

Expenditure on Environmentally Sensitive Goods and Services: Household spending in Europe

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I. Introduction: Data Sources

This paper analyses expenditure on environmentally sensitive goods and services for the member states of the EEC. The main data source used was the EUROSTAT Family Budgets (EUROSTAT 1992, 1993), which contains detailed household consumption data based on surveys carried out in the 12 member states in 1988. The national surveys are consolidated on a common basis, so that comparisons of household expenditures can be made across countries. The data covers 11 of the 12 EEC states, but detailed data for (West) Germany are not available in this source, so the German survey (Statistisches Bundesamt 1994) was used. Data for Finland, Norway, Sweden have been obtained from the Statistical Offices of these countries and the Swiss expenditure survey has also been used. The EUROSTAT data includes expenditures of households grouped by expenditure categories, by socio-economic groups and by the main income source of the household. The data across the expenditure categories provides information on the distribution of consumption expenditure and the income source groups enable the 'at risk' groups - those whose income is mainly derived from social transfers and state pensions - to be analysed. The data for Finland, Norway, Sweden and Switzerland have not been converted into the EUROSTAT categories and are therefore not directly comparable with the other countries. In particular, households are often grouped by income instead of expenditure. However, Smith (1992 p.252) found that for the UK, analysis of expenditures by expenditure category and by income category gave similar results, so some general comparisons can be made. Consumption patterns in these countries are considered in a separate section.

The EUROSTAT data are limited in that numbers of households in the various surveys are not given and the data are given for adult equivalents (converted from the household membership using the OECD scale³), so further analysis cannot be undertaken. This also means that no account can be taken of effects due to household composition, but Smith (1992 p.252) suggests that this will not give rise to major biases. Some data are also missing and is imputed from other data points - details are given in Köhler 1997. The EUROSTAT expenditure categories seem to concentrate on low expenditure groups: the lowest category is 'less than 0.4 of the average expenditure over all households'. This is considerably less than expenditure by the unemployed or pensioners, so there are probably very few households that fall into this category and the data would then be based on a very small sample and might take extreme values. Furthermore, the highest income category is '1.6* the average expenditure over all households'. In the UK 1988 Family Expenditure Survey (CSO 1990),

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³ The OECD scale is: No. of adult equivalents = 1.0*1st. adult in household + 0.7*no. of subsequent adults (over 13 years) + 0.5*no. of children

this was found to cover 2,134 of the 7,265 households surveyed, so the wealthy parts of the populations are not described in much detail. However, since the objective of this analysis is to concentrate on the low expenditure/income groups who may be disadvantaged by new eco-taxes, the organisation of the data are well suited to this purpose.

The main difficulty with analysis of countries not included in the EUROSTAT statistics is that data is often categorised on a different basis. The issue of analysing data by expenditure categories compared with income categories is considered, using the case of the Swedish data as an example.

II. Expenditure on Environmentally Sensitive Goods and Services

The data tables show expenditure distributions by expenditure categories, which are household average expenditure bands relative to the average expenditure of all households. The expenditures are shown as percentages of total household expenditure.

Total expenditure on domestic energy

Total expenditure on energy for heating, lighting, power and cooking is calculated from the EUROSTAT Family Budgets expenditure categories as electricity + gas + other fuels. The data are shown in Table 1 and Graph 1.

*Table 1 Distribution of total expenditure percentages on domestic energy
Percentages of total household expenditure in 1988*

	All households	Expenditure groups						Social transfers	Pensions
		<0.4	0.4-0.6	0.6-0.8	0.8-1.2	1.2-1.6	>1.6		
Belgium	5.28	9.07	7.09	6.30	5.10	4.15	2.96	6.99	6.18
Denmark	6.41	13.91	9.95	8.58	6.50	5.00	4.36	7.68	11.5
W.Ger	5.44	10.03	9.33	7.96	5.54	3.87	3.18	8.25	7.46
Greece	4.14	12.48	10.10	7.42	6.12	4.91	3.37	4.97	4.97
Spain	2.79	4.11	3.54	3.11	2.74	2.51	2.09	3.15	3.39
France	4.05	6.82	5.48	4.89	4.00	3.18	2.40	4.44	5.18
Ireland	6.20	9.53	8.57	7.64	6.44	5.20	4.16	9.41	7.60
Italy	4.65	6.01	5.35	5.00	4.80	4.63	3.31	6.31	5.61
Lux	5.33	8.93	7.25	6.26	5.19	4.30	3.48	6.26	6.34
Neth	3.98	8.73	5.70	4.66	3.99	3.35	2.70	5.45	4.29
Portugal	4.17	9.08	6.24	5.30	4.83	3.78	2.63	3.84	3.28
UK	4.65	6.17	7.21	5.52	4.07	3.65	2.21	8.73	4.95

Sources: EUROSTAT Family Budgets 1992, 1993; EUROSTAT calculations; Statistisches Bundesamt (1994) and EU project PL950582 Environmental Fiscal Reform.

The percentage of household budgets spent on domestic energy decreases as they spend more overall i.e the poor spend a larger percentage of their budgets on energy. For most countries, the budget portion spent on energy decreases from about 40 to 50% above the average (from 3.14%

*Graph 1 Distribution of total expenditure percentages on domestic energy
Percentages of total household expenditure in 1988*

Sources: EUROSTAT Family Budgets 1992, 1993; EUROSTAT calculations; Statistisches Bundesamt (1994) and EU project PL950582 Environmental Fiscal Reform.

in Spain to 10.1% in Greece) for the 0.4-0.6 expenditure group to roughly 60 to 70% of the average (2.09% in Spain to 4.36% in Denmark) for the highest expenditure group. There is less variation across groups for Spain and Italy, perhaps because these are warm countries so that the poor do not have to heat as much. Denmark, Greece and Portugal have distributions with rapidly

decreasing percentages as overall expenditures increase. However, as can be seen from Graph 1, there is only slight evidence of a North-South split; expenditure on energy in southern Europe is somewhat less peaked than expenditure in northern Europe. Spanish people in particular spend little on energy (2.79% of expenditure over all households). For the expenditure group 0.4-0.6*expenditure of all households people in Denmark (9.95%), Greece (10.1%) and Ireland (8.57%) spend more than people in a similar category in other countries.

In terms of income categories, households whose main income is social transfers or pensions spend a higher percentage of their budgets on energy than wage earners or the average household, but the difference is not very great. The only groups that spend significantly more than the average household are those receiving social transfers in Ireland (9.41% of expenditure compared to 6.2% average over all households) and pensioners in Denmark (11.5% of expenditure compared to 6.41% average over all households).

Expenditures on Electricity and Gas

Data for expenditures on electricity and gas are shown in Table 2. The pattern of expenditure on electricity is similar to that for total domestic energy consumption: the expenditure percentage

Table 2 Distribution of expenditure percentages on electricity and gas

Electricity	All households	Expenditure groups						Social transfers	Pensions
		<0.4	0.4-0.6	0.6-0.8	0.8-1.2	1.2-1.6	>1.6		
Belgium	2.74	4.96	3.67	3.33	2.73	2.11	1.55	3.32	2.86
Denmark	2.33	4.79	3.32	3.22	2.31	1.93	1.54	3.21	3.38
W. Ger	2.52	4.62	4.25	3.59	2.60	1.93	1.60	4.18	3.34
Greece	2.00	4.12	3.49	3.10	2.75	2.26	1.74	2.30	2.35
Spain	1.62	2.36	2.10	1.85	1.60	1.46	1.19	1.76	1.81
France	2.55	4.44	3.52	3.13	2.57	2.05	1.55	2.85	2.95
Ireland	2.32	3.85	3.18	2.71	2.39	2.02	1.59	2.63	2.66
Italy	1.39	3.27	2.22	1.77	1.38	1.10	0.66	1.84	1.49
Lux	2.74	4.96	3.67	3.33	2.73	2.11	1.55	3.32	2.86
Neth	1.44	3.76	2.19	1.72	1.45	1.16	0.91	1.85	1.39
Portugal	2.82	7.60	4.44	3.67	3.10	2.59	1.83	2.65	2.25
UK	1.67	2.96	2.87	1.92	1.44	1.00	0.68	3.91	2.17

Gas	All households	Expenditure groups						Social transfers	Pensions
		<0.4	0.4-0.6	0.6-0.8	0.8-1.2	1.2-1.6	>1.6		
Belgium	1.25	1.74	1.48	1.34	1.25	1.09	0.82	1.91	1.63
Denmark	0.32	0.80	0.33	0.36	0.31	0.26	0.38	0.22	0.49
W. Ger	1.36	2.57	2.40	2.07	1.37	0.85	0.61	2.06	1.92
Greece	0.18	1.13	0.75	0.50	0.31	0.23	0.12	0.41	0.28
Spain	0.73	1.43	1.10	0.87	0.70	0.58	0.44	0.99	0.91
France	0.43	0.74	0.61	0.49	0.45	0.28	0.21	0.37	0.62
Ireland	0.74	1.27	1.15	1.00	0.75	0.57	0.43	1.35	1.19
Italy	1.41	2.03	1.86	1.72	1.53	1.31	0.80	1.28	1.72
Lux	1.25	1.74	1.48	1.34	1.25	1.09	0.82	1.91	1.63
Neth	2.22	4.59	3.16	2.57	2.21	1.92	1.52	2.90	2.42
Portugal	1.06	1.10	1.32	1.30	1.40	0.99	0.64	0.84	1.00
UK	1.28	1.95	1.95	1.39	0.97	1.06	0.72	2.06	1.72

Sources: EUROSTAT Family Budgets 1992, 1993; EUROSTAT calculations; Statistisches Bundesamt (1994) and EU project PL950582 Environmental Fiscal Reform.

decreases with increasing household expenditure. For most countries, the top two expenditure groups allocate between 30% and 50% less of their budgets to electricity compared with the bottom two expenditure groups. Overall spending in the different countries varies between 1.39% of the household budget in Italy and 2.82% in Portugal. Spending by households whose main income is social transfers or pensions is mostly slightly higher than the average over all households. The social transfer group allocates considerably more expenditure to electricity than the overall average (at least 30% more) in Denmark (3.21% vs. 2.33%), W. Germany (4.18% vs. 2.52%), Italy (1.84% vs. 1.39%) and the UK (3.91% vs. 1.67%). The pension group allocates considerably more expenditure to electricity than the overall average (at least a 30% increase) in Denmark (3.38% vs. 2.33%) and the UK (2.17% vs. 1.67%).

Expenditures on gas are lower than those on electricity except for Italy and the Netherlands. Apart from the Netherlands, overall expenditure on gas varies from 0.18% of total expenditure in Greece to 1.41% in Italy. There is a decline in the expenditure with

increasing expenditure in some countries, but the effect is slight. Expenditure in the 0.4-0.6 expenditure group varies between 0.33% (Denmark) and 2.03% (Italy) which can be compared to the highest expenditure group with a range of values from 0.12% (Greece) to 0.72% (UK). Considering the 'at risk' groups whose main income is either social transfers or pensions, while they spend more on gas, the proportion of the budget is quite small, so increases from the overall average are also small. Expenditure percentages for the social transfer income group range from 0.22% (Denmark) to 1.19% (Belgium) and for the pension income group from 0.28% (Greece) to 2.42% (Netherlands). In the Netherlands, expenditure on gas is relatively heavy: 2.22% of expenditure overall, decreasing from 3.16% for the 0.4-0.6 expenditure group to 1.52% for the highest (more than 1.6) expenditure group.

The social transfer income group spends 2.9% of their budget on gas and the pension group 2.42%.

Total transport expenditure: (vehicle purchases+vehicle fuels+public transport)

The data are shown in Table 3, with plots of the distributions in Graph 2. It can be seen

Table 3 Distribution of expenditure percentages on transport

	All households	Expenditure groups						Social transfers	Pensions
		<0.4	0.4-0.6	0.6-0.8	0.8-1.2	1.2-1.6	>1.6		
Belgium	7.01	3.05	3.96	5.28	6.26	9.83	10.25	5.8	5.43
Denmark	10.96	3.1	6.2	5.57	8.9	14.51	19	7.29	4.22
W.Ger	7.72	2.39	3.14	4.95	7.92	9.02	8.51	5.76	6.1
Greece	5.83	1.24	1.51	2.46	4.11	3.75	6.14	4.29	7.04
Spain	7.72	3.08	4.24	5.24	8.21	9.23	11.85	7.88	8.31
France	11.14	3.81	5.99	7.93	11.09	13.52	16.41	10.97	8.87
Ireland	8.96	2.52	4.86	6.32	8.06	10.1	13.06	6.52	8.69
Italy	9.74	2.81	6.09	7.07	7.38	8.45	17.3	9.82	11.18
Lux	10.66	3.94	5.14	7.14	11.06	13.85	15.46	10.12	7.73
Neth	7.84	3.39	3.79	4.72	7.5	9.37	13.88	6.43	6.82
Portugal	9.65	1.7	3.31	3.88	6.38	6.94	15.9	12.57	10.62
UK	7.66	3.24	4.54	5.57	6.37	6	13.83	4.07	5.87

Sources: EUROSTAT Family Budgets 1992, 1993; EUROSTAT calculations; Statistisches Bundesamt (1994) and EU project PL950582 Environmental Fiscal Reform.

Graph 2 Distribution of expenditure percentages on transport

Sources: EUROSTAT Family Budgets 1992, 1993; EUROSTAT calculations; Statistisches Bundesamt (1994) and EU project PL950582 Environmental Fiscal Reform.

that the pattern of transport expenditure is in sharp contrast to expenditures on domestic energy; for all countries it increases with overall expenditure while expenditure percentages on energy decrease. In Italy, Portugal and the UK there is a particularly sharp increase between the 1.2-1.6*average expenditure group and >1.6*average expenditure, the highest expenditure group. Most households spend much more of their budgets on transport than energy: over all households the spending is between 9.34% (Greece) and 14.76% (Denmark) compared to a variation between 2.79% (Spain) and 6.41% (Denmark) for expenditure on energy. Greece and the UK have the lowest overall expenditures on transport: 9.34% and 9.42% of expenditure over all households respectively. Greece also has the lowest proportion of expenditure on transport in each of the expenditure categories. The high expenditure groups spend very heavily on transport; in Denmark, Italy and Portugal 23-24% of household expenditure is on transport for the highest expenditure group. This is in sharp contrast to the low expenditure groups; in all the countries the top two expenditure groups spend a much higher percentage of their budget than the bottom two expenditure groups. The increase varies between 86% in Spain and 234% in Greece, where the percentage is more than three times the percentage of the low income groups. Italy, Portugal and the UK both have a very sharp increase in expenditure from the 1.2-1.6 * average expenditure group to the highest expenditure group, more than 1.6 * average expenditure.

Looking at the 'at risk' groups, those whose main income is social transfers or pensions, their spending is below the average in most countries. Only people whose main income is social transfers in Luxembourg or Portugal spend more than the overall average on transport. In Denmark, Greece, Spain, France and the UK both groups spend less by at least 20% compared to all households. In Luxembourg, Italy and Portugal, pensioners spend a 20% lower percentage or less compared to all households and in the Netherlands and Ireland those whose income is mainly social transfers spend a 20% lower percentage or less compared to all households. Thus it can be said that in most member states, the percentage of household expenditure going on transport is much less than average in these groups.

Purchases of Vehicles

The data are at Table 4, plotted in Graphs 5 and 6. This one expense is very significant in several

Table 4 Distribution of expenditure percentages on vehicle purchases

	All households	Expenditure groups						Social transfers	Pensions
		<0.4	0.4-0.6	0.6-0.8	0.8-1.2	1.2-1.6	>1.6		
Belgium	3.99	0.77	1.36	2.20	2.99	6.78	7.53	2.27	3.21
Denmark	7.32	0.47	2.89	2.02	5.09	10.88	15.68	3.13	1.62
W. Ger	5.04	0.14	0.79	2.36	5.21	6.59	6.54	2.33	3.72
Greece	1.88	0	0	0.02	0.16	0.33	2.56	0	1.28
Spain	3.86	0.48	0.70	1.58	2.60	5.50	8.58	2.80	2.94
France	6.03	1.02	1.40	2.48	5.81	8.82	11.03	4.28	4.05
Ireland	4.06	0.41	1.18	1.63	2.98	5.22	8.01	1.91	4.10
Italy	4.04	0.01	0.09	0.20	0.52	1.97	12.64	3.29	2.69
Lux	8.68	1.99	3.55	5.40	9.03	11.76	13.10	6.44	6.62
Neth	4.61	0.77	1.12	1.78	4.11	6.15	10.45	3.71	4.07
Portugal	5.29	0.09	0.38	0.66	1.14	2.58	11.50	8.00	1.51
UK	2.57	0.08	0.23	0.34	0.51	0.54	8.75	0.15	1.31

Sources: EUROSTAT Family Budgets 1992, 1993; EUROSTAT calculations; Statistisches Bundesamt (1994) and EU project PL950582 Environmental Fiscal Reform.

countries. Over all households, the percentage of the budget allocated to buying vehicles varies between 1.88% in Greece and 8.68% in Luxembourg. The pattern of expenditures on vehicle purchases across expenditure groups is similar to that for total transport consumption - an increasing percentage of household expenditure is spent buying vehicles as household expenditure increases, but the increase with increasing overall expenditure is more marked. Two types of expenditure pattern can be identified. In Italy, Portugal and the UK the highest income group (more than 1.6* overall average) spends much more than the next expenditure group (1.2-1.6*overall average): 12.64% vs. 1.97% (Italy), 11.5% vs. 2.58% (Portugal) and 8.75% vs. 0.54% (UK). A similar pattern holds for Greece, but the expenditure of the highest income group is not as large as these other countries. Greek households had very low expenditure percentages over all expenditure groups; from 0% for the 0.4-0.6*average expenditure group to 0.33% for the 1.2-1.6*average expenditure group and 2.56% for the highest expenditure group. In the other countries, there is a large increase in expenditure percentages across the income groups.

Graph 3

Sources: EUROSTAT Family Budgets 1992, 1993; EUROSTAT calculations; Statistisches Bundesamt (1994) and EU project PL950582 Environmental Fiscal Reform.

Expenditures for the 0.4-0.6*overall average group range from 0.7% (Spain) to 3.55% (Luxembourg) and for the highest expenditure group from 7.53% (Belgium) to 15.68% (Denmark).

The 'at risk' groups spend less than the average on vehicle purchases. Of those households whose main income is social transfers, only in Portugal do they spend a higher percentage than all households. However, note that the distribution over expenditure groups shows that only the highest group spends more than the average in Portugal. This implies that households in Portugal

whose main income is social transfers are in the highest expenditure groups, so there may be a problem with the data. Excluding Portugal, the social transfers group spends approximately 2% less on vehicle purchases than the overall average - the average difference over the countries is 1.91%. The expenditure percentages vary from 0% in Greece and 0.15% in the UK to 6.44% in Luxembourg. Pensioners also spend less than the average - the average difference over the countries (including Portugal) is 1.72%, with the expenditure percentages varying from 1.28%

in Greece to 6.62% in Luxembourg. Denmark shows the largest decrease from the overall average for both groups, a reduction of 4.19% to 3.13% for the social transfers group and a reduction of 5.7% to 1.62% among pensioners. These patterns of expenditure are similar to those of total transport expenditure.

Expenditure on Vehicle Fuels (petrol and diesel for cars etc.)

The data are shown in Table 5. Purchases of vehicles and expenditure on vehicle fuels together make up most of the expenditure on transport. Over all households, the percentage of expenditure on vehicle fuels ranges from 1.64% in Luxembourg to 5.11% in Italy. The distribution of expenditure over expenditure groups is similar to that of total transport spending; percentages tend to increase with overall household expenditure, from a range of 0.40% (Greece) to 5.49% (Italy) for the 0.4-0.6*average expenditure group to a range of 1.6% (W. Germany) to 4.3% (France) for the highest expenditure group. Italy has exceptionally high vehicle expenses for all expenditure groups apart from the highest expenditure group; this results in the overall average percentage of 5.11% being considerably higher than the next country - France - where the percentage is 4.38%. Belgium, Denmark, W. Germany and the UK have an approximately flat distribution across the expenditure groups: the differences in percentage expenditures between the 0.4-0.6 and the highest expenditure groups are (a negative value represents a decrease) --0.01%, 0.22%, 0.47% and 0.18% respectively. In general, low income groups spend a higher percentage of their expenditure on vehicle expenses than on vehicle purchases while in high expenditure groups a higher percentage is spent on vehicle purchases.

The at risk groups have roughly similar expenditure percentages to the overall average, although there is a wide variation between different countries. The social transfers group spend between 1.69% (Netherlands) and 6.11% (France). Pensioners spend between 0.83% (Luxembourg) and 7.9% (Italy). These variations are much smaller than the equivalent changes for vehicle purchases, reflecting the smaller percentage of the household budget spent on petrol and diesel compared to vehicle purchases in many countries.

Table 5 Distribution of expenditure percentages on vehicle fuels

	All households	Expenditure groups						Social transfers	Pensions
		<0.4	0.4-0.6	0.6-0.8	0.8-1.2	1.2-1.6	>1.6		
Belgium	2.32	1.53	1.94	2.4	2.56	2.37	1.93	2.60	1.60
Denmark	2.43	1.82	2.02	2.34	2.52	2.47	2.28	2.26	1.18
W. Ger	1.92	1.06	1.13	1.43	1.93	1.93	1.60	2.25	1.32
Greece	2.42	0.10	0.40	1.00	2.48	1.94	2.02	2.56	4.17
Spain	2.62	0.90	2.06	2.46	4.35	2.53	2.18	3.73	4.05
France	4.38	2.32	4.02	4.91	4.62	3.92	4.3	6.11	4.25
Ireland	3.48	0.97	2.39	3.37	3.65	3.21	3.65	3.47	3.95
Italy	5.11	2.38	5.49	6.27	6.21	5.86	4.08	5.55	7.90
Lux	1.64	1.43	1.27	1.43	1.78	1.74	1.86	2.57	0.83

Neth	2.20	2.35	1.53	2.07	2.32	2.26	2.25	1.69	1.73
Portugal	2.73	0.26	1.00	1.27	3.20	2.49	3.13	3.21	6.21
UK	3.11	1.59	2.49	3.38	3.81	3.42	2.67	1.92	3.07

Sources: EUROSTAT Family Budgets 1992, 1993; EUROSTAT calculations; Statistisches Bundesamt (1994) and EU project PL950582 Environmental Fiscal Reform.

Purchased (Public) Transport

The data are shown in Table 6. Purchases of transport forms a much smaller expenditure than that

Table 6 Distribution of expenditure percentages on purchased transport

	All households	Expenditure groups						Social transfers	Pensions
		<0.4	0.4-0.6	0.6-0.8	0.8-1.2	1.2-1.6	>1.6		
Belgium	0.70	0.75	0.66	0.68	0.71	0.68	0.79	0.93	0.62
Denmark	1.21	0.83	1.29	1.21	1.29	1.16	1.04	1.90	1.42
W. Ger	0.76	1.19	1.22	1.16	0.78	0.50	0.37	1.17	1.07
Greece	1.53	1.14	1.11	1.44	1.47	1.48	1.56	1.73	1.59
Spain	1.24	1.70	1.48	1.20	1.26	1.20	1.09	1.35	1.32
France	0.73	0.47	0.57	0.54	0.66	0.78	1.08	0.58	0.57
Ireland	1.42	1.14	1.29	1.32	1.43	1.67	1.40	1.14	0.64
Italy	0.59	0.42	0.51	0.60	0.65	0.62	0.58	0.45	0.59
Lux	0.34	0.52	0.32	0.31	0.25	0.35	0.50	1.11	0.28
Neth	1.03	0.27	1.14	0.87	1.07	0.96	1.18	1.03	1.02
Portugal	1.63	1.35	1.93	1.95	2.04	1.87	1.27	1.36	2.90
UK	1.98	1.57	1.82	1.85	2.05	2.04	2.41	2.00	1.49

Sources: EUROSTAT Family Budgets 1992, 1993; EUROSTAT calculations; Statistisches Bundesamt (1994) and EU project PL950582 Environmental Fiscal Reform.

on private vehicles, even in the low expenditure groups and has a different distribution across expenditure groups. In all countries other than Greece, even the 0.4-0.6 expenditure group spend

more on total vehicle expenses than on purchased transport. Expenditure percentages over all households range from 0.34% in Luxembourg to 1.98% in the UK. The overall pattern is that the expenditure percentage is more or less independent of the expenditure group; for the 0.4-0.6 group expenditure percentages vary between 0.32% (Luxembourg) and 1.93% (Portugal) and for the more than 1.6 - the highest - group expenditure percentages vary between 0.37% (W. Germany) and 2.41% (UK). In France and the UK spending increases somewhat between the 0.4-0.6 and the highest income groups (0.57% to 1.08% and 1.82% to 2.41% respectively). In Portugal, the highest expenditure group spends a rather lower percentage of the household budget on purchased transport than the other groups: 1.27% compared with e.g. 1.93% for the 0.4-0.6 group.

The at risk groups reflect this flat distribution; spending by the social transfers group varies between 0.45% (Italy) and 2.0% (UK) and by pensioners between 0.28% (Luxembourg) and 2.9% (Portugal) in comparison to a range of 0.34% in Luxembourg to 1.98% in the UK over all households. In Denmark and Luxembourg, the social transfers

group spend rather more than the percentage over all households; 1.9% against 1.21% and 1.11% against 0.34% respectively. In Portugal, pensioners spend rather more on purchased transport than the overall average; 2.9% compared to 1.63%. In Ireland and the UK, pensioners spend rather less on purchased transport; 0.64% against 1.42% and 1.49% against 1.98% respectively.

Package Tours

The data are shown at Table 7. The countries can be divided into two groups. Only in Belgium, Denmark, Ireland, Luxembourg and the UK is there any significant expenditure on package tours; over all households between 2.21% (Denmark) and 4.21% (Luxembourg). Expenditure in the other countries varies between 0.25% (Greece) and 0.54% (France) over all households. For the

Table 7 Distribution of expenditure percentages on package tours

	All households	Expenditure groups						Social transfers	Pensions
		<0.4	0.4-0.6	0.6-0.8	0.8-1.2	1.2-1.6	>1.6		
Belgium	4.19	1.28	1.42	1.81	3.07	4.90	4.14	2.49	4.04
Denmark	2.21	0.59	1.28	1.82	2.08	2.52	2.90	0.63	1.37
W. Ger	1.66	0.50	0.85	1.38	1.64	1.75	1.90	0.86	2.31
Greece	0.25	0	0.02	0.09	0.09	0.10	0.31	0	0.30
Spain	0.34	0.02	0.13	0.11	0.33	0.44	0.59	0.14	0.27
France	0.54	0.22	0.20	0.33	0.48	0.62	0.80	0.29	0.90
Ireland	2.86	0.26	0.96	1.34	2.62	3.90	4.61	1.24	3.56
Italy	0.35	0.02	0.06	0.11	0.18	0.32	0.78	0	0.42
Lux	4.21	2.81	3.16	3.42	4.00	5.17	5.74	2.04	3.93
Neth	0.20	1.06	0.10	0.11	0.24	0.17	0.30	0.26	0.45
Portugal	0.25	0	0.02	0.05	0.13	0.26	0.48	0.39	0.97
UK	3.12	0.17	0.42	1.32	2.17	4.04	2.58	0.14	2.52

Sources: EUROSTAT Family Budgets 1992, 1993; EUROSTAT calculations; Statistisches Bundesamt (1994) and EU project PL950582 Environmental Fiscal Reform.

countries with significant expenditure percentages, these increase with household expenditure, from between 0.42% (UK) and 3.16% (Luxembourg) for the 0.4-0.6 expenditure group to between 2.9% (Denmark) and 11.1% (Belgium) for the highest expenditure group.

The social transfers groups have a lower expenditure percentage than the overall average in Belgium (2.49% against 4.19%), Denmark (0.63% against 2.21%), Ireland (1.24% against 2.86%) and Luxembourg (2.04% against 4.21%). The UK social transfers group spends only 0.14% of the household budget on package tours. Pensioners spend more than the social

transfers group, even in those countries where spending is very low: from 0.27% in Spain to 4.04% in Belgium.

Food (not including drink)

As can be seen from Table 8 and Graph 4, expenditure on food is a major part of household

spending. In several countries (Belgium, Greece, Spain, Ireland, Italy, Portugal, UK), spending on food averaged over all households is at least 50% spending greater than spending on transport. In all countries except Denmark and W Germany, food expenditure averaged over all households

Table 8 Distribution of expenditure percentages on food

	All households	Expenditure groups						Social transfers	Pensions
		<0.4	0.4-0.6	0.6-0.8	0.8-1.2	1.2-1.6	>1.6		
Belgium	15.89	29.43	23.35	19.37	15.70	12.02	8.76	20.37	16.49
Denmark	12.95	19.70	16.97	16.39	13.47	11.05	9.04	17.19	17.84
W. Ger	11.48	17.07	15.98	14.11	11.48	9.32	7.93	15.60	14.67
Greece	22.03	39.62	35.67	33.25	29.44	26.99	19.09	25.46	24.73
Spain	26.30	41.62	35.34	31.36	26.64	22.36	16.92	30.35	30.25
France	15.21	25.50	21.57	18.73	15.40	12.18	8.93	16.51	17.92
Ireland	20.68	37.67	32.00	26.81	21.61	16.11	11.43	28.62	18.47
Italy	22.56	39.25	33.67	28.86	24.15	19.39	11.59	27.60	24.31
Lux	14.38	27.95	20.86	17.76	14.28	10.62	7.95	20.37	16.49
Neth	13.79	23.41	20.03	16.70	13.99	11.28	8.59	15.79	12.72
Portugal	33.04	50.22	46.77	43.75	37.86	32.15	21.81	33.39	31.45
UK	14.23	28.87	22.87	18.38	14.69	10.83	5.89	15.38	17.17

Graph 4 Distribution of expenditure percentages on food

Sources: EUROSTAT Family Budgets 1992, 1993; EUROSTAT calculations; Statistisches Bundesamt (1994) and EU project PL950582 Environmental Fiscal Reform.

is greater than transport expenditure. Furthermore, the pattern of expenditure as illustrated in Graph 4 is that spending proportions decrease rapidly as total household expenditure increases i.e. the poor spend a very high proportion of their budgets on food. It is possible to draw a distinction between the Southern European countries with the addition of Ireland and the Northern European countries.. In the first group, spending proportions are higher over all

the expenditure groups. Even in the highest expenditure category, spending on food is more than 10% of the household budget and for poorer families, the proportion increases up to a highest value of 50.22% for the <0.4*average expenditure group in Portugal. Portugal has the highest proportions of spending on food of all the countries, declining to 21.81% of the budget for household in the highest expenditure category (>1.6*average expenditure). For the Northern European countries, food expenditure shows a similar pattern to the Southern European countries, with the expenditure proportions falling rapidly as total household expenditure increases. The highest proportion is 29.43% for the lowest income group in Belgium and the lowest proportion is 5.89% in the UK. The general pattern of expenditure proportions is very similar across all the countries, however, with a steady decline in the spending proportion as total expenditure increases. The smallest variation across income groups occur in Denmark and W. Germany, from 19.70% and 17.07% respectively for the lowest expenditure group to 9.04% and 7.93% respectively for the highest expenditure group. Ireland has the largest change in expenditure proportions, from 37.67% declining to 11.43% for the lowest and highest income groups respectively. The expenditure proportions of the ‘at risk’ groups do not fall into the range of the lowest expenditure groups. In most countries, expenditure proportions are in the range covered by the middle expenditure groups, 0.6-0.8, 0.8-1.2 and 1.2-1.6*average expenditure. In Denmark, these groups spend a relatively high proportion of their budget on food, 17.19% for the social transfers group and 17.84% for pensioners. In Greece, spending by these groups falls into the range covered by the highest expenditure group.

White Goods

The proportions of budgets spent on white goods are shown at Table 9. White goods are domestic appliances: cookers, refrigerators and freezers, washing machines, microwave ovens etc. They

account for a relatively small proportion of household spending, the largest proportion over all households being 1.46% in Portugal. The proportion is also similar for all the countries, the smallest overall proportion being 0.81% in Italy. There is no consistent pattern for the distribution of expenditure proportions across different countries. In Belgium, Denmark, Spain and France the highest spending proportions occur in the centre of the expenditure distribution. In Belgium, for example, the <0.4 group spends 1.00% and the >1.6 group spends 1.02% of their budgets on white goods, while the expenditure proportion of the 0.6-0.8 group is 1.37%. In Greece, Italy and the UK spending proportions increase with total household expenditure. The variations between the lowest and highest expenditure groups are 0.32% to 1.14%, 0.17% to 0.9% and 0.41% to 1.6% respectively. There are no clear patterns among the expenditure proportions of the ‘at risk’ groups. Pensioners spend a greater proportion of their income on white goods than the overall average in most countries, but a smaller proportion in Greece (0.97% pensioners vs. 1.06% overall), the Netherlands (0.77% pensioners vs. 0.98%) and the UK (0.71% vs. 1.07%).

Table 9 Distribution of expenditure percentages on white goods

	All households	Expenditure groups						Social transfers	Pensions
		<0.4	0.4-0.6	0.6-0.8	0.8-1.2	1.2-1.6	>1.6		
Belgium	1.24	1.00	1.23	1.37	1.23	1.25	1.02	1.34	1.26

Denmark	0.93	0.82	0.99	1.14	0.93	0.84	0.81	0.80	1.21
W. Ger	1.14	0.43	0.69	1.01	1.21	1.16	1.03	1.06	1.30
Greece	1.06	0.32	0.46	0.63	0.82	1.05	1.14	0.60	0.97
Spain	0.98	0.79	0.85	1.02	1.08	1.00	0.83	1.16	1.05
France	1.04	1.04	1.04	1.10	1.06	1.02	0.97	0.97	1.10
Ireland	0.98	1.05	0.91	0.75	0.95	0.92	1.23	0.97	1.41
Italy	0.81	0.17	0.42	0.67	0.95	0.99	0.90	0.49	0.87
Lux	0.95	1.39	1.02	0.99	0.79	1.34	0.67	1.34	1.26
Neth	0.98	1.72	1.14	0.91	0.95	1.10	0.89	0.89	0.77
Portugal	1.46	1.48	1.25	1.42	1.66	1.83	1.34	1.56	3.01
UK	1.07	0.41	0.57	0.79	0.93	1.16	1.60	0.61	0.71

Sources: EUROSTAT Family Budgets 1992, 1993; EUROSTAT calculations; Statistisches Bundesamt (1994) and EU project PL950582 Environmental Fiscal Reform.

III. Expenditure on Environmentally Sensitive Goods and Services in other European Countries

Some data is available for other European countries; see Tables 10 and 11. However, some of the

Table 10 Distribution of expenditure percentages on environmentally sensitive goods and

FINLAND 1990						
	All households	Income quintiles				
		1	2	3	4	5
HH-energy	2.69	3.15	2.65	2.80	2.61	2.59
Vehicle purchases	8.08	3.17	6.55	3.69	8.46	4.33
Vehicle fuel	3.45	1.77	2.67	3.72	4.06	3.59
Other transport	1.14	1.98	1.74	1.06	0.91	0.89
Package tours	1.85	1.08	1.59	1.58	1.80	2.33
Food	16.31	19.73	16.76	16.83	16.58	14.76
White Goods	1.14	0.87	1.02	1.25	1.21	1.16

NORWAY average 1989-91							
	All households	Expenditure brackets (Kronor)					
		<60000	60000-100000	100000-160000	160000-220000	220000-350000	>350000
HH-energy	4.70	13.88	8.89	6.07	4.87	3.82	2.60
Vehicle purchases	5.12	0.00	0.00	2.26	3.38	6.38	9.16
Vehicle fuel	4.27	2.56	3.85	4.54	4.63	4.65	3.68
Other transport	3.21	2.07	2.29	2.66	3.41	3.10	3.93

Package tours	1.73	2.22	2.22	2.19	1.43	1.49	1.78
Food	14.81	27.53	21.66	17.79	15.61	13.97	9.98
White Goods	1.39	2.20	2.14	1.68	1.43	1.23	1.07

Sources: Statistics Finland, Statistics Norway

data is not available in the EUROSTAT expenditure groupings, so these countries are considered

separately here. These data are based on special runs by the statistical offices of Finland, Norway and Sweden and the Swiss household survey (Bundesamt für Statistik 1994). The Finnish, Norwegian and Swedish surveys are reported in Statistics Finland 1992, Statistics Norway 1993 and Statistics Sweden 1990. In general, these countries follow the patterns observed in the other data. Swiss households seem to spend a relatively low proportion of their budgets on environmentally sensitive goods and services in general. Finnish households spend a lower proportion of their budgets on domestic energy, 2.69% over all households, which is the lowest of the countries for which data is available. This is all the more remarkable, as Finland has one of the coldest climates in Europe. Finnish household spending is also different in that expenditures on vehicle purchases does not increase steadily with income, but it should be remembered that the data is based on income quintiles, rather than the EUROSTAT expenditure categories. As with other countries, spending on vehicle purchases increases with income/expenditure group in Norway and Sweden (0% lowest to 9.16% highest expenditure group and 0.5% lowest to 12.2% highest expenditure group respectively). In Switzerland, this pattern is also evident, except for the highest two expenditure categories. Food spending is also the largest expenditure in these countries, varying from 10.54% in Switzerland to 24.9% to 16.31% in Finland over all households.

Table 11 Distribution of expenditure percentages on environmentally sensitive goods and

Sweden 1988						
	Expenditure relative to mean of all households (EUROSTAT categories)					
	<.4	.4-.6	.6-.8	.8-1.2	1.2-1.6	>1.6
HH-energy	4.8	3.5	3.3	3.4	3.2	2.9
Veh purchases	0.5	0.8	2.1	4.2	6.8	12.2
Veh fuel	2.9	3.3	3.3	3.7	3.4	2.5
Other transport	1.3	1.1	0.8	0.6	0.5	0.5
Package tours	2.3	3.0	2.8	2.6	2.8	3.0
Food	24.9	21.8	22.7	21.5	18.6	15.0

White Goods	0.3	0.5	0.6	0.7	0.8	0.9
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Switzerland 1991											
	All households	Expenditure class in SFr per month									
		up to 1999	2000- 2999	3000- 3999	4000- 4999	5000- 5999	6000- 6999	7000- 7999	8000- 8999	9000- 9999	10000+
HH-energy	1.46	n/p	3.64	2.25	1.54	1.34	1.32	1.52	1.09	0.92	1.22
Veh purchases	2.26	n/p	0.22	0.98	0.48	1.38	2.18	3.09	5.06	3.28	2.20
Veh fuel	1.33	n/p	0.82	1.15	1.28	1.58	1.52	1.34	1.28	0.98	1.34
Other transport	1.27	n/p	2.14	1.78	1.42	1.22	1.22	1.07	1.17	1.02	1.12
Package tours	1.68	n/p	1.95	1.17	1.41	1.65	0.99	1.36	2.09	1.83	2.41
Food	10.54	n/p	15.77	12.57	13.16	12.36	10.9	10.3	9.22	9.78	7.24
White Goods	0.43	n/p	0.37	0.47	0.35	0.6	0.28	0.57	0.43	0.45	0.43

Sources: Statistics Sweden, Bundesamt für Statistik 1994

Note: n/p - not published due to insufficient data for statistical analysis

IV. Frugality Or Poverty?

In the original design of the project we assumed that we would be using income quintiles to look at the distributional aspects of environmental fiscal instruments, i.e. if they are regressive or not. Most Statistical offices publish expenditure data with income groupings.

In the EUROSTAT compilation of the (ca) 1988 expenditure surveys in the member states, they chose to use another approach. In the relevant tables they use Total expenditures per adult equivalent instead of the income groups. The groups they use are < 0.4, 0.4-0.6, 0.6-0.9, 0.8-1.2, 1.2-1.6 and >1.6 of the mean total expenditures per adult equivalent. The adult equivalent is a chapter in itself, as different countries and different surveys use different adult equivalent schemes. This approach causes some problems for us.

- It makes it more difficult to compile data for the member states not in the EUROSTAT compilation and the non-member states that we are interested. Income groupings are more frequently used. It is generally not possible to get the expenditures grouped according to

Table 12 Comparison of household groupings by income and expenditure classifications

Expenditures	< 0.4	0.4-0.6	0.6-0.8	0.8-1.2	1.2-1.6	>1.6
Disposable Income						
< 0.4	25.5 38.6	39.2 18.7	25.5 8.8	8.5 1.3	1.3 0.2	0 0
0.4-0.6	7.8 27.7	40 44.9	31.9 25.9	15.3 5.3	4.4 1.4	0.6 0.3
0.6-0.8	2.9 13.9	16.9 25.6	30.1 32.9	39.6 18.7	9.1 3.8	1.4 1
0.8-1.2	0.9	2.4	10.3	44	34.9	7.5

	9.9	8.1	25	45.9	32.5	11.2
1.2-1.6	0.9	0.6	2.1	24.8	47.8	23.9
	739	1.6	4.1	21.2	36.6	29.3
> 1.6	0.25	0.5	1.85	9.7	36.3	51.4
	2	1.3	3.4	7.7	25.6	58.3

Table 13 Comparison of household groupings by income and expenditure classifications, weighted by adult equivalents (OECD scale)

Expenditures	< 0.4	0.4-0.6	0.6-0.8	0.8-1.2	1.2-1.6	>1.6
Disposable Income						
< 0.4	26.7	27.6	35.5	22.4	4	0
	47.2	10.5	3.1	0.9	0.5	0
0.4-0.6	3.8	17.2	42.1	33	3.4	0.4
	31.6	40.7	22.9	8.2	2.8	1.2
0.6-0.8	1.3	5.5	37.3	50.3	5.1	0.4
	21.1	25.6	39.9	24.3	8.1	2.5
0.8-1.2	1	2.4	17.2	61.6	16	1.8
	24.6	17.6	29.3	47.6	40.6	16.8
1.2-1.6	0.7	0.9	6.1	50.1	32.5	9.6
	7	2.5	3.8	14.2	30.2	32.3
> 1.6	0.4	2.1	2.8	31.6	36.5	26.7
	1.8	3	1	4.7	17.9	47.2

expenditures in relation to the mean, from the published tables. It is necessary to do special

- It makes the idea of finding the economically weaker households and studying the impact on them, more difficult. It is definitely easier to argue that a household with a low income is economically weak, than to argue that a household that consumes less is economically weaker. We have assumed that there is a strong relationship between income and expenditure.

- There is a possibility that we are looking for economically weak households when we in fact are looking at households that are frugal, i.e that do not maximize consumption. This will of course always be the case when we calculate our expenditure data, but if we used income groups we would know that if we were looking at rich frugal or poor frugal households.

We have used the data from the Swedish expenditure survey to compare the groupings on income or expenditure, just to get a tentative picture of the relationships between the two ways of grouping households. Perhaps Sweden is a bad case if we want to find major differences in income or expenditures, given the tax/benefit schemes and the level of public provision or financing of consumption.

In Table 12 we have tabulated the households according to which income category as proportion of mean disposable expenditure (rows) or which total expenditure as proportion of mean income (columns) they belong. The numbers are rounded percentages and the top

figure shows the distribution on the income categories within a certain expenditure category (the row percentage) while the bottom figure gives the distribution on expenditure categories within a income category (column percentage). For instance, 39.2% of the households in the <0.4 of the mean expenditure category are in fact in the 0.4-0.6 of mean of the disposable income category, or 25.5% of the <0.4 of mean of expenditure group is in the 0.6-0.8 of mean disposable income category. If income and expenditure groupings matched 1:1 we would only have 100% in each cell on the diagonal. Apparently this is not the case. Only in the top expenditure/income group do we reach over 50% in the intersection of the two classifications.

We can then introduce the expenditure/income categories based on adult equivalents, with

expenditure per adult equivalent as proportion of the mean expenditure per adult equivalent in the rows and income per adult equivalent as proportion of the mean income per adult equivalent in the column. Then we get the result shown in Table 13 where the top figure shows the row percentage while the bottom figure gives the column percentage. Once again we would expect the distribution to draw towards the diagonal, but in this case we only get towards 50% in the intersection for the 0.8-1.2 categories, i.e the group around the mean in both income and expenditure per adult equivalent.

We can also compare a more traditional income grouping with the EUROSTAT expenditure classification that we have used. In Table 14 we tabulate the households according to the expenditure as proportion of the mean classification (the rows) against disposable income quintile (the columns). Note that this is total household disposable income and expenditure, not per adult equivalent. Here we see that 42.3% of the households in the 0.6-0.8 of the mean expenditure category belong to the lowest disposable income quintile or that 2% of the highest expenditure category (>1.6 of the mean) belong to the lowest income quintile.

We can also see that 14.1% of the second income quintile has expenditures in the 1.2-1.6 of the mean expenditure category and that 58.3% of the households in the highest income quintile also belong in the highest expenditure group.

Table 14 Comparison of household income classification by quintiles and EUROSTAT groups

Expenditures	Quint 1	Quint 2	Quint 3	Quint 4	Quint 5
Disposable Income					
< 0.4	84.3 17.2	14.4 2.9	0.7 0.1	0.7 0.1	0 0
0.4-0.6	73.6 35.2	18.6 8.9	4.4 2.1	2.8 1.3	0.6 0.3
0.6-0.8	42.3 27.3	37.1 23.9	14 9	5 3.2	1.7 1
0.8-1.2	10.6 15.1	30.7 43.7	31 44	20.1 28.7	7.6 10.9
1.2-1.6	2.6 3.1	12.1 14.1	27.4 32	32.7 38.3	25.2 29.5
> 1.6	2 2.1	6 6.5	11.7 12.6	26.3 28.4	54 58.3

Table 15 Comparison of household income classification by quintiles and EUROSTAT

groups, weighted by adult equivalents (OECD scale)

Expenditures	Quint 1	Quint 2	Quint 3	Quint 4	Quint 5
Disposable Income					
< 0.4	56.6 5.7	26.3 2.7	9.2 1	4 0.4	4 0.4
0.4-0.6	49.8 31.1	23.4 14.6	14.7 9.2	8.3 5.2	3.8 2.4
0.6-0.8	29.1 35.6	29.6 36.3	22.6 27.6	13 15.9	5.7 6.9
0.8-1.2	11.5 22.5	19.7 38.4	23.9 46.8	26.6 51.9	18.4 35.9
1.2-1.6	5 3.6	9.2 6.6	15.9 11.4	27.4 19.7	42.5 30.5
> 1.6	3.9 1.5	3.9 1.5	10.9 4.1	18.3 6.9	63.2 23.9

If we then finally look at the same categories, where both expenditures as proportion of the mean and income quintiles now are on an adult equivalent basis we obtain Table 15. Here we see that the distribution on income quintiles within the expenditure categories get even flatter, at least for the lower categories. Now we have 4% of the households in the lowest expenditure category that belongs to the highest income quintile. We can also see that 35.9% of the households in the highest income quintile belong to the 0.8-1.2 of the mean expenditure category. We find that 22.5% of the households in the lowest income quintile belong to the same expenditure category.

All in all, the reliance on the expenditures instead of incomes makes it complicated to analyse the distributional effects of fiscal measures as we may (mistakenly?) interpret a household as poor when in effect it is frugal and may be quite well off. It may also be that they are frugal for environmental reasons, i.e. they minimize consumption of environmentally sensitive goods in particular, in which case it is even harder to project the effect of a tax on their behaviour or economic situation.

V. Summary and Conclusions

Expenditure on environmentally sensitive goods and services has been analysed for the member states of the EEC. The main data source used was the EUROSTAT Family Budgets household consumption data based on surveys carried out in 1988. There was only a slight North-South split in energy expenditures, patterns of total domestic energy consumption being comparable across the EEC 12. There were contrasting patterns of expenditure for total domestic energy and total transport expenditure percentages. The poor (assumed to be the low expenditure groups) spend a higher percentage of their budgets on energy than the wealthy, but a lower percentage of their budgets on transport, especially vehicle purchases. However, all groups spend a much higher percentage of expenditure on transport than energy. At risk groups - those whose main income is either social transfers or state pensions - followed the patterns of expenditure of the low expenditure groups in general. Electricity

expenditures followed a similar pattern to total domestic energy, while spending on gas was lower than electricity spending. The pattern of higher expenditure percentages on transport amongst the wealthy are even more pronounced for vehicle purchases. This effect is particularly strong in the highest expenditure group in Greece Italy, Portugal and the UK. Purchased transport takes up a similar percentage of expenditure over all expenditure groups; it is a small proportion of transport spending, even for low expenditure groups. Pensioners spend a relatively high percentage of their budgets on package tours, especially compared to the other at risk group - social transfers.

Germany and the other European countries considered followed similar patterns of expenditure to the other countries. Swiss households spend a lower proportion of their budgets on environmentally sensitive goods and services than in other European countries.

An analysis of the Swedish data shows that the categorisation of households by expenditures rather than income may be misleading, as it is not possible to distinguish between households that are poor and households that are well off, but frugal. This effect will be exaggerated if the well off households are being frugal in order to reduce consumption of environmentally sensitive goods and services in particular.

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