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(Paper to be presented to the Comparative Systems Group at the London School of Economics and Political Science on Wednesday 29 November 1989).

1. Introduction

This paper presents analysis based principally but not exclusively on the results of the latest phase of the International Comparison Project (ICP). It deals with three main companies; that of crude labour productivity in 1985 between twenty-one of the twenty-four OECD countries, that of energy intensity on the same basis, and that of the absolute level of real income of the top and bottom quintiles of households across a sub-set of ten OECD countries. This last is more tentative an exercise than the others and the author would much appreciate any suggestions as to how to improve it. In addition there is some discussion of other related issues; notably comparisons of the structure of output, of capital inputs and of the volume of research and development expenditure.

2. Comparison with Previous Paper

The paper differs from the one given two years ago ("Systems and Structures; What Can International Comparisons Tell Us?" 7 October 1987) in that it is confined in its analysis to the OECD area. This is because fully comparable results of the fifth phase of ICP are confined at present to OECD member countries. This is perhaps less of a restriction than it appears. As pointed out in the earlier paper, shares of general

government consumption in those Eastern European Countries which can be compared with market economies lie well within the market economy range. Moreover, OECD contains several middle income economies comparable in a number of respects to those of Eastern Europe and even Latin America (Greece, Portugal and Turkey are obvious examples - for further discussion of this point, readers are recommended to "Size and Wealth in Perspective; Their Effect on Economic Structure and Poverty" D.J. Roy Development Policy Review December 1987). Table A illustrates this point for both Eastern Europe and Latin America using the results of the previous (1980) ICP and for Eastern Europe alone using the 1985 results of the European Comparison Programme.

3. Productivity Comparisons

In principle it would be possible to make whole economy comparisons of productivity for all twenty-four OECD countries, given that rough estimates of real income in 1985 are now available for the two non-participants in the fifth Phase (Iceland and Switzerland). However such an exercise would be of limited value. Whole economy exercises on their own can conceal more than they reveal. A classic example of this is the one published in the Treasury Economic Progress Report (No. 201 April 1989) entitled "Relative Productivity Levels". It suggested quite properly that whole economy productivity on a person/year basis was marginally lower in Japan than in the United Kingdom in 1986 (and on a person/hour basis that it was very much lower). Because of the Treasury's unwillingness to go into more detail, it was left excusing the result rather lamely by claiming that Japanese agriculture was relatively inefficient and manufacturing relatively efficient without citing any numerical evidence to this effect.

Table B shows the author's own estimates for 1985 for whole economy productivity and that in seven sectors across twenty-one OECD countries (he was advised to exclude Luxembourg because of problems with the output side of its national accounts). Whole economy productivity (on a person/year basis) ranged from 35.6 thousand OECD dollars of 1985 in the Netherlands to 11.4 in Turkey (just over three to one, comparable to the range of per capita income reported in OECD Main Economic Indicators between the Netherlands and Turkey but much less than that between Turkey and the United States!). Though Japan was marginally lower than the United Kingdom on a whole economy basis (23.2 as against 25.2, confirming the Treasury estimates for 1986) it was very much higher in manufacturing (31.7 as against 23.7), again confirming the Treasury's claim (similarly it was much lower in agriculture - 1.9 as against 12.7). Japan was also behind in construction and "other marketed services", both sectors relatively "sheltered" from international competition.

Before going into greater detail, it may be worthwhile to investigate the effects of output structure on crude labour productivity. Table C shows the structure of output for all twenty one countries. Mining and quarrying/fuel and power is particularly important in Norway and, to a lesser extent, Australia, Canada, the Netherlands and the United Kingdom; the same applies to agriculture, forestry and fishing in Ireland, manufacturing in Germany and Japan and general government in Denmark, Portugal and Sweden. Table D shows the effects of standardising the economic structure of the nineteen (the group excluding Greece and Turkey - where separate labour input data for general government were lacking) on observed whole economy

productivity (again on a person/year basis). Five out of the twenty-one appear to benefit by 10% or more from a non-standard structure of output. These are Canada, Ireland, Japan, Norway and the United Kingdom. In three instances this appears to reflect the benefits of mineral production; the Irish result appears to be due to the high efficiency of local agriculture and the Japanese to that of local manufacturing. The three countries orientated towards general government (Denmark, Portugal and Sweden) do not gain or lose much. It is a bit of a pity that the analysis could not be extended to Turkey, where the productivity gap between manufacturing and agriculture was of the same order as in Japan while the share of output was skewed towards agriculture.

Another exercise of interest (which could be said to pre figure wider, more general results to be produced in the early 1990s at the University of Pennsylvania) is to compare per capita income and whole economy productivity for the nineteen in 1985. This is done in Table E. It can be seen that the rank order differs substantially between real income per head and whole economy productivity. For instance, the Netherlands and Spain rank much higher in the latter than the former whereas Japan and the Scandinavian countries rank much lower. This suggests that care should be taken about making claims of a close link between one and the other. Labour productivity differences are at best only one factor at work in accounting for differences in real income between countries. The extent of labour force participation and of unemployment need also to be taken into account.

It is possible to set out labour productivity per hour worked in 1985 for a sub-set of nine OECD countries making sue of estimates from a variety of sources. This is done in Table F. Adjustment for hours worked closes the gap between Germany and Sweden and pushes up Italy almost to the North American Level. The results for Italy and Sweden need to be borne in mind in the discussion of income distribution later on.

It is easier to perform a similar exercise for manufacturing making use not only of OECD data but that from the Swedish Employers' Confederation and the ILO. Taking all three together it proved possible to generate the numbers shown in Table G, which covers all nineteen (only Greece and Turkey are excluded). It is noteworthy that the effect of shorter hours in continental Western Europe is sufficient in a number of cases to reduce substantially the apparent productivity gap between manufacturing there and in the United States; conversely the longer hours worked in Japan reduce its relative ranking.

Tables H-N show the results of much greater disaggregation in manufacturing, going in many instances down to three-digit level. The first covers all twenty-one countries; the others between fifteen and sixteen. Taken together they constitute a rich mine of data, the products of which could constitute the basis of more than one seminar on their own. It may be worthwhile, however, to draw attention to a few minor features of interest before moving on. First, the comparative strength of some West European countries (especially Belgium, France, Italy and the Netherlands) and of New Zealand in food processing and of much of Western Europe and Canada in textiles.

Second, the powerful performance of Japan in chemicals and base metals. Last, but by no means least, the effective convergence of labour productivity levels (hours adjusted) between the transport equipment industries of Canada, Germany and the United States.

Table O shows the effect of standardising the structure of manufacturing output for the fifteen France, New Zealand, Spain and Sweden appear to have gained most from having a non-standard output structure while Italy and Japan have actually lost out. One remarkable finding is that the difference in hours adjusted manufacturing productivity between Italy and the three other founder members of the EEC within the fifteen (France, Germany and the Netherlands) disappears entirely when output is standardised. Moreover, the standardised level for the four lies between 89% and 93% of that in the United States. This raises the question as to whether the scale economy gains from European integration may not already have been realised within the original Common Market, at least as far as manufacturing is concerned. The productivity gap between Italy and the others may reflect not so much technological backwardness as labour-intensive specialisation (a reliance on textiles rather than engineering products). This sheds new light on the concept of convergence among industrial countries. It is also interesting to note that the effect of standardising manufacturing output structure as far as Japan is concerned is to raise productivity there above the level of the three Scandinavian countries (Denmark, Norway and Sweden) ahead of it on the actual output structures.

Before leaving labour productivity, it may be worthwhile to consider two minor but related issues. The first is that of capital and total factor productivity. The second is that of the volume of research and development expenditure. Both require appropriate deflation and transformation of original data to achieve an acceptable standard of international comparability.

Table P shows the results of an exercise covering seven countries in 1985. Data on manufacturing net capital stock was standardised to an eighteen year life for equipment (the official estimates for buildings were not altered). Appropriate purchasing power parities were taken from the OECD results for 1985 and applied to the adjusted data. Finally, a weighted average share of gross operating surplus of gross value added was used to standardise the contribution of capital. The results suggest a slightly different rank order for capital productivity than for labour but not enough to affect the rank order of total factor productivity.

Table Q shows the results of an exercise in applying specific purchasing power parities to research and development expenditure. The original data was taken from the OECD STI Indicators Newsletter No. 11, 1988. Parities were calculated from certain areas of general government expenditure (essentially public administration and defence and public education) which were felt to have similar cost characteristics to research and development (these parities are referred to in an article in "Steel Times International" in November 1989 by Dr. Jonathan Aylen of Salford University). Of the twenty-one countries six appear to spend more than 2% of gross domestic product at OECD prices on research and development while three

spend less than 1% (all figures 1985). The six high spenders are in diminishing order Japan, Sweden, the United Kingdom, Germany, the United States and France; the three low spenders are in increasing order Greece, Spain and Portugal. It is noteworthy that in terms of relative volume share the United Kingdom comes third within the OECD twenty-one and in terms of absolute expenditure fourth. These results do not justify claims that the volume of research and development expenditure here is unduly low by international standards; certain high income/productivity countries appear to function well enough with about half the United Kingdom share (e.g. Belgium, Canada and Italy). At the very least, this can be said to indicate that more detailed analysis of the management and structure of research and development in the United Kingdom would be advisable before leaping to conclusions as to ways of improving technological performance.

4. Comparisons of Energy Intensity

Comparisons of energy intensity are of interest from several points of view. They are relevant to public discussion about the scope of energy conservation and future and present effects of economic activity and growth on the environment. They are also of value as a cross-check on labour productivity as a measure of efficiency. Lastly, not totally separately, they can be used to test the hypothesis put forward after 1973 that the slowdown in productivity growth then was due to energy/labour substitution.

Table R presents three definitions of energy intensity, the first two on a whole economy basis and the last covering non-energy manufacturing (i.e. excluding oil refining and coal/oil

products). Energy input data were taken from IEA/OECD and includes biomass such as wood. Primary energy represents consumption plus transformation losses while delivered energy excludes it. The first two columns are likely to be affected by climatic and other geographical factors and thus constitute a rather weak measure of efficiency of energy use. By contrast, such effects are largely eliminated from the third column. It is noteworthy that of the high labour productivity countries France, Germany and Italy are distinguished also by relatively low delivered energy intensity in manufacturing. The same applies to Austria, Denmark, Japan, Turkey and the United Kingdom among lower labour productivity countries. Conversely, Australia, Belgium, Canada, Finland, Greece, Ireland, the Netherlands, New Zealand, Norway, Sweden and the United States appear to be relatively energy intensive in manufacturing. This suggests that at the aggregate level there is little relationship between labour productivity and energy intensity within manufacturing.

It is possible to extend such analysis to two-digit level for all except the United States (where delivered energy statistics are not sufficiently disaggregated). Tables S and T show the effects of so doing for eight out of nine industries. Again this is rather too extensive a data mine to draw much out of in a general review. It is noteworthy that intensities vary very widely within industrial groups between countries. This is true across the board, including in base metals. In some instances this may reflect different sectoral compositions (e.g. Turkish concentration on pharmaceuticals as against Dutch concentration on general chemicals, Finnish and Swedish concentration on paper making as against British and Dutch

concentration on printing and perhaps also Greek concentration on cement-making within the building materials area). However this is unlikely to be the full story, especially with regard to the relatively low intensities observed for base metal manufacture in Denmark, France, Germany, Japan and Sweden as opposed to Australia, Belgium, Canada, Finland, the Netherlands, Norway and Turkey. Again this is an area which could well repay further study. What is clear is that the hypothesis that differences in intensity often reflect efficiency rather than composition of output cannot be rejected in the present state of knowledge.

5. Comparisons of Real Incomes

The last major theme is the comparison of real disposable and final incomes between groups in countries. In attempting to do this, the author had two aims; first to provide a rough and ready proxy for "Rawlsian justice" among industrial countries and second to see how far the real level of the rich correlated with economic efficiency. He relied on income distribution data from the Luxembourg Income Study; this covered twelve OECD countries, two of which (Luxembourg and Switzerland) were outside the twenty-one.

Table U shows alternative purchasing parities. Previous studies between developed countries have relied on gross domestic product parity. Personal consumption parity could be more appropriate for average disposable income. Table V shows derivation of personal disposable income from consumption using OECD national accounts data throughout (the reader should bear in mind that German church taxes have not been deducted - for full

comparability 2% should be deducted from all German disposable income data). Table W shows the derivation of allocable collective consumption (that is to say health care, education and other individual government services as distinct from public administration and defence). Table X shows income distribution for households from the Luxembourg Income Study.

Tables Y and Z show the results for the bottom and top quintiles for all ten countries. It is noticeable that in terms of final income, the poor in Sweden and Italy score much better than elsewhere. The position of the rich is less surprising. Those in North America do best, followed by Australia, France, Germany and Italy. Swedes do better than Norwegians and British, due primarily to higher collective consumption. For both rich and poor, the Netherlands appears to be somewhere to avoid!

6. Conclusion

In conclusion the author would like to express his thanks to colleagues in the National Power Division of the CEGB for helpful comments and support and also to Employment Conditions Abroad and the Luxembourg Income Study for providing data. The full responsibility for errors of calculation and/or fact and for opinions expressed is his alone.

Donald Roy

16.11.89

TABLE A

Comparison of Real Incomes in 1980 and 1985

	1980 $I per capita	1985 A Sch I per capita
Greece	4,566	97,307
Portugal	3,887	92,450
Turkey	N/A	56,471
Hungary	4,491	85,343
Poland	4,191	67,061
Yugoslavia	4,316	79,869
Argentina	4,485	N/A
Brazil	3,758	N/A
Chile	4,327	N/A
Uruguay	4,706	N/A
Venezuela	4,703	N/A

Sources:- For 1980 D.J. Roy "International Comparisons of Real Value Added, Productivity and Energy in 1980 "Economic Trends No.404 June 1987

For 1985 United Nations Statistical Commission and Economic Commission for Europe "International Comparison of Gross Domestic Product in Europe 1985: Report on the European Comparison Programme." United Nations 1988.

TABLE B

Real Value Added per Person Working in 1985: OECD Prices (Thousand Dollars rounded to one decimal place)

	Agriculture Forestry, and Fishing	Mining, Quarrying Fuel and Power	Manu-facturing	Const-ruction	Distributive Trades	Transport and Communication	Other Marketed Services	Whole Economy
Australia	19.1	120.5	29.4	21.1	21.9	27.2	28.6	27.1
Austria	7.7	51.7	24.8	20.7	22.1	20.7	70.5	25.2
Belgium	23.7	68.9	32.2	28.2	29.8	24.6	28.5	28.5
Canada	19.0	197.6	33.9	30.9	17.7	33.8	37.0	34.0
Denmark	15.6	103.2	21.8	19.4	22.5	23.3	44.1	25.1
Finland	10.0	78.3	23.4	26.2	14.9	23.4	41.4	24.4
France	11.1	57.5	38.4	23.9	24.2	23.0	36.3	29.3
Germany	8.6	41.3	33.9	21.5	21.3	25.5	40.0	28.9
Greece	3.5	36.9	11.7	13.2	10.7	26.6	N/A	16.7
Ireland	19.1	23.7	20.1	18.9	11.0	11.4	49.0	22.8
Italy	7.7	150.3	33.8	26.1	20.8	42.9	39.6	29.4
Japan	1.9	112.2	31.7	14.2	16.7	32.4	24.6	23.2
Netherlands	18.7	372.0	36.1	22.4	26.7	46.8	38.7	35.6
New Zealand	19.0	145.8	19.9	14.6	24.6	28.8	34.4	24.4
Norway	8.7	459.2	23.2	21.8	15.1	16.5	45.2	32.6
Portugal	1.6	12.3	10.0	10.4	17.0	16.0	26.5	13.6
Spain	4.9	293.5	22.9	23.6	29.1	25.9	48.9	27.9
Sweden	12.8	139.8	24.9	18.6	16.3	19.2	46.2	24.8
Turkey	1.2	32.1	19.9	12.5	37.4	56.4	N/A	11.4
United Kingdom	12.7	103.9	23.7	17.9	13.0	20.0	39.8	25.2
United States	21.4	189.7	47.3	29.6	32.7	42.4	26.5	33.7

TABLE C

Structure of Value Added
(% of Gross Domestic Product)
(1985 OECD Prices)
(rounded to one decimal place)

	Agriculture Forestry, and Fishing	Mining, Quarrying Fuel and Power	Manu-facturing	Const-ruction	Distributive Trades	Transport and Communication	Other Marketed Services	General Government
Australia	4.4	16.2	18.1	5.4	18.5	7.6	14.6	15.2
Austria	2.7	3.6	27.8	6.8	15.7	5.3	21.0	17.1
Belgium	2.4	4.0	24.9	5.5	20.1	6.2	21.8	15.1
Canada	2.9	16.1	17.3	4.7	12.1	6.6	28.8	11.6
Denmark	4.3	2.9	18.1	5.0	11.9	6.5	26.5	24.9
Finland	4.7	5.0	22.0	8.4	8.9	6.5	24.6	19.8
France	2.9	3.0	28.6	5.8	13.4	5.0	28.8	12.5
Germany	1.6	2.8	37.4	5.3	11.9	5.0	25.9	10.1
Greece	6.0	3.7	13.3	5.4	10.2	11.1	33.9	16.5
Ireland	13.2	2.4	16.6	6.0	8.5	3.2	34.4	15.7
Italy	2.9	4.7	27.2	6.8	14.9	8.7	18.8	16.0
Japan	0.9	3.9	33.3	5.7	12.6	7.5	26.4	9.7
Netherlands	2.1	11.9	19.5	4.4	13.5	9.1	27.6	11.9
New Zealand	8.4	9.4	19.4	4.1	17.4	9.2	17.0	15.2
Norway	1.9	31.0	13.4	5.6	7.4	4.8	19.6	16.2
Portugal	2.7	0.9	18.8	6.3	16.8	4.7	22.7	27.3
Spain	3.1	8.1	18.4	5.9	21.0	6.2	24.0	13.2
Sweden	2.4	6.2	20.8	4.8	9.0	5.6	23.9	27.3
Turkey	6.1	4.5	19.9	4.3	15.9	17.0	14.5	17.7
United Kingdom	1.3	10.3	22.1	4.2	10.8	4.6	27.0	19.6
United States	2.0	8.9	23.7	4.7	22.8	5.1	23.2	9.5
Total of 21:	2.2	7.4	25.7	5.2	17.2	6.1	24.2	12.0

TABLE D

Whole Economy Productivity
1985

(UK = 100)

	Actual	Standard Structure	% Effect of non-standard structure
Australia	108	115	+2.8
Austria	100	118	-6.7
Belgium	113	129	-3.1
Canada	135	133	+11.7
Denmark	100	115	-4.7
Finland	97	106	+0.3
France	116	130	-1.6
Germany	115	117	+7.9
Ireland	91	86	+16.7
Italy	116	134	-4.0
Japan	92	89	+13.6
Netherlands	141	146	+6.4
New Zealand	97	107	0.8
Norway	129	105	+36.2
Portugal	54	56	+5.5
Spain	111	124	-1.9
Sweden	99	109	-0.4
United Kingdom	100	100	+10.0
United States	134	144	+2.3

Note: Because the level of the United Kingdom is affected by standardisation the third column cannot be derived directly from the first two.

	TABLE E Real Income Per Capita 1985 UK=100	Whole Economy Productivity 1985 UK=100
Australia	108	108
Austria	99	100
Belgium	97	113
Canada	142	135
Denmark	115	100
Finland	106	97
France	105	116
Germany	111	115
Ireland	64	91
Italy	100	116
Japar.	109	92
Netherlands	103	141
New Zealand	92	97
Norway	128	129
Portugal	50	54
Spain	72	111
Sweden	117	99
United Kingdom	100	100
United States	152	134

TABLE F

Annual Hours Worked and Labour Productivity
(Whole Economy) 1985

	Annual Hours Worked	Productivity (United Kingdom= 100)
Canada	1,725	123
Finland	1,683	91
France	1,583	116
Germany	1,659	109
Italy	1,500	122
Japan	2,187	66
Sweden	1,417	109
United Kingdom	1,571	100
United States	1,678	126

Sources: Canada, France, Germany, Italy, Japan, United Kingdom Maddison (1982) as extrapolated by IMF Research Department (1987)

Finland, Sweden and United States from OECD National Accounts

TABLE G

Annual Hours Worked and Labour Productivity (Manufacturing)
1985

	Annual Hours Worked	Productivity (United Kingdom= 100)
Australia	1,570	135
Austria	1,739	102
Belgium	1,397	166
Canada	1,800	135
Denmark	1,371	114
Finland	1,701	99
France	1,629	169
Germany	1,470	165
Ireland	1,734	83
Italy	1,654	147
Japan	2,108	108
Netherlands	1,600	162
New Zealand	1,532	93
Norway	1,437	116
Portugal	1,663	43
Spain	1,629	101
Sweden	1,500	119
United Kingdom	1,703	100
United States	1,918	177

TABLE H

Value Added Per Year Worked Within Manufacturing 1985

1985 OECD Dollars-Thousands
(rounded to one decimal place)

	31 Food, Drink and Tobacco	32 Textiles Clothing Leather and Footwear	33 Wood and Furniture	34 Paper, Printing and Publishing	35 Chemicals Oil Refining, Rubber and Plastic	36 Non-Metallic Minerals	37 Base Metals	38 Engineering	39 Other
Australia	37.9	18.5	18.1	25.5	34.8	34.8	18.4	40.2	15.2
Austria	32.0	11.9	29.0	21.7	29.6	27.1	20.1	27.7	N/A
Belgium	47.5	12.5	20.0	26.2	35.1	23.5	26.5	36.4	81.3
Canada	27.5	20.7	32.7	38.0	39.9	28.7	36.1	38.4	29.9
Denmark	26.0	15.7	17.4	17.9	25.5	31.4	23.0	21.1	19.1
Finland	20.1	15.2	20.0	21.2	40.1	17.0	25.3	26.1	19.1
France	53.5	21.7	12.3	30.0	63.4	29.8	39.5	36.8	22.0
Germany	40.1	19.9	26.0	30.6	47.4	29.9	30.5	33.6	18.6
Greece	16.8	11.1	11.1	16.2	14.0	13.4	22.7	5.5	35.4
Ireland	23.8	18.2	7.0	11.2	47.0	5.0	6.8	19.4	8.8
Italy	52.8	22.2	23.9	39.1	43.4	49.1	35.9	33.4	44.2
Japan	28.2	13.5	9.1	42.1	57.0	19.0	95.8	31.4	31.7
Netherlands	41.7	26.3	22.9	25.2	51.0	33.6	39.4	33.7	36.8
New Zealand	26.9	12.9	12.0	25.9	23.5	18.1	36.9	14.7	17.9
Norway	17.1	15.8	23.2	15.3	29.8	19.3	53.4	23.1	23.7
Portugal	15.3	7.0	7.1	16.8	10.7	8.9	7.6	8.5	122.8
Spain	34.3	14.2	19.8	25.6	43.2	20.0	26.7	14.2	18.6
Sweden	21.0	14.8	28.7	19.2	29.3	16.7	40.2	27.8	2.8
Turkey	18.5	19.1	10.7	24.1	40.8	13.9	7.1	20.3	15.6
United Kingdom	27.1	13.6	15.5	27.5	38.7	19.5	22.3	22.4	17.1
United States	49.8	20.6	40.7	62.8	57.3	58.5	30.1	49.1	34.1

TABLE I

Value Added in Manufacturing Per Year Worked 1985 -
Detailed Categories for Light Industry

1985 OECD Dollars - Thousands

(rounded to one decimal place)

	311 Food	312 Drink	313 Tobacco	314 Textiles	322 Clothing	323 Leather	324 Footwear	341 Paper	342 Printing
Austria	24.7	27.6	327.0	13.2	11.1	8.1	11.0	21.4	22.0
Belgium	51.8	31.4	33.8	15.0	8.3	22.7	11.7	36.7	21.2
Canada	25.8	32.4	46.4	26.6	17.4	12.1	13.5	40.6	35.0
Denmark	26.0	26.2	24.1	18.7	12.7	11.5	13.2	21.4	16.6
Finland	19.8	18.7	35.3	21.0	13.1	14.6	11.1	26.8	14.8
France	44.9	93.6	370.6	26.0	17.5	23.8	19.1	41.9	24.2
Germany	30.8	47.0	174.3	20.5	20.1	17.2	17.6	28.7	32.9
Italy	37.4	117.2	42.3	24.0	20.0	42.0	14.8	45.3	34.6
Japan	25.7	39.8	56.0	12.5	15.4	16.5	17.0	47.3	28.6
Netherlands	41.5	49.7	32.8	26.6	22.3	N/A	21.8	30.7	23.0
New Zealand	27.6	14.0	33.3	17.3	10.6	10.2	10.3	23.6	27.6
Norway	16.7	22.2	13.1	18.4	12.0	15.0	11.5	17.3	14.4
Spain	23.6	66.7	111.1	17.1	9.0	23.1	11.5	30.1	22.9
Sweden	20.3	22.2	46.5	19.3	8.6	14.5	10.2	18.2	20.6
United Kingdom	25.6	35.3	29.3	13.9	13.0	13.5	14.9	18.7	32.1
United States	45.0	45.2	187.8	21.1	19.9	24.4	19.3	97.3	47.5

TABLE J

Value Added in Manufacturing Per Year Worked 1985 - Detailed Categories of Heavy Industry
1985 OECD Dollars - Thousands
(rounded to one decimal place)

	351,352 Chemicals	353 Oil Refining	354 Coal/Oil Products	355 Rubber	356 Plastics	381 Metal Products	382 Non-Electric Machinery	383 Electrical Machinery	384 Transport Equipment	385 Professional/ Scientific Equipment
Austria	28.4	30.5	32.8	35.8	29.2	34.2	22.2	24.4	37.1	19.1
Canada	33.1	87.0	63.9	26.6	37.7	28.9	34.5	26.8	60.7	18.5
Denmark	26.3	105.6	45.6	16.9	18.0	20.0	22.5	23.0	15.9	25.1
Finland	30.2	174.5	59.8	23.2	27.4	24.4	30.1	32.1	16.1	30.0
France	56.6	408.1	102.0	27.0	30.6	34.9	38.7	28.6	44.5	25.0
Germany	26.9	565.2	N/A	54.3	44.3	21.6	31.8	32.0	44.3	38.6
Italy	52.7	37.3	N/A	33.2	27.6	25.3	30.4	33.7	37.7	77.2
Japan	77.9	206.4	82.3	31.0	28.9	23.4	32.9	28.2	42.6	31.2
Netherlands	45.5	172.5	13.8	27.3	38.1	31.6	31.5	37.0	29.0	63.0
New Zealand	30.3	40.2	26.4	10.0	17.2	17.9	14.2	16.0	10.8	9.8
Norway	29.9	32.3	40.7	28.6	26.4	20.6	31.5	25.1	14.1	33.3
Spain	38.5	295.3	50.9	22.1	20.7	14.8	17.0	18.7	9.3	12.8
Sweden	26.4	199.9	55.4	18.9	21.2	34.7	28.6	18.6	25.7	41.0
United Kingdom	45.8	149.9	23.8	21.4	22.2	22.8	19.1	28.7	19.7	21.4
United States	50.8	247.3	124.9	38.6	39.2	30.9	45.6	37.6	60.1	106.3

TABLE K

Annual Hours Year Worked in Manufacturing in 1985

(Light Manufacturing)
(rounded to nearest unit)

	Food Processing	Textiles	Clothing	Leather and Fur	Footwear	Wood and Furniture	Paper	Printing
Austria	1,809	1,711	1,645	1,672	1,672	1,780	1,795	N/A
Belgium	1,418	1,355	1,342	1,452	1,380	N/A	1,422	1,418
Canada	1,661	1,833	1,675	1,740	1,703	1,795	1,837	1,591
Denmark	1,409	1,337	1,213	1,337	1,350	1,399	1,371	1,388
Finland	1,778	1,699	1,672	1,677	1,715	1,673	1,668	1,593
France	1,658	1,646	1,637	1,646	1,650	1,649	1,625	1,625
Germany	1,546	1,481	1,423	1,441	1,437	1,484	1,546	1,470
Italy	1,679	1,486	1,450	1,607	1,498	1,633	1,571	1,667
Japan	2,005	2,629	2,174	2,148	2,148	2,314	2,017	2,268
Netherlands	1,612	1,604	1,564	1,616	1,596	1,622	1,584	1,584
New Zealand	1,250	1,536	1,448	1,429	1,467	1,551	1,509	1,520
Spain	1,737	1,578	1,571	1,617	1,571	1,693	1,642	1,642
Sweden	1,464	1,460	1,394	1,465	1,439	1,555	1,838	1,953
United Kingdom	1,764	1,679	1,524	1,723	1,626	1,776	1,695	1,695
United States	1,941	1,955	1,793	1,885	1,803	1,968	1,064	1,810

TABLE L

Annual Hours Year Worked in Manufacturing in 1985

(Heavy Manufacturing)
(rounded to one decimal unit)

	Chemicals	Rubber	Plastic	Non-Metallic Minerals	Base Metals	Metal Products	Non-Electric Machinery	Electrical Machinery	Transport Equipment	Professional Scientific Equipment
Austria	1,732	1,732	1,732	1,816	1,767	1,746	1,767	1,696	1,666	1,746
Canada	1,832	1,832	1,772	1,865	1,876	1,842	1,837	1,856	1,939	1,791
Denmark	1,375	1,320	1,371	1,408	1,371	1,409	1,418	1,362	N/A	1,337
Finland	1,686	1,622	1,721	1,757	1,679	1,712	1,775	1,733	1,628	1,754
France	1,604	1,629	1,642	1,637	1,591	1,637	1,625	1,612	1,633	1,629
Germany	1,471	1,484	1,484	1,506	1,475	1,470	1,488	1,441	1,452	1,434
Italy	1,607	1,510	1,522	N/A	1,283	N/A	1,522	N/A	1,402	N/A
Japan	1,782	2,142	N/A	N/A	1,898	2,109	2,109	2,020	2,124	2,005
Netherlands	1,574	1,600	1,596	N/A	N/A	1,608	1,628	1,592	1,608	1,580
New Zealand	1,533	1,487	1,616	1,644	1,613	1,555	1,551	1,521	1,460	1,490
Spain	1,647	1,637	1,637	1,648	1,311	1,624	1,574	1,606	1,529	1,589
Sweden	1,503	1,462	1,478	1,524	1,509	1,553	1,553	1,474	1,501	1,506
United Kingdom	1,707	1,736	1,752	1,765	1,735	1,715	1,744	1,662	1,670	1,646
United States	1,950	1,912	1,903	1,973	1,945	1,918	1,928	1,886	1,979	1,905

TABLE M

Productivity in Light Manufacturing 1985

(Adjusted for Annual Hours Worked
(US = 100

(rounded to nearest unit)

	Food Processing	Textiles	Clothing	Leather and Fur	Footwear	Wood and Furniture	Paper	Printing
Austria	59	71	61	37	61	79	25	N/A
Belgium	157	102	56	121	79	N/A	55	57
Canada	67	134	94	54	74	88	47	84
Denmark	80	129	94	66	92	60	33	46
Finland	48	115	71	67	61	58	34	35
France	117	146	96	111	108	36	55	57
Germany	86	128	127	93	114	85	39	85
Italy	107	150	124	202	92	71	61	79
Japan	55	44	64	59	74	19	50	48
Netherlands	111	154	128	N/A	127	68	41	57
New Zealand	95	104	66	55	65	37	33	69
Spain	58	100	51	110	68	56	39	53
Sweden	60	123	56	76	66	89	21	40
United Kingdom	63	77	77	60	85	42	23	72

TABLE N

Productivity in Heavy Manufacturing 1985
(Adjusted for Annual Hours Worked)
US = 100

(rounded to nearest unit)

	Chemicals	Rubber	Plastic	Non-Metallic Minerals	Base Metals	Metal Products	Non-Electric Machinery	Electrical Machinery	Transport Equipment	Professional Scientific Equipment
Austria	63	102	82	50	73	121	53	72	73	20
Canada	69	71	103	52	124	97	79	72	103	19
Denmark	73	63	64	75	108	88	67	85	N/A	34
Finland	69	71	77	33	97	88	72	93	32	31
France	135	82	91	61	160	132	101	89	90	28
Germany	70	181	145	67	133	91	90	111	100	48
Italy	126	109	88	N/A	181	N/A	84	N/A	88	N/A
Japan	168	72	N/A	N/A	326	69	66	70	66	28
Netherlands	111	84	116	N/A	N/A	122	82	117	60	71
New Zealand	76	33	52	38	148	71	39	52	24	11
Spain	90	67	61	41	131	56	46	58	20	14
Sweden	67	64	70	37	172	139	78	63	56	49
United Kingdom	102	61	62	37	83	83	46	87	39	23

TABLE O

Effects of Standardising Structure of Manufacturing Output 1985

	Gain from Specialisation (%)	Productivity (Hours Adjusted) assuming standardised output (UK = 100)
Austria	+2.03	106
Canada	+5.89	135
Denmark	+3.35	116
Finland	+3.46	100
France	+15.66	154
Germany	+7.30	162
Italy	-3.36	158
Japan	-4.74	119
Netherlands	+8.06	160
New Zealand	+19.15	84
Norway	+10.66	110
Spain	+26.45	84
Sweden	+17.34	107
United Kingdom	+5.39	100
United States	+7.46	174

TABLE P

Capital Productivity and Total Factor Productivity in Manufacturing in 1985

	Capital Productivity in Manufacturing	Labour Productivity per Hour Worked Adjusted for VA Share (standardised)	Total Factor Productivity
	[VA share (standardised/NCS]	$ 1985 OECD	US=100
Australia	0.208	12.87	73
Canada	0.207	12.94	73
Finland	0.168	9.43	55
Germany	0.336	15.82	98
Japan	0.258	10.33	68
United Kingdom	0.232	9.57	62
United States	0.314	16.93	100

TABLE Q

Research and Development Expenditure Volumes
Using Specific Purchasing Power Parities

(All figures 1985)

	OECD Dollars (millions)	% of Gross Domestic Product
Australia	2,050	1.1
Austria	959	1.2
Belgium	1,595	1.3
Canada	4,555	1.2
Denmark	871	1.4
Finland	903	1.6
France	13,473	2.1
Germany	17,458	2.4
Greece	189	0.3
Ireland	209	1.2
Italy	7,869	1.3
Japan	38,838	2.7
Netherlands	3,102	1.9
New Zealand	389	1.2
Norway	897	1.6
Portugal	365	0.7
Spain	1,613	0.5
Sweden	2,713	2.6
Turkey	2,633	1.5
United Kingdom	15,211	2.5
United States	93,927	2.4

TABLE R

Three Measures of Energy Intensity for Twenty-one OECD Countries in 1985

Kilograms of Oil Equivalent per OECD Dollar

	Primary Energy/ Whole Economy	Delivered Energy/ Whole Economy	Delivered Energy/ Non-Energy Manufacturing
Australia	0.416	0.274	0.528
Austria	0.340	0.238	0.251
Belgium	0.406	0.299	0.415
Canada	0.593	0.369	0.656
Denmark	0.310	0.231	0.225
Finland	0.479	0.335	0.678
France	0.308	0.203	0.206
Germany	0.363	0.259	0.209
Greece	0.311	0.209	0.455
Ireland	0.374	0.265	0.471
Italy	0.226	0.164	0.194
Japan	0.260	0.171	0.202
Netherlands	0.380	0.307	0.442
New Zealand	0.395	0.239	0.436
Norway	0.465	0.297	0.786
Portugal	0.242	0.172	0.334
Spain	0.257	0.165	0.333
Sweden	0.523	0.313	0.531
Turkey	0.226	0.174	0.231
United Kingdom	0.327	0.220	0.262
United States	0.454	0.314	0.433

TABLE S

Delivered Energy Intensity in Specific Manufacturing Industries 1985

Kilograms of Oil Equivalent per OECD Dollar

	Food, Drink and Tobacco	Textiles Leather and Footwear	Wood and Furniture	Paper and Printing
Australia	0.424	0.146	0.184	0.346
Austria	0.120	0.111	0.067	0.765
Belgium	0.170	0.163	0.047	0.204
Canada	0.117	0.077	0.128	0.780
Denmark	0.274	0.116	0.233	0.201
Finland	0.482	0.099	0.625	1.835
France	0.107	0.114	0.078	0.189
Germany	0.111	0.139	0.058	0.266
Greece	0.158	0.113	0.034	0.212
Ireland	0.260	0.157	0.143	0.112
Italy	0.079	0.058	0.015	0.161
Japan	0.079	0.123	N/A	0.098
Netherlands	0.231	0.144	0.077	0.199
New Zealand	0.260	0.069	0.675	0.628
Norway	0.447	0.126	0.327	1.008
Portugal	0.225	0.155	0.197	0.302
Spain	0.111	0.159	0.036	0.315
Sweden	0.333	0.196	0.374	2.257
Turkey	0.059	0.083	0.304	0.167
United Kingdom	0.179	0.136	0.040	0.120

TABLE T

Delivered Energy Intensity in Specific Manufacturing Industries 1985

Kilograms of Oil Equivalent per OECD Dollar

	Chemicals and Allied (less Energy Products)	Building Materials	Base Metals	Engineering and Allied
Austrialia	0.468	1.155	2.381	0.056
Austria	0.239	0.493	1.395	0.031
Belgium	0.676	1.345	2.810	0.052
Canada	0.787	0.984	2.160	0.027
Denmark	0.291	0.724	1.014	0.073
Finland	1.033	2.137	2.208	0.071
France	0.360	0.747	1.016	0.051
Germany	0.392	0.631	0.956	0.044
Greece	0.320	2.457	1.972	0.050
Ireland	0.170	1.845	7.752	0.034
Italy	0.393	0.415	1.302	0.066
Japan	0.151	0.558	0.712	0.015
Netherlands	1.567	0.759	2.165	0.071
New Zealand	0.653	1.000	1.592	0.039
Norway	1.294	1.456	2.475	0.100
Portugal	0.547	1.316	1.435	0.041
Spain	0.404	1.175	1.300	0.121
Sweden	0.529	1.414	1.020	0.082
Turkey	0.071	0.160	2.045	0.009
United Kingdom	0.347	0.803	1.349	0.092

TABLE U

Alternative Specific Purchasing Power Parities per US Dollar 1985

Units of National Currency

	Poverty Consumption Parity (own Calculation)	Personal Consumption Parity (OECD)	Gross Domestic Product Parity (OECD)	Riches Consumption Parity (derived from ECA)
Australia	1.1108	1.24	1.24	1.0530
Canada	1.2369	1.23	1.22	1.1538
France	6.8560	7.52	7.27	7.1305
Germany	2.3764	2.57	2.48	2.2895
Italy	1,167.2	1,345	1,302	1,382.0
Netherlands	2.3921	2.53	2.55	2.4895
Norway	9.0650	9.78	8.63	8.3942
Sweden	8.4627	8.89	8.15	7.5971
United Kingdom	0.56024	0.591	0.568	0.6150

Sources: Poverty consumption parity based on United Kingdom 1985 weights as follows:-

6.2% at United Kingdom own prices on meat and dairy products, 20.0% on other food, 7.0% on clothing, 9.6% on drink and tobacco, 18.2% on housing, 7.0% on household durables, 9.6% on transport vehicles, 8.2% on fuel, power etc., 7.7% on other goods and 6.5% on other services taken from 1985 Family Expenditure Survey. General parities taken from "Purchasing Power Parities and Real Expenditures 1985" OECD 1987 and Riches Consumption Parity derived from ECA's Inter Country Executive Remuneration Report 1985.

TABLE V

Derivation of Per Capita Disposable Income 1985
(own currency basis)

	Personal Consumption Millions (Billions for Italy)	Savings Ratio %	Disposable Income	Population Thousands	Per Capita Disposable Income (Units/ Thousands for Italy)
Australia	135,335	6.9	145,365	15,788	9,207
Canada	269,979	13.8	313,201	25,181	12,438
France	2,938,364	14.0	3,416,702	55,170	61,930
Germany	1,160,209	11.4	1,309,491	61,024	21,459
Italy	495,407	24.7	657,911	57,128	11,516
Netherlands	244,787	2.0	249,783	14,491	17,237
Norway	241,917	-1.9	237,406	4,153	57,165
Sweden	442,378	1.1	447,298	8,350	53,569
United Kingdom	211,695	9.8	234,695	56,618	4,145
United States	2,584,275	4.5	2,706,047	239,279	11,309

TABLE W

Derivation of Allocable Collective Consumption 1985

1985 US Dollars at PPP

	Total GGFC (excluding Public Administration and Defence) (Millions)	Population (Thousands)	Per Capita (Units)
Australia	18,108.92	15,788	1,147
Canada	27,750.46	25,181	1,102
France	51,808,14	55,170	939
Germany	48,801.68	61,024	800
Italy	79,541.27	57,128	1,392
Netherlands	11,449.45	14,491	790
Norway	9,243.924	4,153	2,226
Sweden	31,789.86	8,350	3,807
United Kingdom	95,036.88	56,618	1,679
United States	253,019.4	239,279	1,057

TABLE X

Top and Bottom Quintile
Shares of Disposable Income

	Top	Bottom	Year
Australia	38.8	5.7	1981
Canada	39.4	5.4	1981
France	40.8	6.5	1979
Germany	38.0	7.2	1981
Italy	41.0	6.8	1986
Netherlands	38.3	6.9	1983
Norway	36.6	6.6	1979
Sweden	36.8	8.2	1981
United Kingdom	39.3	5.9	1979
United States	39.7	5.2	1979

Source: Private communication from Luxembourg Income Study 1989

TABLE Y

Derivation of Total Final Income Bottom Quintile - Per Capita Basis 1985

	Per Capita Disposable Income (Units/ Thousands for Italy)	Bottom Quintile Share (%)	Poverty Purchasing Power Parity Units per Dollar	Per Capita Disposable Income Bottom Quintile US $	Allocated Collective Consumption per Capita Bottom Quintile US $	Per Capita Final Income Bottom Quintile US $
Australia	9,207	5.7	1.1108	2,362	739	3,101
Canada	12,438	5.4	1.2369	2,933	710	3,643
France	61,930	6.5	6.8560	2,936	605	3,541
Germany	21,459	7.2	2.3764	3,251	515	3,766
Italy	11,516	6.8	1,167.2	3,355	896	4,251
Netherlands	17,237	6.9	2.3921	2,486	509	2,995
Norway	57,165	6.6	9.0650	2,081	1,434	3,515
Sweden	53,569	8.2	8.4627	2,595	2,452	5,047
United Kingdom	4,145	5.9	0.56024	2,175	1,081	3,256
United States	11,309	5.2	1.000	2,940	681	3,621

Sources: 64.4% of average collective consumption (excluding public administration and defence) allocated to bottom quintile on basis of Table 3, page 101, Economic Trends November 1986

TABLE Z

Derivation of Total Final Income Top Quintile - Per Capita Basis 1985

	Per Capita Disposable Income (Units/ Thousands for Italy)	Top Quintile Share (%)	Riches Purchasing Power Parity Units per Dollar	Per Capita Disposable Income Top Quintile US $	Allocated Collective Consumption Per Capita Top Quintile US $	Per Capita Final Income Top Quintile US $
Australia	9,207	38.8	1.0530	16,963	1,399	18,362
Canada	12,438	39.4	1.1538	21,237	1,344	22,671
France	61,930	40.8	7.1305	17,718	1,146	18,864
Germany	21,459	38.0	2.2895	17,808	976	18,784
Italy	11,516	41.0	1.382	17,082	1,698	18,780
Netherlands	17,237	38.3	2.4895	13,259	964	14,223
Norway	57,165	36.6	8.3942	12,462	2,716	15,178
Sweden	53,569	36.8	7.5971	12,974	4,645	17,619
United Kingdom	4,145	39.3	0.6150	13,244	2,048	15,292
United States	11,309	39.7	1.000	22,448	1,290	23,738

Sources: 122% of average collective consumption (excluding public administration and defence) allocated to top quintile on basis of Table 3,page 101 Economic Trends November 1986.