

**THE EFFECT OF EU STRUCTURAL AND COHESION FUNDS FOR THE ENVIRONMENT  
ON REGIONAL COHESION**

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## **1 INTRODUCTION**

Environmental policy is essential for EU social cohesion in the sense that there cannot exist social cohesion if environmental quality disparities, and hence quality-of-life differences, are large across Member States. EU environmental policy is also crucial for economic cohesion in the Common Market, since lacking a common environmental policy could lead to environmental *dumping*, resulting in lower environmental quality and market distortions. However, these are not the meanings usually attributed to economic and social cohesion in the EU vocabulary; economic and social cohesion is usually interpreted in terms of closing regional disparities as indicated by measures such as GDP per capita or unemployment rate. In this restricted sense, economic and social cohesion presents a very important common feature with environmental policy: both are a component of all EU policies, since the Community's institutions are obliged to take into account both the closing of regional disparities and environmental considerations in all other policies. Moreover, together with economic development, the social and environmental dimensions are the three pillars of sustainable development. Therefore, it is obvious that EU environmental policy and economic and social cohesion must be closely related.

The most obvious interaction between EU environmental and cohesion policies comes through the Structural and Cohesion Funds, which are EU central instrument for closing regional disparities and, at the same time, a very important instrument to achieve environmental objectives. Agenda 2000 produced further integration of environmental concerns into cohesion policy through the reform of the latter in the form of a series of measures such as the introduction of systematic scrutiny of the environmental impact of projects over 50 million ECU, the adoption of a degraded environment as one of the criteria for defining eligible urban areas within the new Objective 2 regions, the integration of the environment as an objective for assistance from the Structural Funds in the framework of proposed new Structural Funds regulations, the appraisal by the Commission of regional development plans as regards environmental protection, and the introduction of

a partnership involving environmental bodies and non-governmental environmental organisations for the preparation of Cohesion Policy intervention programmes.

Of all the financial instruments for the environment in place in the EU, the European Regional Development Fund and the Cohesion Fund are the most significant because of their quantitative volume. LIFE is significant because it is the only financial instrument specifically tailored to the environment, but it is quantitatively minor in comparison with the Structural and Cohesion Funds.

In this paper, we report available data on the distribution of structural and cohesion funds for the environment, and provide indications of their magnitude and effect on cohesion through indicators of their scale in relation to total environmental expenditure, their scale in relation to GDP, their per capita volume, and through Lorenz curves.

## **2 STRUCTURAL FUNDS**

### **2.1 INTRODUCTION**

Unfortunately, there is no readily available information that allows to identify the environmentally related expenditure from Structural Funds during the programming period 1993-1999. For the programming period 2000-2006, the European Commission<sup>1</sup> has provided information by Member State and field of intervention, that allows us to identify and aggregate the environmentally related funds allocated for the whole period. No information has been provided on actual payments made for the years already passed of these programming period.

Eurostat (2003) provides information on environmental protection expenditures by EU institutions by Member State for 1994 to 1997. However, this limited information does not seem accurate, since the expenditures by all EU institutions reported for some cohesion countries (Greece and Spain) are smaller for 1994 than the actual payments made to these countries only through the Cohesion Fund, and for the other years they seem too small if compared with the actual size of Cohesion Fund payments.

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<sup>1</sup> The author wish to thank Ms. Luisa Sanches, from the Directorate-General for Regional Policy and Cohesion, for kindly providing raw data on Structural Funds and discussing some methodological issues.

## 2.2 METHODOLOGICAL ISSUES AND KEYS TO INTERPRET TABLES

### 2.2.1 Introduction

The raw data provided by the European Commission on funds allocated by Member State, field of intervention and particular fund have been studied to determine which fields of intervention can be considered as environmental expenditure or environmentally beneficial expenditure. Based on this study, we have constructed tables for each country that show the funds budgeted for the programming period 2000-2006 for each field of intervention and particular fund, as well as the accompanying national and private funds. Given space constraints, we will only report aggregated data for all fields of intervention. The following sections provide the necessary information to interpret tables, and state the underlying assumptions on what percentages of some fields of intervention can be considered as environmental expenditure.<sup>2</sup>

### 2.2.2 Fields of intervention

The relevant fields of intervention have been grouped in two categories:

1. Environmental expenditure: categories of expenditure that are commonly considered as environmental.
2. Environmentally beneficial expenditure: categories of expenditure that are clearly beneficial for the environment and whose primary categorization would commonly be different from environmental.

#### 2.2.2.1 *Environmental expenditure*

*Code 1: Productive environment: In the field of intervention of productive environment, we identify the following environmental expenditure fields:*

Code 12: Forestry; Code 125: Restoring forestry production potential damaged by natural disasters and fire and introducing appropriate prevention instruments; Code 127: Improving/maintaining the ecological stability of protective forests.

Code 13: Promotion of rural areas adaptation and development; Code 1308: Agricultural water resources management; Code 1312: Preservation of the environment in connection with land, forestry and landscape conservation as well as with the improvement of animal welfare; Code 1313: Restoring agricultural production potential damaged by natural disasters and introducing appropriate prevention instruments.

Code 14: Fishing; Code 145: Equipment of the fishing ports and protection of the coastal marine zones: given that only protection of the coastal marine zones should be considered as environmental expenditure, only 50 per cent of the expenditure under this code has been categorized as such.

Code 15: Grants to large business; Code 152: Environment-friendly technologies, clean and economical energy technologies; Code 153: Business advisory services (including internationalisation, exporting, environmental management, purchase of technology): given that only environmental management advisory services should be considered as environmental expenditure, only 25 per cent of the expenditure under this code has been categorized as such.

Code 16: Grants to small and medium business; Code 162: Environment-friendly technologies, clean and economical energy technologies; Code 163: Business advisory services (information, business planning, consultancy services, marketing, management, design, internationalisation, exporting, environmental management, purchase of technology): given that only environmental management advisory services should be considered as environmental expenditure, only 10 per cent of the expenditure under this code has been categorized as such.

*Code 3: Basic infrastructure:*

Code 33: Energy infrastructure (production and distribution); Code 332: Renewable sources of energy (solar power, wind power, hydro-electricity, biomass); Code 333: Energy efficiency, cogeneration, energy control.

Code 34: Environmental infrastructure (including water); Code 341: Air; Code 342: Noise; Code 343: Urban and industrial waste (including hospital and dangerous waste); Code 344: Drinking water (collection, storage, treatment and distribution); Code 345: Sewerage and purification.

*Code 4: Miscellaneous:*

Code 41: Technical assistance and innovative actions (ERDF, ESF, EAGGF, FIFG); Code 411: Preparation, implementation, monitoring, publicity; Code 412: Evaluation; Code 413: Studies; Code 414: Innovative actions; Code 415: Information to the public. Since these fields of intervention apply to expenditures related to all kind of interventions, and

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<sup>2</sup> When no percentage is stated, 100 per cent of the field is considered as environmental expenditure. In the case of environmentally beneficial expenditure fields, 100 per cent of the expenditure under these fields is considered as such.

given the relative size of environmental expenditure, only 20 per cent of the expenditure has been considered as environmental.

### **2.2.2.2 Environmentally beneficial expenditure**

*Code 3: Basic infrastructure:*

Code 31: Transport infrastructure: Code 311: Rail; Code 3123: Cycle tracks; Code 316: Waterways; Code 317: Urban transport; Code 318: Multimodal transport; Code 319: Intelligent Transport Systems.

Code 35: Planning and rehabilitation: Code 351: Upgrading and rehabilitation of industrial and military sites; Code 352: Rehabilitation of urban areas.

### **2.2.3 Source of funds**

The following sources of funds are considered in the tables:

1. ERDF: European Regional Development Fund.
2. ESF: European Social Fund.
3. EAGGF: European Agricultural Guidance and Guarantee Fund.
4. FIG: Financial Instrument of Fisheries Guidance.
5. Total SF: ERDF + ESF + EAGGF + FIG.
6. National: co-financing by national authorities.
7. Private: co-financing by private agents.

## **2.3 AGGREGATE ANNUALISED DATA**

### **2.3.1 Environmental expenditure**

Table 1 aggregates and annualises the information on the Structural Funds for the programming period 2000-2006 allocated for environmental expenditure (according to the fields of intervention mentioned in section 2.2.2.1) for each of the fifteen Member States. Since no information has been provided on the annual distribution of the budgeted funds, we assume equal allocation through the seven years of the programming period.

This table shows very clearly that the European Regional Development Fund is the main driver of environmental expenditure from EU sources. It represents 79 per cent of all Structural Funds for the EU as a whole. The European Agricultural Guidance and Guarantee Fund is the second most important financial instrument, with 19 per cent of all funds allocated for environmental expenditure. The Financial Instrument of Fisheries Guidance and the European Social Fund are insignificant, although the European Social

Fund is clearly underestimated, since there are sizeable funds allocated for environmental education of employed and unemployed workers that have not been identified.

**Table 1: Annualised budgeted environmental expenditure from the Structural Funds for the programming period 2000-2006 (€)**

|             | ERDF          | ESF        | EAGGF       | FIFG      | TOTAL SF      | NATIONAL      | PRIVATE     |
|-------------|---------------|------------|-------------|-----------|---------------|---------------|-------------|
| Austria     | 9,671,490     | 704,997    | 811,641     | 0         | 11,188,128    | 6,466,477     | 34,851,240  |
| Belgium     | 6,695,551     | 1,604,330  | 184,592     | 0         | 8,484,474     | 9,000,846     | 1,043,810   |
| Denmark     | 862,028       | 472,354    | 0           | 0         | 1,334,381     | 1,613,849     | 3,562       |
| Finland     | 13,257,566    | 875,243    | 85,000      | 243,950   | 14,461,759    | 19,574,176    | 33,658,653  |
| France      | 124,813,819   | 4,836,997  | 7,915,818   | 1,041,280 | 138,607,914   | 181,361,260   | 105,867,024 |
| Germany     | 218,846,120   | 13,364,145 | 63,925,109  | 0         | 296,135,373   | 167,064,448   | 8,700,829   |
| Greece      | 175,546,503   | 3,151,915  | 90,730,173  | 903,760   | 270,332,350   | 131,028,037   | 140,340,513 |
| Ireland     | 39,314,939    | 199,743    | 0           | 0         | 39,514,682    | 27,058,284    | 272,857     |
| Italy       | 352,861,997   | 4,959,612  | 102,155,881 | 3,326,059 | 463,303,548   | 454,933,172   | 279,314,640 |
| Luxembourg  | 1,212,429     | 28,831     | 0           | 0         | 1,241,260     | 2,815,980     | 1,106,850   |
| Netherlands | 10,520,547    | 329,954    | 202,393     | 21,429    | 11,074,323    | 15,049,223    | 5,118,322   |
| Portugal    | 123,719,579   | 3,342,221  | 17,136,657  | 2,361,682 | 146,560,139   | 64,510,580    | 5,845,807   |
| Spain       | 644,436,043   | 3,123,099  | 142,197,122 | 0         | 789,756,264   | 481,348,953   | 4,910,024   |
| Sweden      | 1,441,378     | 918,879    | 60,822      | 6,439     | 2,427,518     | 2,637,637     | 851,094     |
| UK          | 73,124,826    | 4,585,826  | 6,807,470   | 1,166,443 | 85,684,565    | 83,163,413    | 30,064,953  |
| EU-15       | 1,796,324,812 | 42,498,147 | 432,212,677 | 9,071,041 | 2,280,106,677 | 1,647,626,335 | 651,950,177 |

Source: own calculations based on Directorate-General for Regional Policy and Cohesion (European Commission).

By country, the largest share of Structural Funds is for Spain, which receives 35 per cent. Spain is followed by Italy (20%), Germany (13%), Greece (12%), Portugal (6%) and France (6%). These six Member States combined represent 92 per cent of all Structural Funds. These funds are also an important driver for the allocation of national funds for environmental expenditure: 1,6 billion Euros per annum, which represent 72 per cent of the size of the Structural Funds. In the case of private funds, 652 million Euros accompany the Structural Funds for environmental expenditure, adding 29 per cent more to these funds. Private funds are especially important in Italy (279 M €), Greece (140 M €) and France (106 M €).

### 2.3.2 Environmentally beneficial expenditure

Table 2 aggregates and annualises the information on the Structural Funds for the programming period 2000-2006 allocated for environmentally beneficial expenditure (according to the fields of intervention mentioned in section 2.2.2.2) for each of the fifteen Member States. As with environmental expenditure, data is annualised assuming equal allocation of funds through the seven years of the programming period.

**Table 2: Annualised budgeted environmentally beneficial expenditure from the Structural Funds for the programming period 2000-2006 (€)**

|             | ERDF          | ESF | EAGGF | FIFG | TOTAL SF      | NATIONAL      | PRIVATE     |
|-------------|---------------|-----|-------|------|---------------|---------------|-------------|
| Austria     | 2,835,248     | 0   | 0     | 0    | 2,835,248     | 4,981,134     | 600,114     |
| Belgium     | 11,522,705    | 0   | 0     | 0    | 11,522,705    | 15,632,919    | 1,839,357   |
| Denmark     | 429,741       | 0   | 0     | 0    | 429,741       | 594,857       | 17,809      |
| Finland     | 7,129,414     | 0   | 0     | 0    | 7,129,414     | 13,581,921    | 4,545,750   |
| France      | 150,551,079   | 0   | 0     | 0    | 150,551,079   | 243,593,541   | 42,464,037  |
| Germany     | 310,419,972   | 0   | 0     | 0    | 310,419,972   | 221,446,593   | 46,717,115  |
| Greece      | 401,028,213   | 0   | 0     | 0    | 401,028,213   | 278,211,095   | 139,381,694 |
| Ireland     | 30,171,377    | 0   | 0     | 0    | 30,171,377    | 29,693,763    | 0           |
| Italy       | 343,272,950   | 0   | 0     | 0    | 343,272,950   | 435,157,230   | 53,824,268  |
| Luxembourg  | 1,581,429     | 0   | 0     | 0    | 1,581,429     | 3,690,000     | 1,486,813   |
| Netherlands | 34,962,060    | 0   | 0     | 0    | 34,962,060    | 73,870,785    | 3,210,661   |
| Portugal    | 351,596,545   | 0   | 0     | 0    | 351,596,545   | 316,973,559   | 110,514,596 |
| Spain       | 517,632,187   | 0   | 0     | 0    | 517,632,187   | 443,097,532   | 0           |
| Sweden      | 4,538,097     | 0   | 0     | 0    | 4,538,097     | 7,459,347     | 4,825,541   |
| UK          | 162,022,521   | 0   | 0     | 0    | 162,022,521   | 154,439,152   | 81,556,309  |
| EU-15       | 2,329,693,537 | 0   | 0     | 0    | 2,329,693,537 | 2,242,423,427 | 490,984,064 |

Source: own calculations based on Directorate-General for Regional Policy and Cohesion (European Commission).

Given the nature of these expenditures (transport infrastructure, and planning and rehabilitation of industrial and military sites and urban areas), all the funds come from the European Regional Development Fund, what makes it even more important as the main driver of environmental expenditure when we add environmental and environmentally beneficial expenditure. By Member State, Spain receives also in this case the largest share of Structural Funds (22%), followed by Greece (17%), Portugal (15%), Italy (15%), Germany (13%), UK (7%) and France (6%). These seven countries represent 96 per cent of all Structural Funds. The importance of these funds as drivers for the allocation of national funds is even more important here than in the case of environmental expenditure: 2,2 billion Euros per annum, which represent 96 per cent of the size of the Structural Funds. Private funds are 491 million Euros, which add 21 per cent more to Structural Funds. Private funds are largest in Greece (139 M €), Portugal (111 M €) and UK (82 M €).

### **3 COHESION FUND**

#### **3.1 INTRODUCTION: METHODOLOGICAL ISSUES**

The European Commission<sup>3</sup> has provided information on the actual payments made to the four cohesion countries from 1993 to the present, both from programming periods 1993-1999 and 2000-2006. The data consist of the actual payments made for each project by year. This information was not enough to aggregate expenditure by environmental domain, since the file titles of the projects were not always sufficiently descriptive to allow identification of the type of expenditure.

The raw data provided by the European Commission on actual payments from the Cohesion Fund divides projects in the following categories: environmental projects, transport projects, mixed projects and technical assistance. Obviously, environmental projects have been considered as environmental expenditure. In the case of transport projects, it is clear that some of them should be considered as environmentally beneficial expenditure, as some transport infrastructures were considered in the case of the European Regional Development Fund: rail, cycle tracks, waterways, urban transport, multimodal transport and intelligent transport systems. Unfortunately, the non-descriptive file titles of the projects prevented us again from identifying the type of transport expenditure. Hence no transport expenditure has been considered neither environmental nor environmentally beneficial expenditure, which means that we are underestimating the environmental impact of Cohesion Funds. Finally, with regard to mixed projects and technical assistance, the following criterion has been followed: the percentage of environmental projects over the sum of environmental and transport projects in each particular year is applied to mixed projects and technical assistance to determine what fraction of them should be considered as environmental expenditure (in any case, it is a negligible amount).

#### **3.2 ENVIRONMENTAL EXPENDITURE BY MEMBER STATE**

Table 3 through Table 6 report the payments made through the Cohesion Fund to Greece, Ireland, Portugal and Spain for environmental projects from 1993 to 2002. The total payments made for environmental projects have grown steadily from 279 million Euros in 1993 to 1,3 billion Euros in 2002. The average yearly total amount paid for the ten year period is 838 million Euros, with Spain being the main recipient of funds in average

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<sup>3</sup> The author wish to thank Ms. Luisa Sanches, from the Directorate-General for Regional Policy and Cohesion, for kindly providing raw data on the Cohesion Fund.



(53%), followed by Portugal (20%), Greece (16%) and Ireland (11%). However, Spain is the country that benefits the less of cohesion funds for environmental projects in terms of average GDP percentages (0.08%), and Portugal the most benefited Member State (0.17%), followed by Greece (0.12%) and Ireland (0.12%). Also in average per capita terms, Spain is the least benefited country (11.38 € per capita), and Ireland is the Member State that benefits the most (24.54 € per capita), followed by Portugal (17.09 € per capita) and Greece (12.49 € per capita).

The aim of the Cohesion Fund is to spend 50 per cent of the available resources to finance transport infrastructures and 50 per cent to finance environmental projects. We can see that, although with large variations from one year to another, the average percentages represented by environmental projects in each Member State approach 50 per cent of total payments from the Cohesion Fund.

**Table 3: Cohesion Fund payments for environmental projects in Greece (€)**

| Payment Year                                                           | Amounts paid (€) | Percentage over all cohesion countries' environmental projects (%) | Percentage over Greece's total cohesion funds (%) | Percentage Over GDP (%) | Amounts per capita (€) |
|------------------------------------------------------------------------|------------------|--------------------------------------------------------------------|---------------------------------------------------|-------------------------|------------------------|
| 1993                                                                   | 99,067,294       | 36                                                                 | 67                                                | 0.12                    | 9.57                   |
| 1994                                                                   | 141,687,620      | 40                                                                 | 90                                                | 0.17                    | 13.61                  |
| 1995                                                                   | 76,977,597       | 13                                                                 | 85                                                | 0.09                    | 7.37                   |
| 1996                                                                   | 123,220,822      | 19                                                                 | 50                                                | 0.13                    | 11.77                  |
| 1997                                                                   | 159,072,521      | 19                                                                 | 28                                                | 0.15                    | 15.17                  |
| 1998                                                                   | 152,847,373      | 13                                                                 | 32                                                | 0.14                    | 14.54                  |
| 1999                                                                   | 112,112,440      | 11                                                                 | 45                                                | 0.10                    | 10.66                  |
| 2000                                                                   | 154,913,435      | 18                                                                 | 51                                                | 0.13                    | 14.69                  |
| 2001                                                                   | 162,713,264      | 14                                                                 | 63                                                | 0.12                    | 15.39                  |
| 2002                                                                   | 125,620,657      | 9                                                                  | 26                                                | 0.09                    | 11.86                  |
| Average                                                                | 130,823,302      | 16                                                                 | 44                                                | 0.12                    | 12.49                  |
| <b>Percentage over total environmental expenditure (1999 data) (%)</b> |                  |                                                                    |                                                   |                         | <b>6</b>               |

Source: own calculations based on Directorate-General for Regional Policy and Cohesion (European Commission), ECOTEC (2002) and Eurostat (2002).

Finally, we can look into the importance of these funds in relation to the total environmental expenditure in each country, according to ECOTEC (2002)'s estimate for 1999. Cohesion Fund payments represent a significant percentage of total environmental expenditure for all Member States: 18 per cent in Ireland, 8 per cent in Portugal and Spain, and 6 per cent in Greece. Since a large fraction of environmental expenditure is due to the implementation of EU directives, these sizeable percentages imply that the burden of EU

policy for the less rich Member States is greatly softened by the Cohesion Fund, which in turn makes easier that the expenditure associated to EU directives is additional, in the sense of not replacing other productive expenditure.

**Table 4: Cohesion Fund payments for environmental projects in Ireland (€)**

| Payment Year                                                    | Amounts paid (€) | Percentage over all cohesion countries' environmental projects (%) | Percentage over Ireland's total cohesion funds (%) | Percentage over GDP (%) | Amounts per capita (€) |
|-----------------------------------------------------------------|------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------|------------------------|
| 1993                                                            | 28,845,009,00    | 10                                                                 | 43                                                 | 0.07                    | 8.08                   |
| 1994                                                            | 24,853,596,00    | 7                                                                  | 29                                                 | 0.05                    | 6.94                   |
| 1995                                                            | 53,993,215,00    | 9                                                                  | 40                                                 | 0.11                    | 15.01                  |
| 1996                                                            | 97,081,483,00    | 15                                                                 | 47                                                 | 0.17                    | 26.82                  |
| 1997                                                            | 64,353,898,00    | 8                                                                  | 30                                                 | 0.09                    | 17.62                  |
| 1998                                                            | 139,261,365,28   | 12                                                                 | 59                                                 | 0.18                    | 37.70                  |
| 1999                                                            | 138,700,175,00   | 13                                                                 | 73                                                 | 0.16                    | 37.14                  |
| 2000                                                            | 52,352,074,90    | 6                                                                  | 41                                                 | 0.05                    | 13.86                  |
| 2001                                                            | 203,841,708,59   | 17                                                                 | 65                                                 | 0.18                    | 53.27                  |
| 2002                                                            | 98,074,303,62    | 7                                                                  | 51                                                 | 0.08                    | 25.30                  |
| Average                                                         | 90,135,683       | 11                                                                 | 51                                                 | 0.12                    | 24.54                  |
| Percentage over total environmental expenditure (1999 data) (%) |                  |                                                                    |                                                    |                         | 18                     |

Source: own calculations based on Directorate-General for Regional Policy and Cohesion (European Commission), ECOTEC (2002) and Eurostat (2002).

**Table 5: Cohesion Fund payments for environmental projects in Portugal (€)**

| Payment Year                                                    | Amounts paid (€) | Percentage over all cohesion countries' environmental projects (%) | Percentage over Portugal's total cohesion funds (%) | Percentage over GDP (%) | Amounts per capita (€) |
|-----------------------------------------------------------------|------------------|--------------------------------------------------------------------|-----------------------------------------------------|-------------------------|------------------------|
| 1993                                                            | 31,513,629       | 11                                                                 | 34                                                  | 0.04                    | 3.19                   |
| 1994                                                            | 54,527,570       | 15                                                                 | 22                                                  | 0.07                    | 5.51                   |
| 1995                                                            | 97,052,060       | 17                                                                 | 26                                                  | 0.12                    | 9.79                   |
| 1996                                                            | 124,128,046      | 19                                                                 | 38                                                  | 0.14                    | 12.51                  |
| 1997                                                            | 296,413,027      | 35                                                                 | 57                                                  | 0.32                    | 29.84                  |
| 1998                                                            | 448,300,972      | 37                                                                 | 67                                                  | 0.45                    | 45.02                  |
| 1999                                                            | 148,680,989      | 14                                                                 | 45                                                  | 0.14                    | 14.90                  |
| 2000                                                            | 108,569,263      | 13                                                                 | 93                                                  | 0.09                    | 10.86                  |
| 2001                                                            | 202,215,792      | 17                                                                 | 46                                                  | 0.16                    | 20.19                  |
| 2002                                                            | 187,660,533      | 14                                                                 | 46                                                  | 0.15                    | 18.70                  |
| Average                                                         | 169,906,188      | 20                                                                 | 48                                                  | 0.17                    | 17.09                  |
| Percentage over total environmental expenditure (1999 data) (%) |                  |                                                                    |                                                     |                         | 8                      |

Source: own calculations based on Directorate-General for Regional Policy and Cohesion (European Commission), ECOTEC (2002) and Eurostat (2002).

**Table 6: Cohesion Fund payments for environmental projects in Spain (€)**

| Payment Year                                                           | Amounts paid (€) | Percentage over all cohesion countries' environmental projects (%) | Percentage over Spain's total cohesion funds (%) | Percentage over GDP (%) | Amounts per capita (€) |
|------------------------------------------------------------------------|------------------|--------------------------------------------------------------------|--------------------------------------------------|-------------------------|------------------------|
| 1993                                                                   | 119,120,124      | 43                                                                 | 28                                               | 0.03                    | 3.05                   |
| 1994                                                                   | 136,688,294      | 38                                                                 | 32                                               | 0.03                    | 3.49                   |
| 1995                                                                   | 359,900,803      | 61                                                                 | 33                                               | 0.08                    | 9.19                   |
| 1996                                                                   | 296,992,139      | 46                                                                 | 27                                               | 0.06                    | 7.57                   |
| 1997                                                                   | 331,909,950      | 39                                                                 | 33                                               | 0.07                    | 8.45                   |
| 1998                                                                   | 466,669,817      | 39                                                                 | 44                                               | 0.09                    | 11.86                  |
| 1999                                                                   | 661,018,573      | 62                                                                 | 70                                               | 0.12                    | 16.78                  |
| 2000                                                                   | 547,361,595      | 63                                                                 | 48                                               | 0.09                    | 13.88                  |
| 2001                                                                   | 631,664,305      | 53                                                                 | 66                                               | 0.10                    | 15.99                  |
| 2002                                                                   | 920,093,597      | 69                                                                 | 45                                               | 0.13                    | 23.25                  |
| Average                                                                | 447,141,920      | 53                                                                 | 44                                               | 0.08                    | 11.38                  |
| <b>Percentage over total environmental expenditure (1999 data) (%)</b> |                  |                                                                    |                                                  |                         | <b>8</b>               |

Source: own calculations based on Directorate-General for Regional Policy and Cohesion (European Commission), ECOTEC (2002) and Eurostat (2002).

### 3.3 IMPACT ON COHESION AMONG COHESION MEMBER STATES

We will study in the following section the combined impact on cohesion of the Structural and Cohesion Funds. But before we do so, we can ask if the Cohesion Fund is also “cohesive” among the cohesion countries. For this purpose, we may use the Lorenz curve, a graphical representation of the magnitude of inequalities, as our frame of analysis. Figure 1 represents the Lorenz curve of the four cohesion countries' average GDP and average cohesion funds paid for environmental projects during the period 1993-2002. The horizontal axis indicates the cumulative population from low to high GDP per capita in percentages; that is, Member States are arranged in ascending order according to their GDP per capita (poorer countries on the left side and richer countries on the right side).

On the vertical axis, we have the two variables measured against cumulative population: cumulative average GDP (in percentages) and cumulative average cohesion funds paid for environmental projects (in percentages). Therefore, Figure 1 represents countries in two ways:

1. By relating their cumulative share of total GDP to their cumulative share of total population. Since countries are arranged in ascending order according to their GDP per capita, the line representing GDP will always be confined into the lower triangle formed by the 45 degrees line, the low horizontal axis and the right vertical axis. Hence, for each point (x, y) in this line, x is always greater or equal

than  $y$ , and we can state that the poorest  $x\%$  of the population earns  $y\%$  of GDP. Therefore, an unequal income distribution is represented by a GDP line that is far beneath the 45 degrees line. This line represents a situation of total equalitarianism, that is, every country has the same GDP per capita. Therefore, the aim of economic and social cohesion should be to bring the line representing GDP as close as possible to the 45 degrees line or equity line.

2. By relating their cumulative share of Cohesion Fund payments to their cumulative share of total population. In this case, the cohesion funds line indicates the percentage of total funds ( $y\%$ ) received by the poorest  $x\%$  of the population.

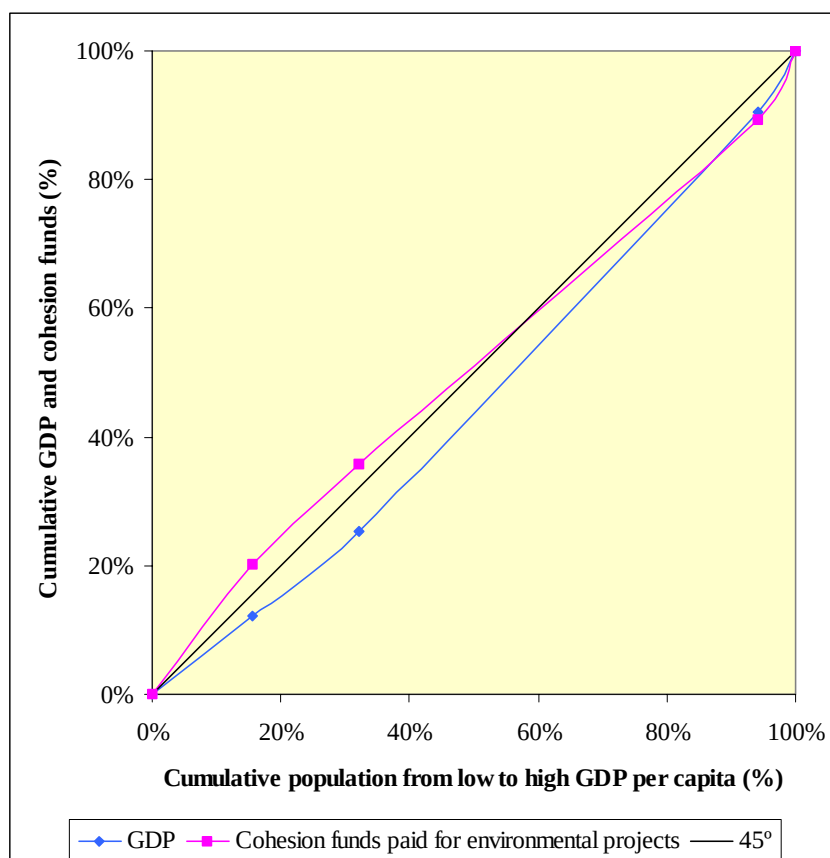
From the point of view of economic and social cohesion, the following cases are possible:

1. The cohesion funds line lies below the GDP line: the existing inequalities in terms of GDP per capita are increased by the distribution of cohesion funds payments.
2. The cohesion funds line is situated between the GDP and equity lines: the Member States with lower GDP per capita receive less payments per capita than the countries with higher GDP per capita. However, the former receive more payments as a percentage of GDP than the latter. Hence the implications for cohesion of this situation are ambiguous.
3. The cohesion funds line is placed above the equity line: the distribution of cohesion fund payments certainly contributes to economic and social cohesion also among the four recipient countries, since the countries with lower GDP per capita receive more funds per capita than the Member States with higher GDP per capita.

Figure 1 indicates that the distribution of Cohesion Fund payments for environmental projects contributes to further cohesion also among the four cohesion countries only for the lower income countries. This is explained because the country with the lowest GDP per capita, Portugal, represents 15.7 per cent of the four cohesion countries' population and 12.1 per cent of their combined GDP, but receives 20.1 per cent of Cohesion Fund payments. The second lowest GDP per capita belongs to Greece, which receives more payments (15.6%) than its share of GDP (13.2%), but less than its share of population (16.5%). The cohesive impact of the distribution of the Cohesion Fund among these four countries disappears as we move into percentages of population with highest GDP per capita, with a clear effect against cohesion from the allocation of funds to the richest of the

four countries, Ireland. This result is due to Ireland obtaining 10.8 per cent of Cohesion Fund payments when it only represents 5.8 per cent of population and 9.5 per cent of combined GDP. On the contrary, Spain, the second country in GDP per capita terms, receives much less payments (53.4%) than its share of population (62.0%) and GDP (65.1%).

**Figure 1: Lorenz curve of average GDP and average cohesion funds paid for environmental projects (1993-2002)**



Source: own calculations based on Directorate-General for Regional Policy and Cohesion (European Commission) and Eurostat (2002).

## 4 STRUCTURAL AND COHESION FUNDS: MAGNITUDE AND EFFECT ON COHESION

### 4.1 AGGREGATION AND MAGNITUDE OF STRUCTURAL AND COHESION FUNDS

#### 4.1.1 Environmental expenditure

The annualised budgeted environmental expenditure from the Structural Funds for the programming period 2000-2006 from Table 1 is combined in Table 7 with the 2000-2002 average payments made through the Cohesion Fund to Greece, Ireland, Portugal and Spain for environmental projects from Table 3 through Table 6. The aggregated EU

funds for environmental expenditure are put in relation to several other variables to provide an idea of their magnitude and importance. All the information in Table 7 refers to 2000 values when nothing else is indicated. All monetary amounts have been brought to 1995 price levels using the following indices (Eurostat, 2002) to change price bases:

1. Industrial producer price index - Total industry (excluding construction): used for funds for environmental expenditure and for ECOTEC (2002)'s estimated total environmental expenditure.
2. Implicit deflator of gross domestic product (SEC95): used for GDP.

**Table 7: Annualised Structural and Cohesion Funds for environmental expenditure (1995 price levels, 2000 values)**

|             | Annualised budgeted SF (programming period 2000-2006) (M €) | Annual CF payments (average 2000-2002) (M €) | SF+CF (M €) | Percentage of SF+CF over EU total SF+CF (%) | Percentage of SF+CF over GDP (%) | SF+CF per capita (€) | Percentage of SF+CF over total environmental expenditure (1999 data) (%) |
|-------------|-------------------------------------------------------------|----------------------------------------------|-------------|---------------------------------------------|----------------------------------|----------------------|--------------------------------------------------------------------------|
| Austria     | 10.89                                                       |                                              | 10.89       | 0.35                                        | 0.005                            | 1.34                 | 0.12                                                                     |
| Belgium     | 7.76                                                        |                                              | 7.76        | 0.25                                        | 0.003                            | 0.76                 | 0.16                                                                     |
| Denmark     | 1.22                                                        |                                              | 1.22        | 0.04                                        | 0.001                            | 0.23                 | 0.02                                                                     |
| Finland     | 13.76                                                       |                                              | 13.76       | 0.45                                        | 0.011                            | 2.66                 | 0.64                                                                     |
| France      | 133.52                                                      |                                              | 133.52      | 4.35                                        | 0.010                            | 2.25                 | 0.35                                                                     |
| Germany     | 290.98                                                      |                                              | 290.98      | 9.47                                        | 0.014                            | 3.54                 | 0.51                                                                     |
| Greece      | 214.48                                                      | 114.35                                       | 328.83      | 10.70                                       | 0.309                            | 31.18                | 20.26                                                                    |
| Ireland     | 36.26                                                       | 104.78                                       | 141.04      | 4.59                                        | 0.173                            | 37.35                | 18.53                                                                    |
| Italy       | 424.04                                                      |                                              | 424.04      | 13.80                                       | 0.046                            | 7.35                 | 2.73                                                                     |
| Luxembourg  | 1.18                                                        |                                              | 1.18        | 0.04                                        | 0.006                            | 2.71                 | 0.42                                                                     |
| Netherlands | 9.69                                                        |                                              | 9.69        | 0.32                                        | 0.003                            | 0.61                 | 0.10                                                                     |
| Portugal    | 121.81                                                      | 137.32                                       | 259.13      | 8.43                                        | 0.260                            | 25.92                | 15.35                                                                    |
| Spain       | 729.10                                                      | 635.17                                       | 1,364.27    | 44.40                                       | 0.253                            | 34.59                | 17.45                                                                    |
| Sweden      | 2.36                                                        |                                              | 2.36        | 0.08                                        | 0.001                            | 0.27                 | 0.07                                                                     |
| UK          | 84.02                                                       |                                              | 84.02       | 2.73                                        | 0.008                            | 1.41                 | 0.34                                                                     |
| EU-15       | 2,081.08                                                    | 991.63                                       | 3,072.71    | 100                                         | 0.041                            | 8.16                 | 1.68                                                                     |

Source: own calculations based on Directorate-General for Regional Policy and Cohesion (European Commission), ECOTEC (2002) and Eurostat (2002).

The total annualised Structural and Cohesion Funds for environmental expenditure in 1995 price levels represent more than 3 billion Euros; two thirds coming from the Structural Funds and one third from the Cohesion Fund. Spain is the largest beneficiary in absolute terms, with 1.4 billion Euros, which signify 44 per cent of all funds. In this respect, Spain is followed by Italy (14%), Greece (11%), Germany (9%) and Portugal (8%), the only countries receiving more than 5 per cent of the total funds. In relation to GDP, these funds represent a small 0.04 per cent for the whole EU. This percentage is surpassed only by

Greece (0.31%), Portugal (0.26%), Spain (0.25%), Ireland (0.17%) and Italy (0.05%). In per capita terms, the EU average of 8.16 Euros per capita is only exceeded by Ireland (37.35 € per capita), Spain (34.59 € per capita), Greece (31.18 € per capita) and Portugal (25.92 € per capita).

In relation to the total environmental expenditure in each country, according to ECOTEC (2002)'s estimate for 1999, EU funds represent in average a small 2 per cent. However, this percentage is very significant for the four cohesion countries: 20 per cent in Greece, 19 per cent in Ireland, 17 per cent in Spain, and 15 per cent in Portugal. Italy, with 3 per cent, is also above the EU average, but far from the cohesion countries.

#### **4.1.2 Environmental and environmentally beneficial expenditure**

The information provided in Table 7 is completed in Table 8 by adding the annualised budgeted environmentally beneficial expenditure from the Structural Funds for the programming period 2000-2006 from Table 2, which is added to the environmental expenditure from Structural Funds in the same column. The information in Table 8 is treated in the same way than the information in Table 7. Also, identical comparisons are established in both tables, with the exception that the relationship to the total environmental expenditure in each country makes sense only with regard to environmental expenditure, and hence it is not established for environmental and environmentally beneficial expenditure combined.

Including environmentally beneficial expenditure together with environmental expenditure brings the total annualised environmental Structural and Cohesion Funds from 3 to 5,2 billion Euros. Again, Spain is the largest beneficiary in absolute terms, with 1.8 billion Euros (36% of all funds), followed by Italy (14%), Greece (13%), Germany (12%), Portugal (11%) and France (5%), the only countries above 5 per cent of the total funds. The funds for the whole EU represent 0.07% of EU GDP. The same as when not including environmentally beneficial expenditure, this percentage is exceeded only by Greece (0.61%), Portugal (0.55%), Spain (0.34%), Ireland (0.21%) and Italy (0.08%). In per capita terms, the EU average of 13.73 Euros per capita is also surpassed by the same countries than when we considered only environmental expenditure, but in different order: Greece (61.35 € per capita), Portugal (55.15 € per capita), Spain (46.71 € per capita) and Ireland (44.68 € per capita).

**Table 8: Annualised Structural and Cohesion Funds for environmental and environmentally beneficial expenditure (1995 price levels, 2000 values)**

|             | Annualised budgeted SF (programming period 2000-2006) (M €) | Annual CF payments (average 2000-2002) (M €) | SF+CF (M €) | Percentage of SF+CF over EU total SF+CF (%) | Percentage of SF+CF over GDP (%) | SF+CF per capita (€) |
|-------------|-------------------------------------------------------------|----------------------------------------------|-------------|---------------------------------------------|----------------------------------|----------------------|
| Austria     | 13.65                                                       |                                              | 13.65       | 0.26                                        | 0.007                            | 1.69                 |
| Belgium     | 18.31                                                       |                                              | 18.31       | 0.35                                        | 0.008                            | 1.79                 |
| Denmark     | 1.62                                                        |                                              | 1.62        | 0.03                                        | 0.001                            | 0.30                 |
| Finland     | 20.54                                                       |                                              | 20.54       | 0.40                                        | 0.016                            | 3.97                 |
| France      | 278.55                                                      |                                              | 278.55      | 5.39                                        | 0.021                            | 4.70                 |
| Germany     | 596.01                                                      |                                              | 596.01      | 11.53                                       | 0.029                            | 7.25                 |
| Greece      | 532.66                                                      | 114.35                                       | 647.00      | 12.52                                       | 0.609                            | 61.35                |
| Ireland     | 63.95                                                       | 104.78                                       | 168.73      | 3.26                                        | 0.207                            | 44.68                |
| Italy       | 738.22                                                      |                                              | 738.22      | 14.28                                       | 0.080                            | 12.80                |
| Luxembourg  | 2.68                                                        |                                              | 2.68        | 0.05                                        | 0.014                            | 6.16                 |
| Netherlands | 40.28                                                       |                                              | 40.28       | 0.78                                        | 0.011                            | 2.54                 |
| Portugal    | 414.03                                                      | 137.32                                       | 551.35      | 10.67                                       | 0.554                            | 55.15                |
| Spain       | 1,206.97                                                    | 635.17                                       | 1,842.14    | 35.64                                       | 0.342                            | 46.71                |
| Sweden      | 6.78                                                        |                                              | 6.78        | 0.13                                        | 0.003                            | 0.76                 |
| UK          | 242.90                                                      |                                              | 242.90      | 4.70                                        | 0.024                            | 4.07                 |
| EU-15       | 4,177.13                                                    | 991.63                                       | 5,168.75    | 100                                         | 0.069                            | 13.73                |

Source: own calculations based on Directorate-General for Regional Policy and Cohesion (European Commission) and Eurostat (2002).

## 4.2 IMPACT ON COHESION

To study the combined impact on economic and social cohesion of the Structural and Cohesion Funds for environmental and environmentally beneficial expenditure we can use, like in section 3.3, the Lorenz curve as our main analytical tool. Figure 2 represents the Lorenz curve of real GDP in 2000 and the sum of the annualised budgeted Structural Funds for environmental and environmentally beneficial expenditure for the programming period 2000-2006 and the 2000-2002 average Cohesion Funds paid for environmental projects, all of them in 1995 price levels. The horizontal axis indicates the cumulative population from low to high GDP per capita in percentages.

As explained in section 3.3, the vertical axis of Figure 2 represents the two variables measured against cumulative population:

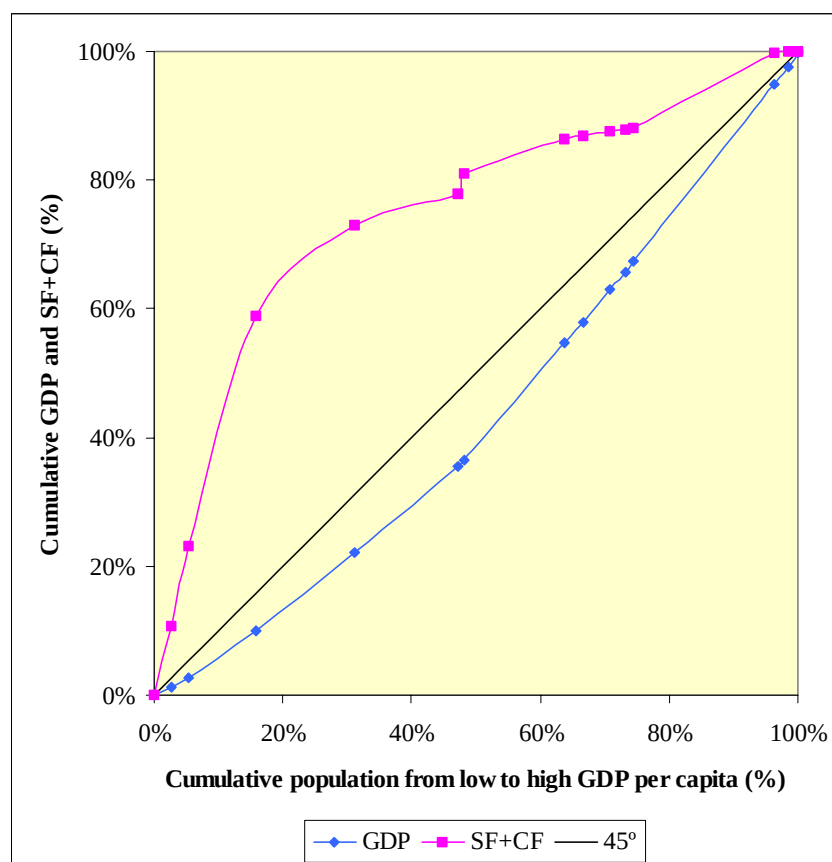
1. Cumulative GDP (in percentages).
2. Cumulative Structural and Cohesion Funds (in percentages).

Figure 2 shows that the Structural and Cohesion Funds line is placed well above the equity line, and hence the distribution of Structural and Cohesion Funds for environmental



and environmentally beneficial expenditure certainly contributes to economic and social cohesion, since the countries with lower GDP per capita receive more funds per capita than the Member States with higher GDP per capita. The cohesive impact is especially strong with regard to the three poorest Member States, Portugal, Greece and Spain, which represent 16 per cent of the EU population and 10 per cent of the EU GDP, but receive 59 per cent of environmentally related Structural and Cohesion Funds. If we add the other two Member States below the EU average GDP per capita, Italy and UK, we see that the poorest five countries represent 47 per cent of the EU population and 35 per cent of GDP, but obtain 78 per cent of the funds. Precisely after the representation of the five poorest countries, there is a kink on the Structural and Cohesion Funds line due to Ireland, which, although now is above the average GDP per capita, is still a recipient of Cohesion Funds. As a result, the funds received by this country have a negative cohesion impact, although scarcely significant overall, given the relatively small size of Ireland.

**Figure 2: Lorenz curve of real GDP in 2000 and annualised Structural (2000-2006) and Cohesion Funds (2000-2002) for environmental and environmentally beneficial expenditure (1995 price levels)**



Source: own calculations based on Directorate-General for Regional Policy and Cohesion (European Commission) and Eurostat (2002).

## **5 SUMMARY AND CONCLUSIONS**

Of all the financial instruments for the environment in place in the EU, the European Regional Development Fund and the Cohesion Fund are the most significant because of their quantitative volume. With regard to the former and the rest of Structural Funds, we have identified two categories of environmentally related fields of intervention in the programming period 2000-2006:

1. Environmental expenditure: categories of expenditure that are commonly considered as environmental. The European Regional Development Fund is the main driver of environmental expenditure from EU sources. It represents 79 per cent of all environmental Structural Funds for the EU as a whole. The European Agricultural Guidance and Guarantee Fund is the second most important financial instrument for the environment, with 19 per cent of all funds allocated for environmental expenditure. The Financial Instrument of Fisheries Guidance and the European Social Fund are insignificant, although the latter is clearly underestimated, since there are sizeable funds allocated for environmental education of employed and unemployed workers that we could not identify.
2. Environmentally beneficial expenditure: categories of expenditure that are clearly beneficial for the environment and whose primary categorization would commonly be different from environmental. Given the nature of these expenditures (transport infrastructure, and planning and rehabilitation of industrial and military sites and urban areas), all the funds come from the European Regional Development Fund.

The Cohesion Fund is allocated to environmental and transport projects. Obviously, environmental projects have been considered as environmental expenditure. In the case of transport projects, it is clear that some of them should be considered as environmentally beneficial expenditure, but we could not identify them. Hence no transport expenditure has been considered neither environmental nor environmentally beneficial expenditure, which means that we are underestimating the environmental impact of Cohesion Funds. The payments made through the Cohesion Fund to Greece, Ireland, Portugal and Spain for environmental projects from 1993 to 2002 have grown steadily from 279 million Euros in 1993 to 1.3 billion Euros in 2002.

If we aggregate the annualised budgeted environmental expenditure from the Structural Funds for the programming period 2000-2006 with the 2000-2002 average payments made through the Cohesion Fund to Greece, Ireland, Portugal and Spain for

environmental projects, we see that the total annualised Structural and Cohesion Funds for environmental expenditure in 1995 price levels represent more than 3 billion Euros; two thirds coming from the Structural Funds and one third from the Cohesion Fund. Spain is the largest beneficiary in absolute terms, with 1.4 billion Euros, which signify 44 per cent of all funds. In this respect, Spain is followed by Italy (14%), Greece (11%), Germany (9%) and Portugal (8%), the only countries receiving more than 5 per cent of the total funds. In relation to GDP, these funds represent a small 0.04 per cent for the whole EU. This percentage is surpassed only by Greece (0.31%), Portugal (0.26%), Spain (0.25%), Ireland (0.17%) and Italy (0.05%). In per capita terms, the EU average of 8.16 Euros per capita is only exceeded by Ireland (37.35 € per capita), Spain (34.59 € per capita), Greece (31.18 € per capita) and Portugal (25.92 € per capita).

In relation to the total 1999 estimate of environmental expenditure in each country, EU funds represent in average a small 2 per cent. However, this percentage is very significant for the four cohesion countries: 20 per cent in Greece, 19 per cent in Ireland, 17 per cent in Spain, and 15 per cent in Portugal. Italy, with 3 per cent, is also above the EU average, but far from the cohesion countries. Since a large fraction of environmental expenditure is a direct consequence of EU environmental legislation, these sizeable percentages imply that the burden of EU policy for the less rich Member States is greatly softened by the Structural and Cohesion Funds, which in turn makes easier that the expenditure associated to EU directives is additional, in the sense of not replacing other productive expenditure.

Including environmentally beneficial expenditure together with environmental expenditure brings the total annualised environmental Structural and Cohesion Funds from 3 to 5.2 billion Euros. Again, Spain is the largest beneficiary in absolute terms, with 1.8 billion Euros (36% of all funds), followed by Italy (14%), Greece (13%), Germany (12%), Portugal (11%) and France (5%), the only countries above 5 per cent of the total funds. The funds for the whole EU represent 0.07% of EU GDP. Again, this percentage is exceeded only by Greece (0.61%), Portugal (0.55%), Spain (0.34%), Ireland (0.21%) and Italy (0.08%). In per capita terms, the EU average of 13.73 Euros per capita is surpassed by Greece (61.35 € per capita), Portugal (55.15 € per capita), Spain (46.71 € per capita) and Ireland (44.68 € per capita).

The distribution of Structural and Cohesion Funds for environmental and environmentally beneficial expenditure certainly contributes to economic and social

cohesion, since the countries with lower GDP per capita receive more funds per capita than the Member States with higher GDP per capita. The cohesive impact is especially strong with regard to the three poorest Member States, Portugal, Greece and Spain, which represent 16 per cent of the EU population and 10 per cent of the EU GDP, but receive 59 per cent of environmentally related Structural and Cohesion Funds. If we add the other two Member States below the EU average GDP per capita, Italy and UK, we see that the poorest five countries represent 47 per cent of the EU population and 35 per cent of GDP, but obtain 78 per cent of the funds. The only negative cohesion impact of Structural and Cohesion Funds is produced in relation to Ireland, which, although now is above the average GDP per capita, is still a recipient of Cohesion Funds. However, this non-cohesive effect is scarcely significant overall, given the relatively small size of Ireland.

In short, the European Regional Development Fund and the Cohesion Fund allocated for environmental purposes produce strong positive effects on economic and social cohesion. Moreover, they are very important as a guarantee that environmental expenditure is additional (that is, it does not simply replace other productive expenditure) in the poorest Member States. This increases the likelihood that the potential income and employment opportunities associated with the expenditure necessary to implement EU environmental policy translate into actual income and employment.

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