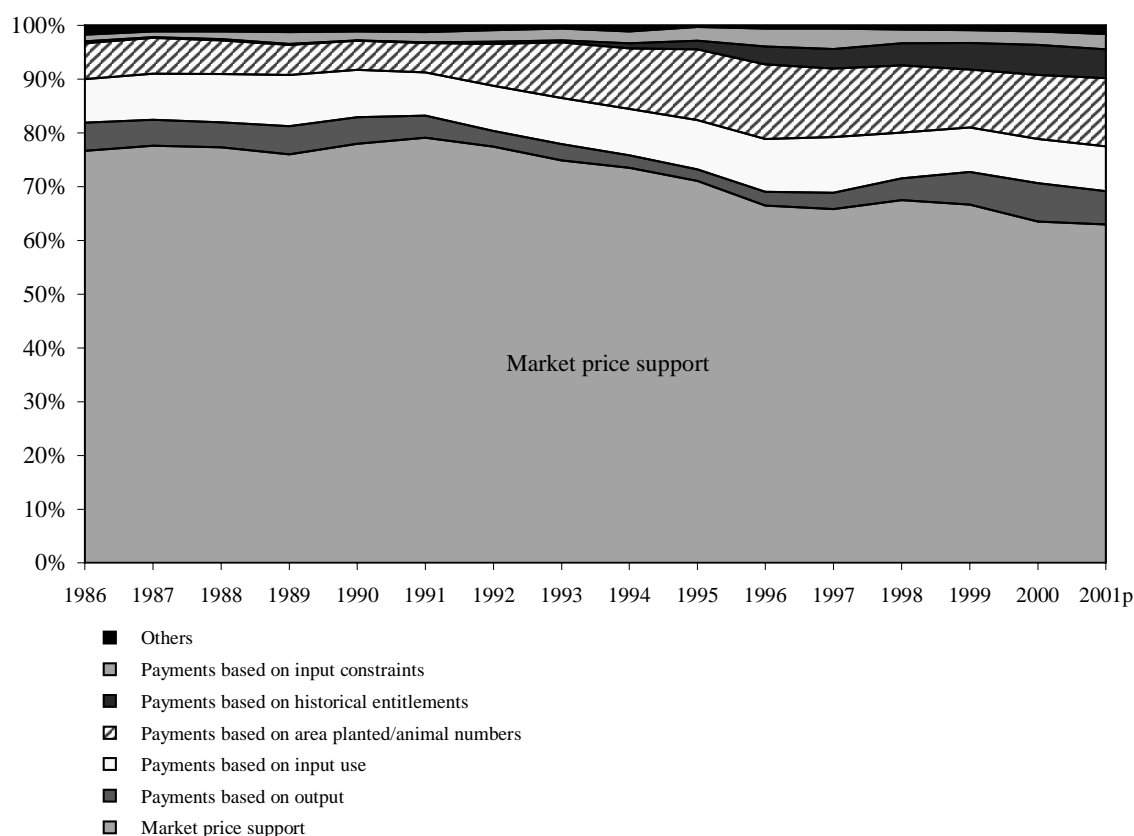
Source: OECD, PSE/CSE database, 2002.

17. The work on the Producer Support Estimate and the Policy Evaluation Matrix (PEM) together with the conceptual work on the impact of support on environment allow to rank support measures according to their relative impacts on the environment (OECD, 2002d). Details on the ranking is showed in Box 1.

Trends in OECD countries

18. In 2001, total support estimate to agriculture amounted to USD 311 billion (OECD, 2002d), which represents 1.3% of GDP in OECD countries. During the 1990s many OECD countries began to take steps to reduce and restructure their support policies in an effort to reduce overproduction and trade distortions, and to encourage more environmentally sound use of land, soil, and water. The pace of these developments has been modest and subsidies remain high in many OECD countries and for some commodities, causing adverse effects on the environment. In 2001, support to farmers represented 31% of the value of farm receipts, compared with 38% in the 1986-1988 period (Figure 1).

Figure 2. Composition of Producer Support Estimate (PSE) (1986-2001)

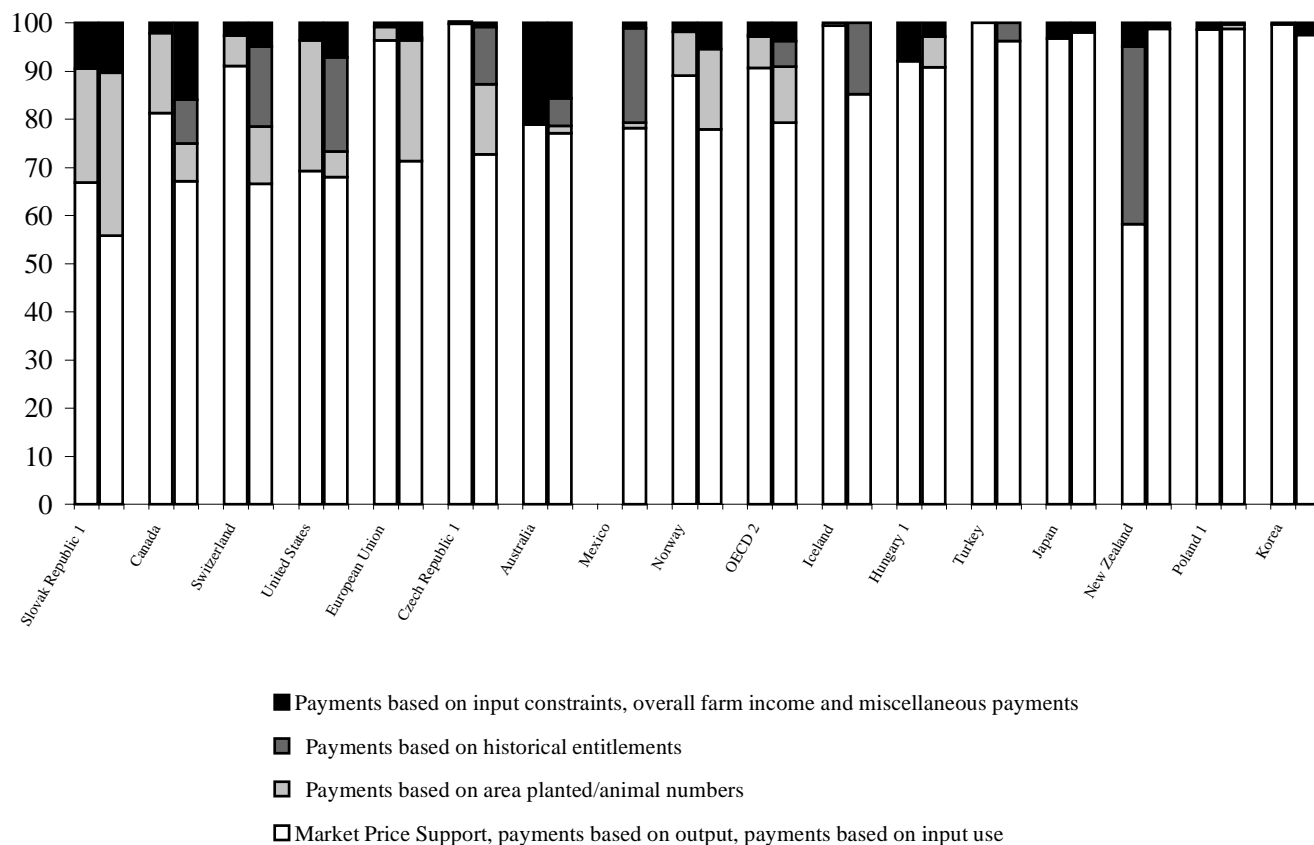


Source : OECD, PSE/CSE database, 2002.

19. The share of market price support, output payments and input subsidies (such as interest, water, fertiliser, and energy subsidies), which are potentially the most environmentally harmful types of support, decreased from 91% of support to producers in mid-1980's to 78% by the end of the 1990s (Figure 2). This share varies across countries, and is highest in the countries with the highest levels of support (Figure 3).

For example, over the period since 1986-88 it has remained above 95% in **Japan** and **Korea**. However, it decreased by 11 percentage points to 78% in **Norway**, and by 25 percentage points to 66% in **Switzerland**.

Figure 3. Composition of Producer Support Estimate by country 1986-88 and 1999-2001 (Percentage share in PSE)



Notes: Countries are ranked according to 1999-2001 levels of market price support and payments based on output. 1. For the Czech Republic, Hungary, Poland and Slovak Republic 1986-88 is replaced by 1991-93. 2. For 1986-88, the Czech Republic, Hungary, Poland and Slovak Republic are excluded. *Source:* OECD, PSE/CSE database, 2002.

Box 1. Relative potential impacts of producer support measures on the environment

All other things being equal, the main categories of PSE measures can be ranked according to their relative impacts on the environment as follows:

Market Price Support and **Payments based on output** both increase the price received by producers for a specific commodity such that the more the commodity is produced, the higher will be the support. Thus, the higher these forms of support, the greater is the incentive for monoculture, for increasing the use of inputs (such as chemicals), and/or for using environmentally sensitive land, and the higher is the pressure on the environment. Moreover, these payments have the lowest effectiveness in achieving environmental goals, as they are sector-wide payments that can not be targeted to any environmental goal or situation that are generally local.

Payments based on input use reduce the cost of inputs used by producers such that the more the input is used the higher will be the support. Thus, the higher these payments, the greater the incentive to use the input, and the greater the impact on production and the environment. The more the payment is specific to a variable input (*e.g.* fertiliser, pesticide) the greater the incentive for production intensification, and the pressure on the environment. For example, the environmental impact of a credit subsidy for purchasing fertilisers or pesticides is potentially higher than a credit subsidy for acquiring farm land or extending farm buildings. Therefore, these payments may have a higher, the same, or a lower effect on production and the environment than an output payment depending on the type of input on which the payment is based.

Payments based on area planted/animal numbers reduce the cost of land/livestock for current plantings/animal numbers. As producers have to plant a specific crop or own specific animals, these payments may be an incentive for keeping environmental sensitive land producing commodities non-environmentally-friendly in such land. Although these payments may be targeted to a specific environmental goal or situation, they provide an incentive to bring additional land or animals into specific production and encourage monoculture in the same way as the payments based on output. However, as producers are not encouraged to increase yields and to produce as intensively as they are with the forms of support outlined above, the environmental impact of these payments is potentially lower.

Payments based on historical entitlements (*i.e.* past support, area, animal numbers, production, or income) and **Payments based on overall farming income** (paid on the condition that the overall farmers' income is below a pre-defined level) also have the potential for retaining environmentally sensitive areas under production. However, as to receive these payments producers are not obliged to plant, own animals, or produce any particular commodities, they allow for individual choices on environmentally friendly production techniques, and do not encourage production intensification and/or monoculture. Therefore, the impact of these payments on the environment are relatively benign or lower than the previous forms of support.

Payments based on input constraints are paid on the condition that farmers respect certain constraints (reduction, replacement or withdrawal) on the use of inputs often for environmental purposes. These payments may be targeted to specific environmental situations to address specific environmental issues associated with agriculture. They may contribute to offset the reduction on a positive environmental impact or the increase on a negative environmental impact of farming activities often benefiting from one or more of the previous forms of support. These mainly through input constraints that reduce production intensity, encourage production diversification, or put environmentally sensitive land aside from production relatively to which otherwise would occur. The environmental impacts of these payments depend on the type of constraint, but they have the potential for reducing environmental pressure and for being the most environmentally effective PSE measures.

Source: OECD, 2002d.

5. Fisheries

20. The Committee for Fisheries has collected data on financial support to fisheries in 1965, 1971, 1980, 1993, and for 1996-1999. The OECD collects data on direct payments, cost-reducing transfers and general services to the marine capture fisheries. Other international data sources for fisheries subsidies include the WTO and the EU State Aid Survey, details are shown in Table 3.

Table 3. Fisheries subsidy data available

Source	Coverage	Reliability	Frequency
OECD	Government financial transfers to marine capture fisheries, includes direct payments, cost-reducing transfers and general services.	Good.	Every two years
WTO	Measures reported under the WTO Agreement on Subsidies and Countervailing Measures: direct transfers of funds, fiscal incentives, and government provision of goods and services other than general infrastructure.	Variable, many programmes not reported. Inconsistencies in reporting among member countries.	Annual
EU State Aid Survey	Grants, interest subsidies, tax exemptions, equity participation, soft loans, tax deferrals and loan guarantees, converted into cash grant equivalents	Good.	Annual

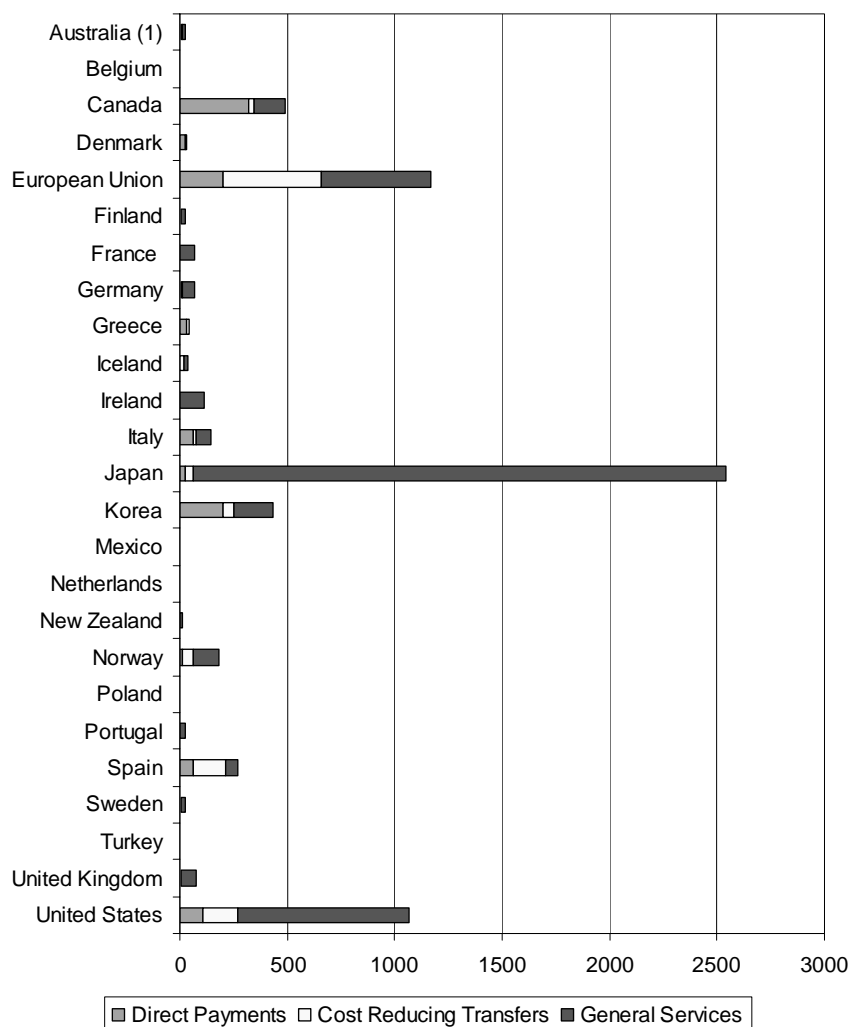
Trends in OECD countries

21. The OECD countries have supported their fishing industries by significant amounts of money and over long periods of time. The latest estimate for fisheries subsidies in the OECD countries is USD 6 billion in 1999 (OECD, 2001c) (Figure 4). This corresponds to 20 % of the value of landings (Figure 5). Japan provides the largest fisheries subsidies in the OECD, followed by the European Union, United States, Canada, Korea, Spain and Norway.

22. Most of the government financial transfers in the OECD countries are for general services. Expenditures on research, management and enforcement activities are important as they can contribute to ensuring the sustainable use of fish stocks and the aquatic ecosystem. In some countries, however, bulk of

the expenditure on general services is on fisheries infrastructure and fisheries enhancement programmes that can contribute to over-fishing (Cox, 2002). The introduction of cost recovery programmes for some research, management and enforcement expenditure in some countries implies that some of these activities directly benefit fishers, rather than society as a whole (Cox, 2002). Capacity-reducing transfers, including vessel buyback programmes, licence retirement schemes and payments to fishers to leave the industry, have been widely used in OECD countries in response to over-fishing and over-capacity (Cox, 2002).

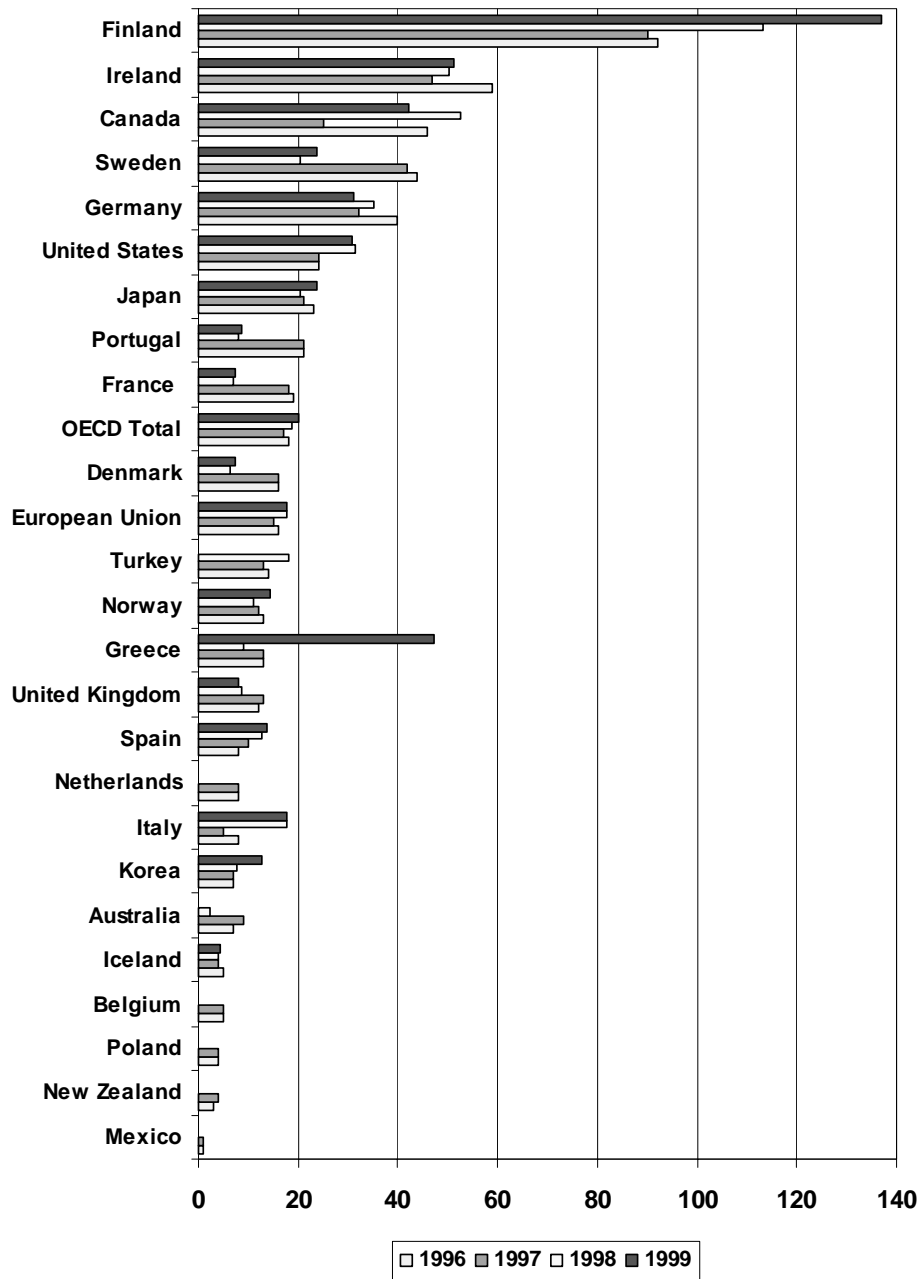
Figure 4. Financial transfers in OECD countries in 1999



Notes: (1) Figures refer to 1998.

Source: OECD 2002.

Figure 5. Financial transfers as a share of landings (percentage)



Source: OECD, 2002.

6. Forestry

23. The OECD has not collected information on forestry subsidies. Nor have other international institutions, and consequently there is no dataset on government transfers to the forest sector for OECD countries or for other groups of countries. The European Forest Institute, however, launched a four-year international research project in 2001 called “Evaluating Financing of Forestry in Europe” (EFFE). This project is the most comprehensive effort to collect data on forestry subsidies. It aims at evaluating public forestry expenditure programmes in twelve European countries between 1990 and 1999. Data collection is being carried out during 2002 and country reports containing national data will be available in early 2003. The data will be analysed in the course of 2003, and the project results will be disseminated during 2004. The OECD has established contacts with the EFFE Secretariat at will draw on the EFFE data when these become available.

24. Three general types of subsidies have been widely recognised in the literature as having been provided to producers of forest products: resource rent subsidies; budgetary subsidies for road-building or other services of value to the sector; and quantitative restrictions on timber exports or high log export taxes, which benefit wood processing industries. The most typical forestry subsidy is the deliberate failure to capture the full economic rent associated with the right to log (i.e. the price for timber paid by processing industry is set at an unrealistically low level). Consequently the logging company effectively enjoys a cost-reducing subsidy and collects a windfall profit. In addition logging companies may also benefit from hidden support through poorly designed forest concession policies and allocation procedures and the nature of fees and taxes (van Beers and de Moor, 2001). The most common types of forestry subsidies are for:

- Cutting/transport: mainly grants for harvesting in difficult terrain, transport, felling of broadleaved trees (to regenerate with spruce), technical equipment, planning of timber trade, and employment measures.
- Road-building: grants for forest road construction (where difficult terrain and remote timber supply regions have had priority), the subsidising effect of loans and tax exemptions for road construction and employment measures.
- Drainage: grants for drainage and the subsidising effect of tax exemptions.
- Silviculture: mainly grants for silviculture, thinning of young stands, afforestation of agricultural land, net costs of state-owned forest nurseries and the “forest seed service” and employment measures, forest improvements, silvicultural investments and investments in forest seed plantations.
- Environment: grants for measures to enhance biodiversity or conserve cultural heritage (this also includes no action, when the alternative is timber production), forestry in broadleaved forests of high value, and inventory of key habitats and swampy forests.
- Fixed term, interest free loans: Loans for regeneration thinning, new drainage and forest roads have been somewhat cheaper than others.

Trends in OECD countries

25. The OECD does not collect information on forestry subsidies. The EFFE project at the European Forest Institute is the most comprehensive effort to collect data on forestry subsidies. According to Porter (2002), earlier efforts have consisted of one off studies for certain countries (e.g. World Resources Institute for the United States and the Sierra Club of Canada for Canada) or incomplete estimates for larger regions (e.g. the European Union. The estimated total sum of EU's forestry subsidies (EAGGF) during 1994-1999 is over 2.5 billion euros⁴. About half of the sum of 2.5 billion euros was allocated to afforestation programs, resulting in about 500 000 ha farmland afforestations by 1997. Another half of the forestry subsidies was targeted to various forestry development measures. The subsidies were allocated fairly differently between the EU member countries, Spain, Italy, Germany, France, Portugal and Ireland being among the largest target countries. Myers and Kent (2001) estimate forestry subsidies in Canada and the United States to be around USD 6 billion.

7. Energy

26. The International Energy Agency (IEA) calculates the amount of financial assistance to indigenous hard coal production in France, Germany, Japan, Spain, Turkey and the United Kingdom using the producer subsidy equivalent (PSE) measure. Subsidies for coal production in other OECD countries, namely Canada, Czech Republic, Hungary and Norway are significantly smaller than in the six "PSE"-countries (IEA, 2002 -- WEO).

27. The IEA also reports periodically on its member's energy policies, including policies aimed at supporting energy producers. Energy subsidies range from measures, such as grants and tax exemptions, that directly affect costs or prices to indirect measures, such as those that flow from government interventions that skew the market in favour of a particular fuel or government-sponsored technology research and development (UNEP/IEA, 2002, NIEIR, 1996; de Moor, 2001). The different types of energy subsidies and their impacts are summarised in Table 4.

4. The data consists of the development programs of EU's structural funds in the member states, various statistics, interviews of experts and a mail survey to the ministries of forestry of EU-member states during 1998 (PTT, Finland).

Table 4. Types of energy subsidies

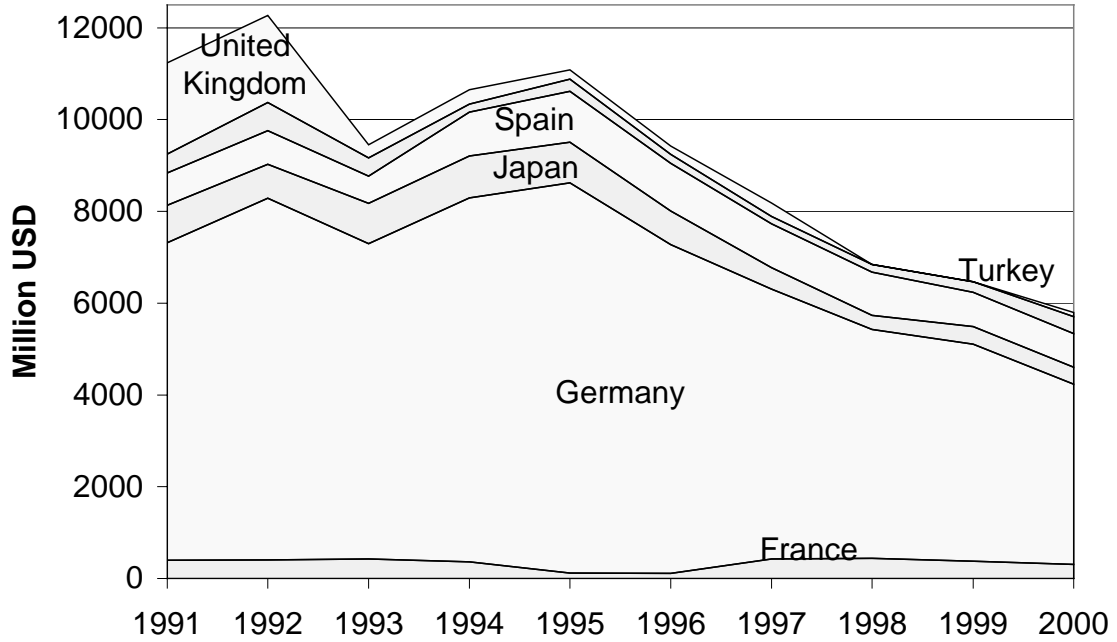
Government intervention	Example	What the subsidy does
Direct financial transfer	Grants to producers	Lowers production cost
	Grants to consumers	Lowers consumer price
	Low-interest or preferential loans to producers	Lowers production cost
Preferential tax treatment	Rebates or exemptions on royalties, duties, producer levies and tariffs	Lowers production cost
	Tax credit	Lowers production cost and/or consumer price
	Accelerated depreciation allowances or energy-supply equipment	Lowers production cost
Trade restrictions	Quotas, technical restrictions and trade embargoes	Raises production cost
Energy-related services provided directly by government below full cost	Direct investment in energy infrastructure	Lowers production cost
	Public research and development	Lowers production cost
Regulation of the energy sector that gives rise to subsidies	Demand guarantees and mandated deployment rates	Lowers or raises production cost
	Price controls	Raises production cost
	Market-access restrictions	Raises production cost

Source: UNEP/IEA (2002).

Trends in OECD countries

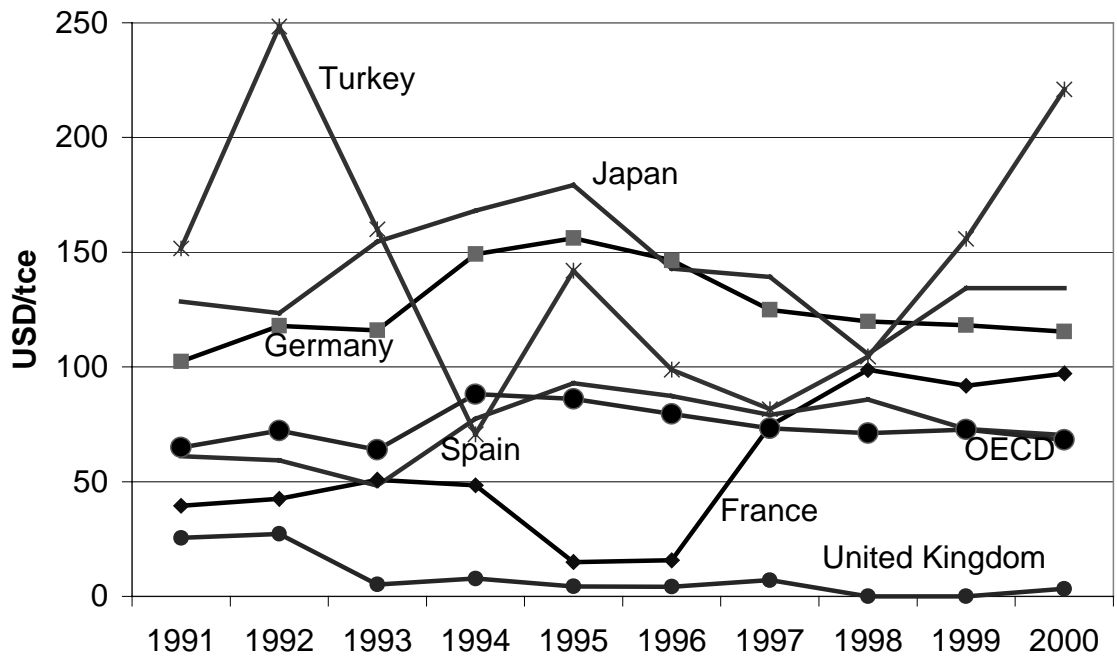
28. Estimates of support for coal are more systematic and complete than for other forms of energy. The IEA publishes annually PSE figures for the primary production of coal, which are the only regular, systematic reporting of energy subsidies carried out by an international body. Total support to coal industry in the OECD countries decreased through most of the 90s from USD 11.4 billion in 1990 to USD 5.4 billion in 2000 (IEA, 2001). Germany and the United Kingdom are the countries with the biggest decreases in support (Figure 6). Coal production decreased significantly over the same time period and, consequently, support per tonne of coal equivalent increased (Figure 7).

**Figure 6. Support to coal in selected OECD countries
Million USD**



Source: IEA.

**Figure 7. Support to coal in selected OECD countries
USD/tce**



Source: IEA.

8. Manufacturing

29. The Industry Committee has published several reports on support to industry. Most recently it has calculated public support in terms of Gross Government Budget Expenditure (GGBE) and Net Cost to Government (NCG) (OECD, 1998a,b). GGBE measures the total amount of funds transferred to beneficiary companies and the total amount of uncollected tax liabilities from them per year of programme. NCG measures the difference between the cost of funding a programme and the revenue generated for the public budget by the same programme in any given year. Public support was classified into ten policy areas identified as priority objectives of industrial support policies. Other data sources for manufacturing subsidies include the System of National Accounts, WTO, EU State Aid Survey and the Productivity Commission for data for Australia (Table 5).

30. The Industry Committee work classifies the industrial support programmes according to their objectives. Some of the objectives are considered to benefit the environment, in particular government expenditure for improving energy efficiency and environmental protection. Other objectives can be considered to be environmentally neutral. Such objectives include support to SMEs, labour and training and regional development. The remaining categories are sectoral aid, crisis aid, R&D and technological innovation, general investment incentives and exports and foreign trade. Apart from sectoral aid for some very specific sectors, where the negative environmental impacts are well established, it is difficult to say anything definite about the environmental impacts of the other types of support. Because some manufacturing sectors have a greater impact on the environment than others, it is important to look which of the sectors receive most of the support.

31. Many support programmes aim at stimulating investments, production or exports of the sector. In some cases subsidies are used to protect an infant or dying industry when economic development is fragile. In other cases they are motivated by regional employment or development objectives. There have been no systematic efforts to assess the environmental impacts of manufacturing subsidies.

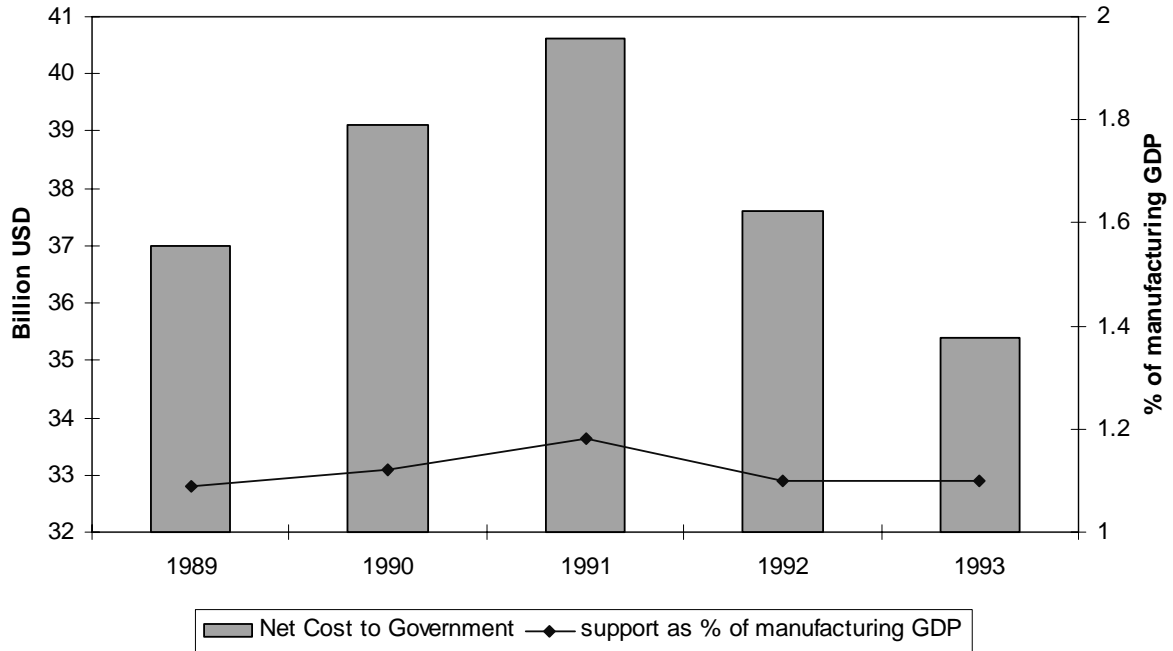
Table 5. Manufacturing subsidy data available

Source	Coverage	Reliability	Frequency
OECD: Industry Committee	Industry Committee	Good.	Data collected for the period 1989-1993
OECD: System of National Accounts	Direct grants to producers in terms of gross budgetary outlays. Excludes tax concessions, credit subsidies, consumer subsidies, market prices support, etc.	Good, but coverage is limited .	Annual
WTO	Measures reported under the WTO Agreement on Subsidies and Countervailing Measures: direct transfers of funds, fiscal incentives, and government provision of goods and services other than general infrastructure.	Variable, many programmes not reported. Inconsistencies in reporting among member countries.	Annual
EU State Aid Survey	Grants, interest subsidies, tax exemptions, equity participation, soft loans, tax deferrals and loan guarantees, converted into cash grant equivalents	Good, but data often too aggregated for the purpose of analysis.	Annual
Other	Australia: Productivity Commission.	Good	Annual

Trends in OECD countries

32. Support to manufacturing, measured in constant prices declined in 1986-1989, reaching USD 37 billion in 1989 (OECD, 1998a). The support peaked at USD 45.7 billion in 1991 before declining to USD 43.7 billion in 1993 (Figure 8). There was a 24% growth in support in nominal terms from 1989 to 1993, corresponding to a 4% decrease in constant terms during the period (OECD, 1998a).

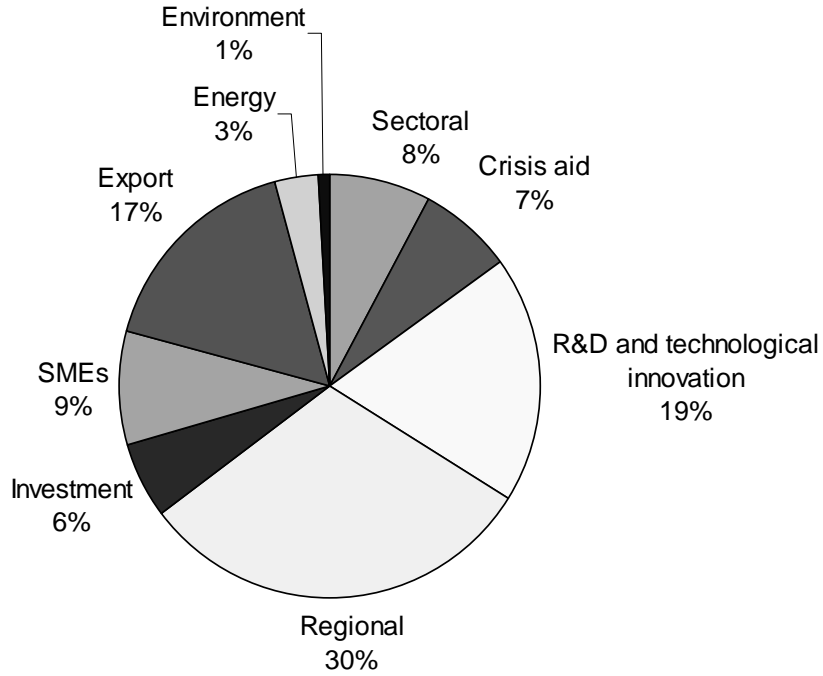
Figure 8. Support to Industry in OECD Countries
 USD 1993 billion and % of manufacturing GDP



Source: OECD Industrial Support Database, OECD, 1998a.

33. There is a continuing trend away from subsidies for particular sectors towards more horizontal objectives, including regional development, research and development (R&D) and small and medium-sized enterprises (SMEs) (OECD, 1998a). Indirect means of support, such as public procurement, R&D contracts, and R&D intermediary institutions, channel far more financial resources to manufacturing industry than does direct support. Even if the support element in indirect measures only represents a very small percentage, it would still be very significant. As there is no agreed methodology for measuring the support element in indirect support, uncertainties remain as to its role as a policy instrument and, more specifically, as a tool of support to manufacturing industry. The distribution of support by policy objective is shown in Figure 9.

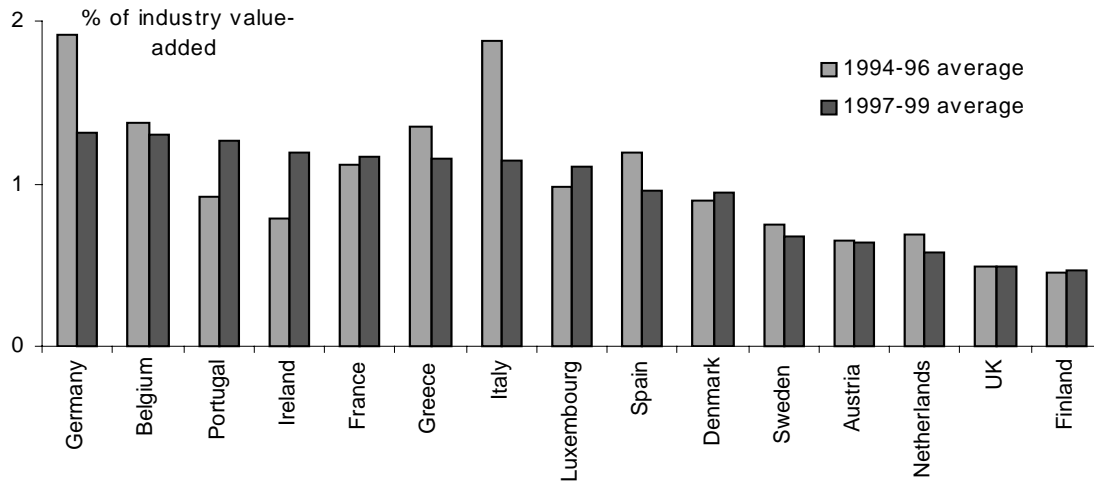
Figure 9. Industrial support by policy objective (as a % share of total support)



Source: OECD Industrial Support Database, OECD, 1998a.

34. Figures 10 and 11 show state aid as a percentage of industry and manufacturing value-added.

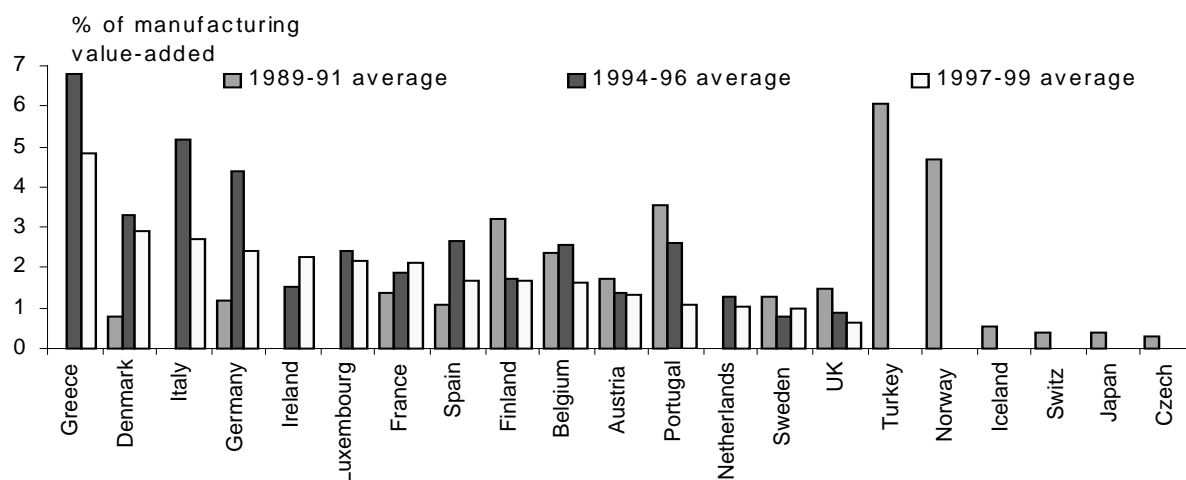
Figure 10. State-aid to industry as a share of industry value-added (percentage)



Note: Industry excludes the primary sector.

Source: Based on EC (1998, 2001b).

Figure 11. State-aid to manufacturing as a share of manufacturing value-added (percentage)



Note: The 1989-91 subsidy rates from the OECD may not strictly be comparable with the 1994-96 and 1997-99 state aid rates from the EC due to differences in coverage, methodology and definition.

Source: 1989-91 average from OECD (1998), other years based on the EC (1998, 2001b).

35. Programmes intended to support one or selected manufacturing sectors are of special interest from the point of view of environment. Most sectoral programmes target the shipbuilding industry. Other industries where sectoral programmes are common include fish processing, textiles and the steel industry. The support for the aircraft and space industries is also channelled through R&D programmes, equity capital injections and intermediary space agencies.

Shipbuilding

36. The Council Working Party on Shipbuilding collects information on government subsidies provided by Member and Observer countries. Although it does not currently cover all member countries (as some have not provided the information), it covers most of the OECD area (and therefore global) shipbuilding production. The reports also provide an overall appraisal of the measures, as well as compare the levels of support in each reporting country, based on the monetary values of the individual support measures. No specific work has been undertaken on the effects on the environment of subsidies to shipbuilding.

37. The monetary values included in the inventory are not always strictly comparable (for example some are direct grants, while others are only guarantees), but they do provide a measure of the financial exposure incurred by the governments in providing those support measures to their industries. The comparison between support measures and production will to some extent reflect how successful the support given by governments have been in boosting output in that country. Therefore, a high average level of support will indicate (but not definitively prove) that those support measures were ineffective in producing a comparable increase in output.

38. The total value of cash support measures is presented in Table 6, which shows a wide range in values for the support measures provided by reporting countries to their shipbuilding industries. These range from Sweden which reported no support measures whatsoever in the last three years, to Italy which provided the equivalent of USD 973 million of support (OECD, 2001). This was nearly 50% more than the next highest, Norway. Both Turkey and Romania advised that their support activities were of a type that were not capable of being converted into monetary values. Of the major producing countries Korea (USD 18 million) and Japan (USD 7 million) stood out as providing minimal cash support to their industries.

39. In total, the responding countries provided grants and subsidies to the value of USD 2.7 billion for the years 1998 to 2000. This support was highest in 1998 when a total of almost USD 1.2 billion was provided, but clearly governments have begun to reduce this type of support measures as this amount declined in each of the two subsequent years. In particular, the EU and Norway have decided to no longer provide contract related subsidies from 2001 onwards, and this major change should be reflected in the next update of the Inventory (OECD, 2001).

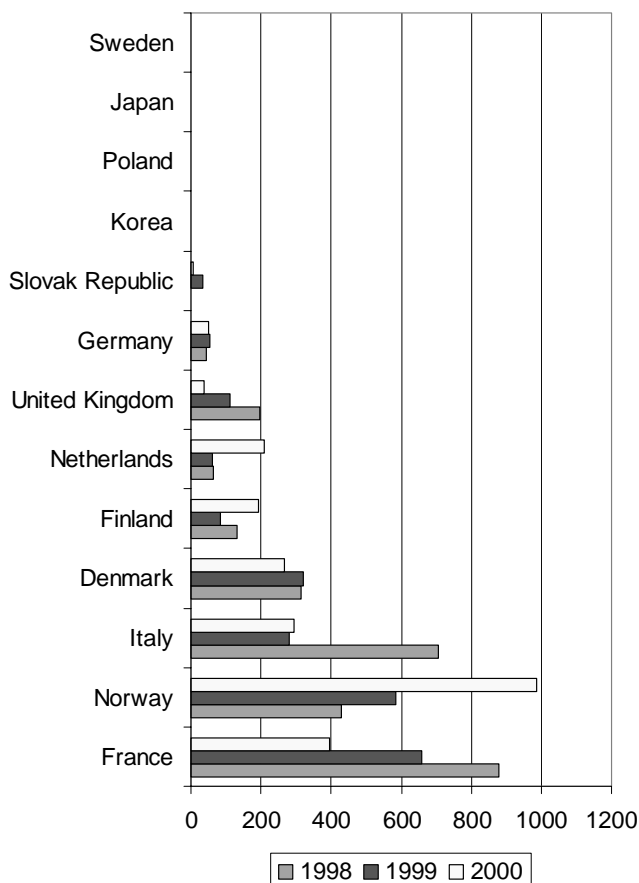
Table 6. Total Value of Cash Support Measures, USD million

Country	1998	1999	2000	TOTAL
Italy*	575.0	215.2	182.9	973.1
Norway	143.6	185.5	166.7	495.8
France	200.2	162.4	119.8	482.4
Denmark	112.0	104.8	69.0	285.8
Netherlands	29.2	31.9	94.3	155.4
Germany	45.2	42.8	45.3	133.3
Finland	34.4	22.2	54.0	110.6
UK*	17.5	6.3	6.4	30.2
Korea	5.5	4.1	8.7	18.3
Japan	1.7	2.4	2.7	6.8
Poland	0.2	0.5	0.9	1.6
Slovak Republic	0.3	0.3	0.2	0.8
Sweden	0.0	0.0	0.0	0.0
Turkey	n/a	n/a	n/a	
Romania	n/a	n/a	n/a	
TOTAL	1164.8	778.4	750.9	2694.1
* Where US currency equivalents were not provided, these were calculated by the Secretariat from values applicable on 30 June in the year in question.				
Source: Olsen & Associates, Zurich, from its OANDA subsidiary Web-page				
n/a: Delegations advise that because of their nature				

Source: C/WP6(2001)9/REV1.

40. In order to get a more balanced picture of shipbuilding subsidies, it is useful to look at support per compensated gross tonne of output as shown in Figure 12.

Figure 12. Shipbuilding: Support in USD per compensated gross tonne of output



Steel

41. Work by the OECD Steel Committee shows that subsidies and related governmental supports have played a key role in creating and sustaining global over-capacity in steel. The steel industries in many countries have benefited significantly from subsidies and related government supports, over time. The assistance has been provided to meet a number of objectives. Grants, loans and related financial assistance, for example, have been used in developed and developing countries alike to *promote the construction of facilities*. Such support has been based on the strategic importance that has often been assigned to the industry by governments, and the formidable costs associated with building facilities and providing needed infrastructure (e.g., port and transportation facilities, utilities, and the like). Absent such support, private capital may in many instances not have been sufficient to enable the construction of facilities and/or the ability of firms to attract outside capital may have been much reduced. The active promotion of investment in the industry continued in the OECD area up through the mid-1970s, at which time an economic recession and a less promising outlook suggested that over-expansion had occurred. In other parts of the world, active promotion continued, however, in various forms through the 1990s.

42. Work by the OECD High Level Group on Steel shows that there is support among governments and private sector steel producers to reduce or, where possible eliminate subsidies and related industry

supports in the context of trade negotiations. There have been a number of developments in this effect. For example, the state aid to steel in the European Union has decreased dramatically in the past five years (Table 7).

Table 7. State aid for steel in the European Union

	USD million					
	1995	1996	1997	1998	1999	2000
Austria	4.6	4.6	4.0	4.0	3.7	2.3
Belgium	4.3	5.5	2.5	0.0	0.0	0.0
Denmark	0.0	0.0	0.0	0.0	0.0	0.0
Finland	0.0	0.0	0.0	0.0	0.0	0.0
France	0.0	10.3	0.0	0.0	0.0	0.0
Germany	104.3	6.2	2.5	0.0	0.0	0.0
Greece	0.0	0.0	25.6	0.0	0.0	0.0
Ireland	0.0	71.0	0.0	0.0	0.0	0.0
Italy	238.2	248.0	243.8	7.0	0.0	0.0
Luxembourg	2.6	0.0	0.0	0.0	0.0	0.0
Netherlands	0.0	0.0	0.0	0.0	0.0	0.0
Portugal	72.6	0.0	2.7	0.8	0.3	1.2
Spain	1729.1	209.1	85.8	34.6	32.1	0.0
Sweden	0.0	0.0	0.0	0.0	0.0	0.0
United Kingdom	0.0	0.0	0.0	0.0	0.0	0.0
Total	2155.7	554.6	366.8	46.4	36.1	3.5

Source: Ninth State Aid Survey, EU.

9. Transport

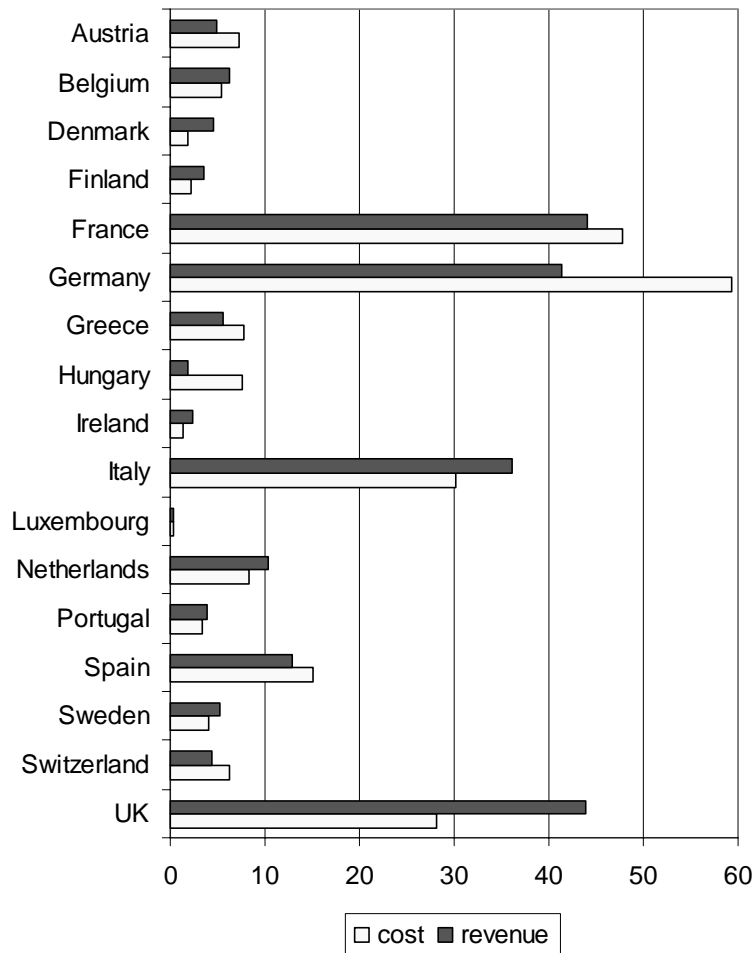
43. The European Conference of Ministers of Transport reports regularly data on public transfers to transport infrastructure. It is currently trying to improve the comparability of the data reported by each of the 42 Member countries. The data consists of government outlays and thus cannot be interpreted as subsidies. Without the public sector there would be no transport infrastructure. Governments use a range of instruments to get back some of the money spent on government outlays through vehicle taxes, fuel duties, vignettes, highway tolls, VAT, and other user charges.

Trends in OECD countries

44. Subsidies for road and rail transport in the European Union, Hungary and Switzerland amounted to about USD 40 billion in 1998 (Nash et al., 2002). The estimate is based on a broad definition of subsidies that compares total revenues with total *social* costs for each mode of transport (in other words internalises externalities). In nearly all countries, revenues from road transport cover the total social cost, as shown in Figure 13. As other modes of transport are heavily subsidised, phasing out transport subsidies would divert traffic from other modes, especially rail, to road. Although there might be some reduction in the total amount of transport, the increase in road transport would have negative effects on the environment. According to Nash et al. (2002), passenger and freight revenues cover, on average, 36 % of rail system costs.

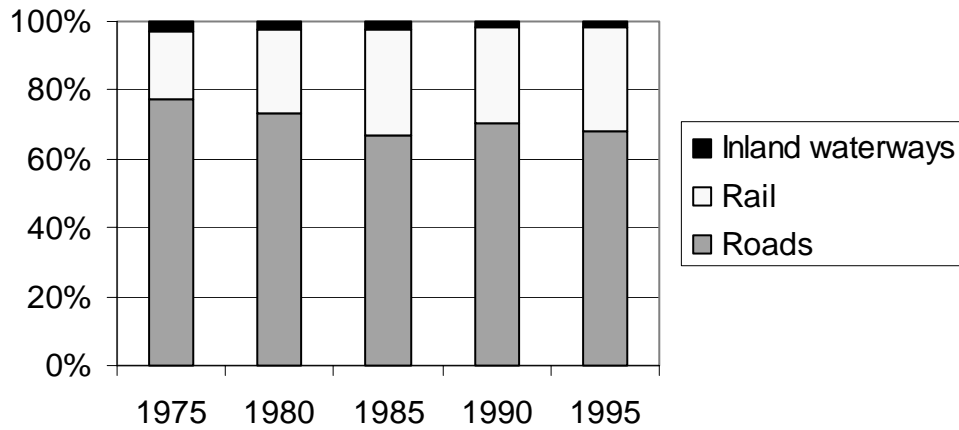
45. Investment in road infrastructure continues to dominate government infrastructure investment expenditures (Figures 14 and 15). Although the figures do not show the magnitude of the subsidies in the transport sector, they do give an indication of the extent of government involvement in encouraging different modes of transport. According to ECMT estimates, “positive transfers” amount to 23% of capital road infrastructure costs (ECMT, 2000).

**Figure 13. Road transport: total social cost and revenue
EUR million**



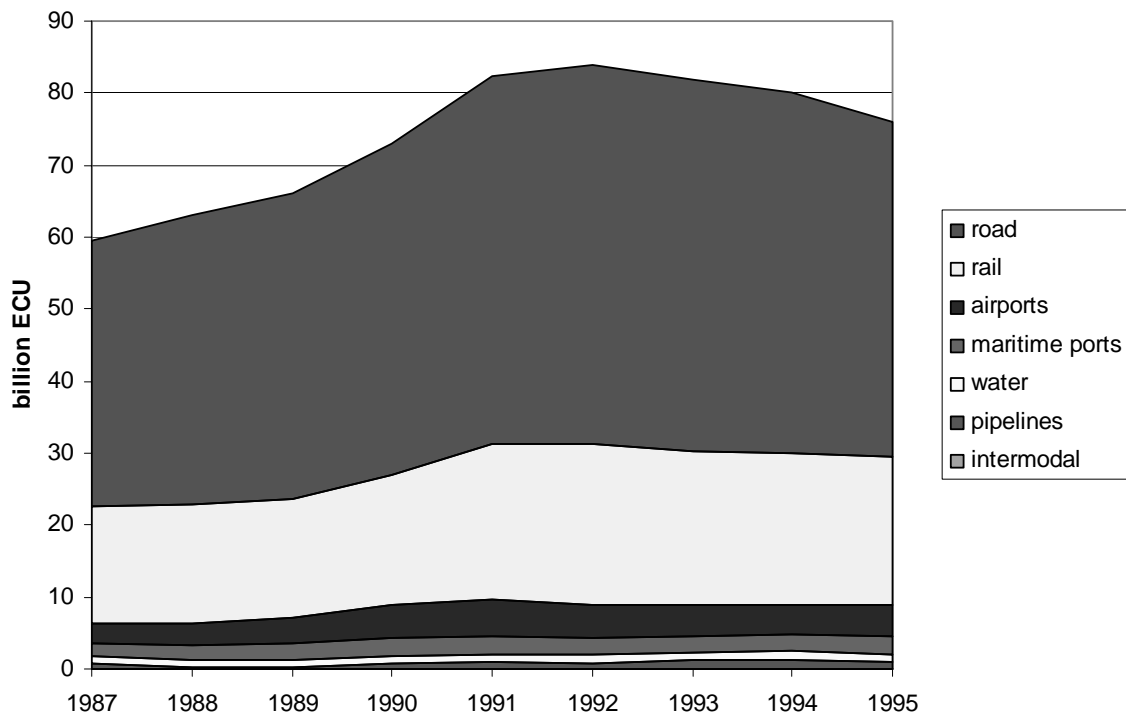
Source: Nash et al. (2002)

Figure 14. Trends in investment share by transport mode in 18 OECD countries (1)



Notes: (1): The countries included are the 15 EU countries, Norway, Switzerland and Turkey.
Source: ECMT (2000).

**Figure 15. Total investment in transport infrastructure in 18 OECD countries (1)
billion ECU**



Notes: (1): The countries included are the 15 EU countries, Norway, Switzerland and Turkey.
Source: ECMT (2000).

10. Conclusion

46. Over the past twenty years, the OECD has made significant progress in the measurement and analysis of subsidies for sectors such as agriculture, coal production and fisheries. Factors contributing to the relatively modest progress in some of the other sectors range from complex methodological and data issues to demand for international subsidy figures. Trade-offs are made both at national and international levels as data collection is often resource intensive and aggregate subsidy estimates are only as good as the underlying data.

47. The paper provides an overview of subsidies in OECD countries. Although methodological and data constraints severely limit comparisons across sectors, work carried out by the OECD highlights agriculture as the sector with the highest subsidies. While the other sectors seem to pale in comparison, it is likely that subsidies are underestimated in these sectors due to the methodologies applied.

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