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INCOME DISTRIBUTION IN ADVANCED ECONOMIES: EVIDENCE FROM THE LUXEMBOURG INCOME STUDY (LIS)*

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I. INTRODUCTION

Personal income distribution, low relative income, and income inequality in general are increasingly important subjects for economic and social policymakers in OECD countries, particularly as they become more interdependent. In the study of these issues, there is now great interest in the comparison of the experience of different countries. Interest in cross-national distribution research did not come about by accident; comparable cross-national data on distribution allow for comparison of similarities and differences across countries and over time. Such comparisons help us understand how market forces, demographic forces, and public policy affect the relative economic status of various groups. We have recently undertaken a major study on behalf of the OECD to investigate this issue using the most expansive of these databases, the Luxembourg Income Study (LIS). This brief paper summarizes a small part of what was learned in this study (Atkinson, Rainwater, and Smeeding, 1995, 1995a).

Such inferences as one might draw from these comparisons are heavily dependent on the underlying quality and comparability of the income data upon which such studies rest. "Empirical facts" are treacherous objects. The subject of income distribution is littered with "facts" that have ceased to hold or which proved on closer examination to be mere statistical artifacts rather than genuine economic regularities (remember Keynes' constancy of the share of labor?). The value of empirical generalizations has more often been found in the theoretical process used to explain them than in the empirical observation itself. It can be argued that the—very substantial—contribution of Kuznets' Presidential Address to the American Economic Association (1955) lay in his analytical framework rather than in the much celebrated Kuznets curve indicating that inequality first rises and then falls as a country develops.

This paper (and our study) starts therefore from a position of modesty as to what can be achieved by a summary of the empirical evidence. Comparisons of income inequality should not be regarded as a Procrustean bed to which theoretical ideas have to be confined. Not the least of the reasons for this are the difficulties in making such comparisons, and it is with their limitations that the paper begins in Section II. The second difficulty in writing a paper on "empirical facts" is that these have many dimensions. Here we have chosen to concentrate on the comparison of income inequality across countries, and across time. Section II covers the specific terms and definitions used to make these comparisons. In order to realize the full range of choices and their potential applications, the entire study needs to be consulted (Atkinson, Rainwater, and Smeeding, 1995, Chapters 2, 3; Appendices 2 through 6).

The purpose of this study is to compare income distribution across a wide range of OECD countries using microdata generated by the Luxembourg Income Study (LIS) database, supplemented by national studies for the major OECD nations. The LIS database, which is described in Appendix 1, for the first time allows comparisons of cross-national distributions in the environment of a unified household income database created explicitly for this purpose. By relying on LIS in conjunction with country studies, we hope to avoid some of the problems faced by previous studies in this area, notably in the study by Sawyer (1976), to which we make reference and comparison in the beginning of Section II. While most OECD countries are included in this study, several levels of comparison are extant. Thus, one will find at least some mention of 20 of the 24 OECD countries in the report though the 16 OECD nations that were members of LIS as of 1993 are most heavily used (Table A-2).

This study appears to be particularly interesting at the present time on account of the economic, social, and political forces which have coincided to produce a widening in the income distribution in several OECD nations (Gardiner, 1993; Gottschalk, 1993; Green, Henley, and Tsakalokos, 1992; Milanovic, 1993; Taylor, 1992). It is of interest, therefore, to know first, the relative level of inequality in OECD nations, and then second, how far this has been a general

trend and what differences there are in country experience. Section III therefore summarizes for a range of OECD countries the extent of income inequality in the 1980s. Can one identify distinct groupings of countries with different degrees of inequality? Is there a world-wide trend toward greater inequality? Or are the Anglo-Saxon countries unusual? Section IV discusses the trend in inequality in recent years. The fifth section briefly reviews our sub-analyses concerning how differences in primary and market incomes, and then government intervention (direct taxes and transfers), affect change in the income distribution in general and in low incomes in particular. The final section summarizes the paper and offers suggestions on further research. Each section ends with brief conclusions.

Even within the field delimited above, any compilation of empirical facts is bound to be selective, and there is a high probability that the selected tables and graphs in this paper fail to answer particular questions in the reader's mind. It is our belief that this method of dissemination should be supplemented by one that takes advantage of modern microtechnology. We should move to a situation where subsets of variables from full micro datasets are available in a form where the reader can choose, within limits, the method of presentation. This, however, requires a change in the rules of official statistical agencies, and greater cross-national support for projects such as LIS which attempt to make such data available via electronic mail while still honoring the restrictions placed on the microdata by its various owners and data collection agencies.

II. ON ENTERING THE MINE FIELD: CHOICES, TERMINOLOGY AND DATA QUALITY

Comparison of income distributions across countries, or across time, raises many issues.[1] There are currently no international standards for income distribution which parallel the international standards used for systems of national income accounts. We need to decide what we want to measure and how far we can measure it on a comparable basis. The LIS offers the reader many choices of perspective in terms of country, income measure, accounting unit, and time frame. And the terminology of income measurement has its roots in both microeconomics and macroeconomics. Subsequently, but no less importantly, the issue of the relative quality of the data with which we are working must enter the discussion.

Choices: Inequality of What among Whom on Whose Terms?

Our attention is focused primarily on the distribution of **disposable money income**, that is income after direct taxes and including transfer payments. Several points should be noted:

a. income rather than consumption is taken as the indicator of resources, although there may be both theoretical and empirical arguments favoring use of the latter;

b. the definition of income falls considerably short of the Haig-Simons comprehensive definition, typically excluding much of capital gains, imputed rents, home production, and income in kind;

c. no account is taken of indirect taxes or of the benefits from public spending (other than cash transfers) such as health care, education, or most housing subsidies;

d. the period of assessment is in general the calendar year with income measured on an annual basis (although the United Kingdom evidence relates to weekly or monthly income).

Thus, variables measured may be less than ideal and results may not be fully comparable across countries. For example, one country may help low-income families through money benefits

(included in cash income), whereas another provides subsidized housing or education (which is not taken into account).

Two concepts of income are also used here: **primary income**, which includes earnings (wages and salaries plus income from self-employment), and **market income**, which adds property income (but not capital gains or losses) and other private cash income transfers (occupational pensions, alimony, and child support) to primary income. To reach disposable income, governments add public transfer payments (social retirement, family allowances, unemployment compensation, welfare benefits) and deduct personal income tax and social security contributions from market income.

The question of distribution "among whom" is here given the simplest answer—among individuals. When assessing disposable income inequality, however, the unit of assessment is the household: the incomes of all household members are aggregated and then divided by an equivalence scale to arrive at individual equivalent income. The choice of the household, rather than a narrower unit such as the spending unit or the family, is open to debate. It captures the economies of scale extant in shared living arrangements, but it assumes a degree of income-sharing within the household that may not take place. Moreover, the choice of unit may affect comparisons across countries in light of different household structures. For the most part, the household—all persons sharing the same housing unit regardless of familial relationship—is the common unit of analysis. However, for Sweden and Canada more restrictive nuclear family (Sweden) and economic family (Canada) definitions of the accounting unit are necessary (see Atkinson, Rainwater, Smeeding, 1995, Chapter 2, for additional details). These restrictions probably overstate the amount of household-based inequality in each of these nations. The same arguments may apply to the choice of equivalence scale, and alternative assumptions are considered below.[2]

Terminology

"On whose terms" refers to the perspective on which income distribution is viewed. The subject of income distribution is an interstitial one. In theoretical terms, it lies between microeconomics and macroeconomics; in statistical terms it lies between national accounts statistics and household surveys. Each of these fields has its own terminology. In this paper we have used terms as they are conventionally applied by the users of micro-data. At the same time, in our larger report, we have taken care to relate these terms to those used in the other fields. In particular our larger report (Atkinson, Smeeding, and Rainwater, 1995, Chapter 2) discusses several other definitions of "income" and their relation to the United Nations *Provisional Guidelines on Statistics of the Distribution of Income, Consumption and Accumulation of Households*, Study M 61 (United Nations, 1977), and to the concepts of income used by those who study Systems of National Accounts (e.g., Maurice, 1968).

Problems in Ensuring Comparability

The problems in ensuring a reasonable degree of comparability may be illustrated by reference to one of the most widely cited international comparisons—that carried out by Sawyer (1976) for the OECD—which is the forerunner of our larger study. Table 1 summarizes the main findings for the size distribution of post-tax income for 12 OECD countries around 1970. The countries are ranked in order of the Gini coefficient (highest at the top), and two other measures of inequality are shown for comparison. The countries fall into three main groups, distinguished by solid horizontal lines in the table (which correspond to differences in the Gini coefficient of more than 2 1/2 percentage points):

- France, Italy, West Germany, and the United States
- Spain, Canada, and the Netherlands
- United Kingdom, Japan, Australia, Norway, and Sweden.

Table 1. International Comparison by Sawyer (1976)

Country	Year	Gini Percent	Champernowne Percent	Share of Bottom 20 Percent	Comments
France	1970	41.4	27.6	4.3	*Based on tax records
Italy	1969	39.8	24.8	5.1	
West Germany	1973	38.3	22.0	6.5	Synthesis of different sources
United States	1972	38.1	24.8	4.5	*
Spain	1973 (-4)	35.5	20.1	6.0	
Canada	1969	35.4	22.0	6.0	
The Netherlands	1967	35.4	19.2	6.5	Based on tax records. Relates to tax unit rather than household.
United Kingdom	1973	31.8	16.6	6.3	*
Japan	1969	31.6	15.6	7.9	* Excludes agricultural, forestry workers and fishermen.
Australia	1966 (-7)	31.2	15.7	6.6	Only households in urban areas
Norway	1970	30.7	16.2	6.3	Based on tax records
Sweden	1972	30.2	15.8	6.6	

*Estimated by applying average tax rates to pre-tax data

Source: Sawyer (1976), Tables 4 and 6.

This grouping is rather surprising: it does not correspond to what might be expected in view of the known features of these societies as generally accepted by social scientists (e.g., Esping-Anderson, 1990).

The Sawyer study met with lively reactions, notably from the French Government, which published a harsh reply (Bégué, 1976). There are indeed a number of serious problems, some of which are indicated in the "Comments" column of Table 1, but many of which may not be readily apparent:

a. The data are derived from different types of sources. In the majority of cases, the source is a household survey, such as the U.S. Current Population Survey, but in other cases the data are based on tax records (France, the Netherlands, and Norway) or a synthesis of different sources (West Germany). Some indication of the consequences are provided by Sawyer's additional memorandum items for West Germany (which replaces the synthetic estimate by one from a household income and expenditure survey) and the United Kingdom (which replaces the expenditure survey figure by a synthetic estimate);[3] the Gini coefficients are

	Synthetic Estimate	**Survey Estimate**
West Germany	*38.3*	31.2
United Kingdom	33.5	*31.8*

Source: Sawyer (1976), Table 6.

Using consistent survey figures instead of those in Table 1 (italicized above) provides a rather different picture of the relative income inequality in the two countries.

b. In two cases the data do not cover the whole population (Japan and Australia) and the exclusions may be expected to reduce the recorded degree of inequality.

c. Sawyer did not have access to the original micro-data, and had in some cases to make heroic aggregative adjustments, particularly in going from pre-tax income to post-tax income (the countries marked by an * in the Comments column).[4] As described by Sawyer,

> "one of these distributions had to be estimated from the other by utilizing data on the average amount of tax paid by each income class...inequality tends to be under-estimated since households have not been ranked by the derived income concept" (1976, p. 12).

d. The distributions relate to household income, but in the main figures no adjustment is made for differences in household size.

Approach Adopted Here

The approach adopted here, based in large part on data from the Luxembourg Income Study (LIS), overcomes some, but not all, of the problems of making comparisons across countries and across time. The first problem outlined above remains: data are still drawn from different types of sources. Table A-2 lists the countries covered and describes the origin of the data. But most of the data are now drawn from household income surveys, or their equivalent, and in no case is synthetic data used.[5] The main qualification concerns the French data, which come from tax records that have been augmented to reflect income transfer receipt.

The major advantage is the availability of micro-data. The aim of the LIS project has been to assemble a single database containing survey data from many countries that is as consistent as possible. (The LIS project is described in more detail in Appendix 1). This paper also includes results for countries not members of LIS for which micro-data are available through cooperation with individual researchers or national statistical offices.

Access to the micro-data means that it is possible to produce results on the same basis, starting from individual household records, and to test their sensitivity to alternative choices of

units, definition and other concepts. It is therefore possible to make any desired adjustment for household size (eliminating problem (d) above). Aggregate adjustments, such as that from pre-tax to post-tax income (problem (c)), are not necessary, although in some cases imputations are necessary at the household level.[6] The data all cover, at least in principle, the whole non-institutionalized population (avoiding problem (b)).

The aim of the LIS project is to increase the degree of cross-national comparability, but complete cross-national comparability is not possible, even if we were to administer our own surveys in each nation. Comparability is a matter of degree, and all that one can hope for is to reach an acceptably high level. It is left to the reader to decide if the level of comparability found in this study is acceptable by his or her own standards; it is certainly better than what Sawyer (1976) was able to achieve.

Data Quality Comparison with National Accounts

One common criticism of income distribution data derived from household surveys is that they are seriously incomplete in coverage of income and that this differentially affects different income ranges. It is therefore important to compare the total income of different types reported in the surveys used with external information, notably that drawn from national accounts and country data registers. The comparison with national accounts is also of interest in considering the links between, on the one hand, explanations of the personal distribution and, on the other hand, aggregate variables such as appear in macro- or growth models (as exemplified in theoretical terms by Stiglitz (1969) and, at a more empirical level, by Bourguignon and Morrison (1990 and 1992)).

In making such a comparison with national accounts, three considerations should be borne in mind. First, national income accounts data may not be uniformly superior to survey data. National accounts aggregates are themselves estimates, whose reliability has been the subject of a long literature. In the United Kingdom, for example, Maurice (1968) grades different variables according to their reliability. Self-employment income is placed in range B, with a 90

percent confidence interval of ± 3 to 10 percent. In the case of property income, she comments that

> like all figures obtained as residues, the estimate of personal income from rent, dividends and net interest cannot be regarded as accurate (1968, p. 103).

Second, before survey data can be compared with national accounts data, the latter may need to be adjusted to produce estimates for comparable income concepts and populations.[7] For example, the national accounts may include not just households but also non-profit organizations. We may have to subtract the income received by those households not in the survey population, e.g., non-residents, the deceased, and the institutionalized. And national income accounts concepts of self-employment income may differ from those used by tax authorities, household survey takers, and household survey respondents (see Atkinson and Micklewright, 1983). Third, in comparing income amounts, it is important to bear in mind that differences between income aggregates may arise from a number of sources, and these may have different implications for the measured distribution. Timing of income receipt versus accrual accounting by the SNA is one example. Differences may also arise from differential non-response to the survey (for example, a lower response rate among those with high incomes may cause investment or property income to be understated), item non-response by households taking part, or inaccurate reporting by respondents.

Unfortunately, because of the time consuming and painstaking nature of these comparisons (see Smeeding, 1982), not all LIS countries have been able to compare survey data with national accounts or other external data. In Appendix Table A-3 we have assembled available information for ten countries and presented it on a comparative basis, showing for eight countries the ratio of survey to administrative estimates for each of five categories of income.

Total or "all income" estimates are about 90 percent of the comparable national income totals in six of the eight countries: Canada, Finland, Italy, the Netherlands, the United Kingdom,

and the United States. In Australia and West Germany there is an aggregate shortfall of some 20 to 25 percent, but at least part of the difference can be explained by the fact that the totals are not fully comparable. When we turn to specific categories, we find that wage and salary income is generally well reported in all ten countries. Self-employment income reporting (and concepts) differs substantially across surveys, as does that of government and private transfers. Incomplete reporting of property income is a problem in all countries. Evidence from the United States (Radner, 1983), indicates that this problem is primarily found among upper income households with heads aged 65 or older.

The differences found in Table A-3 must be carefully noted when comparing relative incomes across countries. Still, the major aggregates used in our study—primary income, market income, and disposable income (not shown but derived by subtracting direct taxes from total or gross income in the last row of Table A-3)—tend to be consistently reported across these countries.

Conclusions

Full comparability of income distribution data is not attainable, and this needs to be borne in mind throughout the rest of the paper. Clearly the LIS data project has lessened some major comparability problems and at the same time highlighted others. Moreover, it has provided the means to test the sensitivity of various choices of accounting unit, income definition, equivalence scale adjustment and other factors. The major report which this paper summarizes has been reviewed in great detail by each country studied and its officials. In some cases, errors were found and were corrected. In summary, we now have a much better idea of where the land mines are located, but we still have to tread very carefully.

III. LEVEL AND TREND IN INCOME INEQUALITY IN OECD COUNTRIES IN THE MID-1980S

This section looks at the distribution of disposable income for the most recent year available in 17 OECD countries, of which 16 are members of LIS.[8] In most cases, the results relate to the period 1984-1987. Estimates allow us to compare income inequality among different countries, but it should be re-emphasized that, while access to micro-data allows a higher degree of comparability than in earlier studies, there remain important respects in which the sources differ. The comparisons may similarly be sensitive to the methods employed and to the form of presentation. We begin by considering disposable income per equivalent adult, using an "intermediate" equivalence scale of household size to the power of a half, and by looking at percentiles of the median.

Percentiles of the Distribution

The first method of presentation (Table 2) expresses the percentiles of the distribution as percentages of the median, denoted by P. The percentile ratios are particularly appealing as a measure of inequality because they are less dependent than income shares on such inter-survey differences as non-uniform top and bottom coding of incomes, the treatment of negative incomes, and underreporting of income at either tail of the distribution (see Atkinson, Rainwater, and Smeeding, 1995, Chapters 2 and 3).

The percentile ratios can be read as follows: in the United States dataset for 1986, the median equivalent income per adult was $13,364 per year. For a family of four, this corresponded to a total income of $26,728, since the equivalence scale is simply the square root of family size (or 2). In that year the average official poverty threshold for a family of four in the United States was $11,203. The equivalent income per adult at the bottom decile was $4,639, so that P_{10} was 34.7 percent. The top decile was $27,540, giving a percentage of 206.1 percent. The ratio of the top to bottom decile, referred to as the decile ratio, is shown in the final column. The decile ratio in the

Table 2. Income Distribution in OECD Countries in Mid-1980s: Percentile of Median and Decile Ratio[a]

	P^{10}	P^{25}	P^{75}	P^{90}	P^{95}	P^{90}/P^{10}
Australia 1985	46.5	66.4	142.1	186.5	218.5	4.01
Austria 1987[b]	56.3	75.9	129.9	162.5	186.7	2.89
Belgium 1988	58.5	74.5	128.8	163.2	190.8	2.79
Canada 1987	45.8	68.5	137.5	184.2	218.0	4.02
Finland 1987	58.9	76.5	125.5	152.7	173.6	2.59
France 1984	55.4	72.1	139.7	192.8	233.5	3.48
Ireland 1987	49.5	66.7	150.9	209.2	252.2	4.23
Italy 1986	48.9	68.8	145.0	197.9	233.8	4.05
Luxembourg 1985	58.5	75.1	132.7	184.0	228.1	3.15
The Netherlands 1987	61.5	75.7	135.0	175.0	206.4	2.85
New Zealand 1987/88	53.6			186.6		3.48
Norway 1986	55.3	76.0	128.7	162.2	187.3	2.93
Sweden 1987	55.6	75.6	125.1	151.5	170.4	2.72
Switzerland 1982	53.9	73.6	134.3	185.1	244.6	3.43
United Kingdom 1986	51.1	67.6	144.6	194.1	232.1	3.79
United States 1986	34.7	61.7	149.6	206.1	247.3	5.94
West Germany 1984	56.9	75.0	132.7	170.8	201.7	3.00

[a]The results are for the distribution among persons of household disposable income adjusted by an equivalence scale equal to (household size)$^{0.5}$.

[b]Austria excludes self-employment income; others use fully comparable definitions of income.

Source: Atkinson, Rainwater, and Smeeding, 1995, Table 4.1.

United States is 5.94, which is the largest value recorded in Table 2. As may be seen from the left hand panel in Figure 1, where countries are ranked according to the value of the decile ratio, the next largest is Ireland, with a value of 4.23.

The lower part of the distribution of disposable income does appear to be different in the United States from that in the other countries. The bottom decile is only slightly over a third of the median, compared with values in excess of 50 percent in Belgium, France, Finland, Luxembourg, New Zealand, Norway, Sweden, Switzerland, the United Kingdom, and West Germany. In the Netherlands, the bottom decile is over 60 percent of the median.

At the top, the United States does not stand out to the same extent. The top decile is 209 percent of the median in Ireland, as compared to 206 percent in the United States, and it is close to it in Italy and the United Kingdom. As far as P_{95} is concerned, Ireland is now the highest at 252.2 percent, and the values for Australia, France, Italy, Luxembourg, Switzerland, the United Kingdom, and the United States all lie in the range of 225 percent to 250 percent. The distribution at the top is noticeably less unequal in Austria, Belgium, Finland, Norway, and Sweden, with Germany and The Netherlands having an intermediate position. It appears from these estimates that there is a grouping of Northern European countries with distinctly less inequality in disposable equivalent income: Finland, Sweden, Norway, Belgium, Luxembourg, the Netherlands, West Germany and Austria, all with decile ratios of 3.00 or less.[9]

The second two columns of Figure 1 are intended to illustrate the sensitivity of this conclusion to the method used to calculate equivalent income. If the equivalence scale is viewed as a function of household size, S: S^E, where E is a parameter varying between 0 and 1 (as in Buhmann, et al., 1988), then the per capita calculation represents one extreme. The other extreme is to make no adjustment at all ($E = 0$). The work of Coulter et al. (1992) suggests a U-shaped relation with E, with measured inequality being highest at the extremes.

Figure 1. Decile Ratios with Three Different Adjustments for Household Size

Decile Ratio	Square Root	Per Capita	No Adjustment
7.0		United States	
6.9			
6.8			
6.7			
6.6			United States
6.5			
6.4			
6.3			
6.2			
6.1			
6.0			
5.9	United States		
5.8			
5.7			
5.6			
5.5			Austria
5.4			
5.3			
5.2			
5.1			
5.0		Austria	United Kingdom
4.9		Ireland	Canada; Australia; Ireland
4.8			
4.7		Australia	Switzerland
4.6		Canada	
4.5		United Kingdom; New Zealand	Italy
4.4		Italy	
4.3		France	Norway
4.2		Switzerland	France; Sweden
4.1			
4.0	Australia; Italy; Canada		New Zealand
3.9			Germany
3.8	United Kingdom		Finland
3.7			Luxembourg
3.6		Germany	Netherlands; Belgium
3.5	France; New Zealand	Netherlands	
3.4	Switzerland		
3.3		Luxembourg	
3.2	Luxembourg		
3.1		Belgium	
3.0	Germany	Sweden	
2.9	Norway; Austria	Norway	
2.8	Netherlands; Belgium		
2.7	Sweden	Finland	
2.6	Finland		
2.5			

Source: Atkinson, Rainwater, and Smeeding, 1995, Table 4.9.

The central panel shows the ranking according to the decile ratio of per capita income. Although standard practice in Eastern Europe (see Atkinson and Micklewright, 1992), per capita distributions are rarely presented in OECD countries.[10] For all countries, except the Netherlands, the decile ratio is increased, but the difference varies across countries. The decile ratio in Sweden increases from 2.72 to 2.95, while that in the Netherlands increases from 2.8 to 3.5, taking it out of the "less unequal" group.

The third panel in Figure 1 shows that the decile ratio is usually higher on a no adjustment basis than on a per capita basis. The exceptions are France and the United States, but in these cases the no adjustment figures are higher than those with the intermediate square root (E = 0.5) scale. Again the rankings are changed to some degree, with Sweden now having the same decile ratio as France, and with Norway having a higher decile ratio than either of these two nations.[11] While the broad picture (in the first column of Figure 1 and as seen in Table 2) is not greatly changed by the use of different equivalence scales, both the level of measured inequality and the position of individual countries can be materially affected (Buhmann et al., 1988).

Lorenz Curves

A second, and more common, form of presentation is as shares of total income, which are the ingredients for the conventional Lorenz curve. Table 3 shows the cumulative shares by decile groups, where we have reverted to the E = 0.5 equivalence scale. Countries are listed in order of the decile ratio in Table 2, with the country with the lowest ratio (Finland) at the top. The most obvious omission, compared with the work of Sawyer (1976), is that of Japan. The European Community countries not covered are Denmark, Spain, Portugal, and Greece, also missing here is Austria.[12]

As is often the case, Lorenz curves are difficult to summarize as presented in Table 3. And so, the decile shares in Table 3 are used in Table 4 to test whether or not the Lorenz curves cross. A "+" in the table indicates that the Lorenz curve for the country shown in the row has Lorenz

Table 3. Summary of Income Distribution in OECD Countries, 1979-87: Cumulative Decile Shares[a]

	Year	S10	S20	S30	S40	S50	S60	S70	S80	S90	S95
Australia	1985	2.9	7.7	13.7	21.0	29.4	39.0	50.2	63.0	78.3	87.3
Belgium	1988	4.2	10.2	17.1	25.0	33.8	43.5	54.3	66.4	80.3	88.4
Canada	1987	2.8	7.8	14.1	21.5	30.1	39.8	50.7	63.3	78.4	87.5
Finland	1987	4.5	10.8	18.1	26.4	35.6	45.6	56.6	68.6	82.2	90.0
France	1984	3.0	8.3	14.6	21.8	29.9	39.1	49.5	61.6	76.3	85.5
Ireland	1987	2.5	7.1	12.6	19.3	27.1	36.3	47.0	59.6	75.1	84.7
Italy	1986	3.1	8.0	13.9	20.7	28.7	38.0	48.7	61.2	76.2	85.4
Luxembourg	1985	4.3	10.2	17.1	24.8	33.5	43.1	53.9	66.0	80.4	88.8
New Zealand	1988	3.2	8.5	14.7	21.9	30.2	39.9	51.0	63.9	79.1	n.a.
Norway	1986	3.9	9.8	16.9	24.9	33.9	43.7	54.6	66.7	80.6	88.7
Sweden	1987	3.3	9.5	16.9	25.3	34.6	44.8	55.9	68.2	81.9	89.7
Switzerland	1982	2.8	8.0	14.1	21.0	29.0	37.8	47.7	58.9	72.5	81.3
The Netherlands	1987	4.1	10.1	16.9	24.5	33.0	42.5	53.2	65.3	79.4	87.8
West Germany	1984	4.0	9.8	16.6	24.2	32.9	42.5	53.2	65.3	79.4	87.8
United Kingdom	1986	2.5	7.5	13.5	20.5	28.7	38.2	49.1	61.8	77.1	86.4
United States	1986	1.9	5.7	11.2	18.0	26.2	35.7	46.9	60.2	76.3	86.2

[a]Excludes Austria, see endnote 12 for explanation.

Source: Atkinson, Rainwater, and Smeeding, 1995, Table 4.3.

Table 4. Lorenz Comparisons[a,b]
(based on decile points)

	BE	CAN	FR	GE	IR	IT	LUX	NO	SWE	SWI	UK	US	FI	NL	NZ
Australia	-			-	+		-	-	-		+	+	-	-	
Belgium		+	+	+	+	+				+	+	+	-	+	+
Canada				-	+		-	-	-		+	+	-	-	
France				-	+		-	-	-	+		+	-	-	-
Germany					+	+				+	+	+	-		+
Ireland						-	-	-	-		-		-	-	-
Italy							-	-	-				-	-	-
Luxembourg										+	+	+	-		+
Norway										+	+	+	-		+
Sweden										+	+	+	-		+
Switzerland													-	-	-
United Kingdom												+	-	-	-
United States													-	-	-
Finland														+	+
The Netherlands															+

[a]The grid should be read as follows: "+" indicates that for the country shown in the row we have Lorenz superiority over the country shown in the relevant column; "-" indicates Lorenz inferiority.

[b]The comparisons do not include the data for New Zealand, which were not available at the time these calculations were made. It may be noted from Table 3 that the distribution for New Zealand is Lorenz superior to those for Australia, Canada, France, Ireland, Italy, Switzerland, United Kingdom, and the United States. Austria is not included as explained in endnote 12.

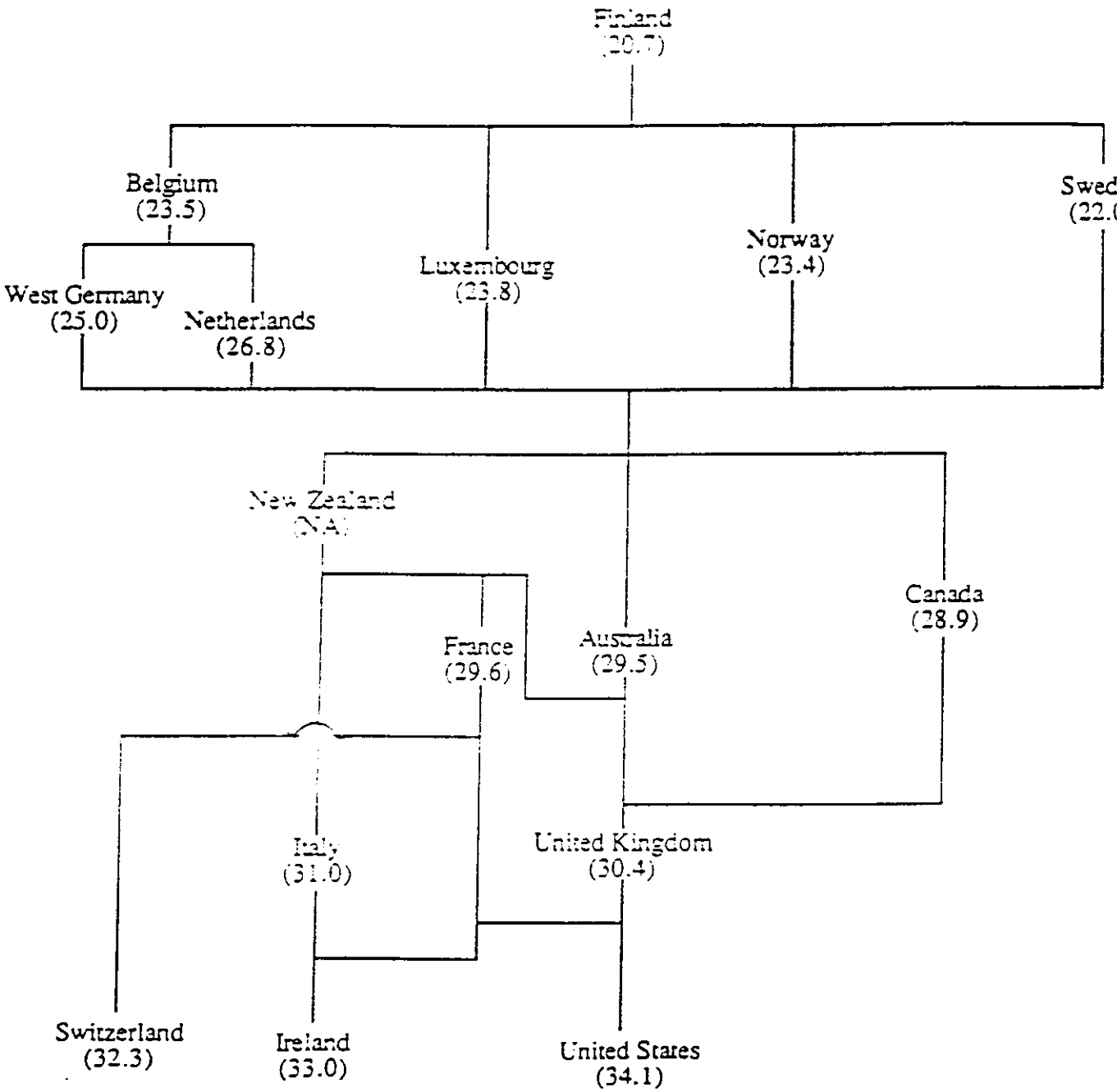
Source: Atkinson, Rainwater, and Smeeding, 1995, Figure 4.3.

superiority lies everywhere outside that for the country shown on the vertical axis; a "-" indicates that the reverse is true. Only cases where differences exceed 1 percentage point for at least one cumulative decile group are so marked. A blank indicates that the Lorenz curves cross or differ everywhere by 1 percentage point or less. Of the 120 possible pair-wise comparisons in the 16 countries, there are 89 cases where one Lorenz curve dominates the other.[13]

The partial ordering resulting from the Lorenz comparisons (taking any difference as significant) are summarized in Figure 2 in terms of a *Hasse diagram.* The countries toward the top of the diagram have lower levels of inequality; where a line can be traced downward from country A to country B the line implies that the Lorenz curve for country A is superior to that of country B (with the differences at some point exceeding 1 percentage point). Finland dominates all countries, having lower inequality in 1987 than Sweden, Norway, Belgium, or Luxembourg. All four of these are 1.0 percentage point or less apart or else cannot be unambiguously compared. Belgium's Lorenz curve cannot be differentiated from Sweden, but Belgium has a Lorenz curve which falls everywhere inside those for the Netherlands and West Germany. Luxembourg, Norway, and Sweden do not meet this criteria with respect to West Germany or the Netherlands. Thus, the shape of the drawing and lines at the top of Figure 2.

Australia, Canada, France and New Zealand form a group in the middle, with New Zealand dominating Italy and France, but not Australia or Canada. Australia and Canada dominate the United Kingdom cannot be differentiated from France or Italy due to intersecting Lorenz curves. The United Kingdom and France, but not Italy, dominate the United States. And France dominates Switzerland, with the United States, Ireland, and Switzerland undistinguishable at the bottom. Otherwise, the ranking corresponds largely with that found using the decile ratio, as is indicated by the preponderance of "+" in Table 4 for these three countries.

Figure 2
Relative Inequality in Different Nations
Lorenz Dominance (and Ginis[a]) Around 1985[b]



a Numbers in parentheses are Gini coefficients
b Based on comparisons of decile shares of all pairs of equivalent income distributions. Excludes New Zealand Gini due to unavailability of micro-data and Austria as explained in endnote 12.
Source: Atkinson, Rainwater and Smeeding (1995), Table 4.4 and Figure 4.4

Taken as a whole, there appears to be a clear grouping of nations here, with Scandinavia and Northern Europe at the top and with the United States and Ireland at the bottom. In the middle come two groups the Commonwealth countries and Southern Europe. These cannot be ranked, since the shares of both the lower and the higher deciles appear to be larger in Southern Europe.

Conclusions

This review for different OECD countries is only partial, but it suggests that certain groupings may be made. The Gini coefficients are shown in brackets in Figure 2. These suggest the following broad groupings:[14,15]

Scandinavia (Finland, Norway, Sweden), Belgium and Luxembourg	20 to 24 percent
North Central Europe (Germany, The Netherlands)	25 to 27 percent
Southern Europe (France, Italy); Commonwealth (United Kingdom, Canada, Australia)	29 to 31 percent
Switzerland, the United States, and Ireland	32 to 34 percent

IV. RECENT TRENDS IN INEQUALITY

There is considerable interest in how the distribution of income has changed over time, particularly over the 1980s.[16] For 11 of the countries discussed in the previous section we have information for two dates: Australia, Belgium, Canada, Finland, France, the Netherlands, New Zealand, Norway, Sweden, the United Kingdom, and the United States. These cover a range of countries, both with regard to their intrinsic features and with regard to what we have seen about the degree of income inequality. In terms of the Gini coefficients in Figure 2, they rank (in ascending order) 1, 2, 3, 4, 7, 8, 9, 10, 11, and 15 out of 15. The results need to be interpreted with care in view of the differing macroeconomic climate at different dates and in different countries.

But we can supplement our LIS-based comparisons with additional evidence drawn from internally consistent national studies of the trend in inequality in various nations, including countries for which LIS has only an observation (e.g., West Germany, Ireland, Italy) and in Japan, Portugal, and Spain.

Percentiles of the Distribution

Percentile changes are shown in Table 5. In considering the changes over time, little significance can be attached to small changes, such as the rise in the bottom decile in the United Kingdom from 50.9 percent of the median to 51.1 percent. On the other hand, the top decile in the United Kingdom moved significantly in the opposite direction, and the decile ratio rose from 3.53 to 3.79.

The decile ratio increased in Finland, the Netherlands, Norway, Sweden, the United Kingdom, and the United States. It remained essentially unchanged in Australia, Belgium, France and Canada, and fell slightly in New Zealand. In broad terms, this summarizes the picture that will emerge throughout this section. The majority of countries covered here show a rise in inequality, particularly the United States and the United Kingdom, but this was not universal.[17] There is diversity of experience across countries for the period over which we have data. The pattern of change has its distinctive features in each of the 11 countries. Even among those where inequality increased, we find differences. If, for instance, we look at the top decile relative to the median, we find little change in the Netherlands and Sweden, where it is the decline in the relative position of the bottom groups that is responsible for the rise in inequality. On the other hand, the rise in the upper percentiles (P_{95}) is marked in the United Kingdom, the United States, and in France. In terms of frequencies, in the United States there has been between 1979 and 1986 a large fall (5 percentage points) in the range from 80 percent to 150 percent of the median, with a rise of 2 percentage points below 50 percent of the median and a rise of 3.5 points above 200 percent of the median, thus

Table 5. Trend Over Time in Income Distribution in Ten OECD Countries, 1979-87: Percentiles of Median

		P_{10}	P_{25}	P_{75}	P_{90}	P_{95}	P_{90}/P_{10}
Australia	1981	46.0	68.3	141.9	186.3	216.4	4.05
	1985	46.5	66.4	142.1	186.5	218.5	4.01
Belgium	1985	59.3	74.7	128.7	162.5	187.2	2.74
	1988	58.5	74.5	128.8	163.2	190.8	2.79
Canada	1981	44.9	69.3	138.3	182.7	211.5	4.07
	1987	45.8	68.5	137.5	184.2	218.0	4.02
Finland	1987	58.9	76.5	125.5	152.7	173.6	2.59
	1990	57.0	76.4	126.2	156.2	178.5	2.74
France	1979	53.6	72.5	138.4	186.5	232.3	3.48
	1984	55.4	72.1	139.7	192.8	233.5	3.48
The Netherlands	1983	64.8	77.2	135.5	176.1	208.1	2.72
	1987	61.5	75.7	135.0	175.0	206.4	2.85
New Zealand	1983/84	53.2			189.6		3.56
	1987/88	53.6			186.6		3.48
Norway	1979	57.0	76.7	126.6	158.1	181.9	2.77
	1986	55.3	76.0	128.7	162.2	187.3	2.93
Sweden	1981	61.5	79.2	124.4	150.9	167.0	2.45
	1987	55.6	75.6	125.1	151.5	170.4	2.72
United Kingdom	1979	50.9	70.4	138.5	179.7	208.9	3.53
	1986	51.1	67.6	144.6	194.1	232.1	3.79
United States	1979	38.1	64.5	141.8	187.6	221.9	4.93
	1986	34.7	61.7	149.6	206.1	247.3	5.94

Sources: Atkinson, Rainwater, and Smeeding, 1995, Table 4.5.

corroborating United States evidence on the emptying of the middle class (e.g., Danziger and Gottschalk, 1993; Duncan, Smeeding, and Rogers, 1994).

Lorenz Curves

Changes in the Lorenz curves, shown in Table 6, are similar to those already described. In 8 of the 11 countries, the maximum shift in the Lorenz curve is less than 1 percentage point. In five of these eight countries, the Lorenz curves shifted outward; in the remaining three cases (Australia, Canada, France) the curves cross. In the three countries where inequality unambiguously increased (Sweden, United Kingdom, United States), the Lorenz curves shift outward by more than 1 percentage point, from the third decile upward in the case of the United States, and from the second decile upward in the United Kingdom. In Sweden the significant difference is from the second decile to the seventh.

Changes over time in the summary measures are not shown (see Atkinson, Rainwater, and Smeeding, 1995, Table 4.8). However, they confirm and quantify the direction of change already observed. In Canada and France there was virtually no change, with the Gini coefficient remaining around 29 percent. Due to differences in observation periods across LIS country datasets during the 1980s, varying from three years (Finland, Belgium) to seven years (United Kingdom, United States), we express changes in the Gini coefficient in terms of percentage points per year. In these terms, the Gini increased by less than .2 points per year in Australia and Norway, and by about .25 points per year in Belgium and Finland. In Sweden the Gini rose by .35 points per year, while the increase in the Netherlands, United Kingdom, and United States were just under .5 points per year. By historic standards, these last four represent noteworthy increases.

Conclusions from National Studies

In addition to the LIS-based work, we examined over 25 national studies using similar data to see if our estimates of the level and trend in inequality correspond to theirs. In general, the results

Table 6. Trend Over Time in Income Distribution: Cumulative Decile Shares of Total Income

		S10	S20	S30	S40	S50	S60	S70	S80	S90	S95
Australia	1981	2.8	7.7	13.9	21.3	29.8	39.6	50.7	63.7	79.0	88.1
	1985	2.9	7.7	13.7	21.0	29.4	39.0	50.2	63.0	78.3	87.3
Belgium	1985	4.2	10.3	17.3	25.1	34.0	43.9	54.8	66.9	80.9	89.1
	1988	4.2	10.2	17.1	25.0	33.8	43.5	54.3	66.4	80.3	88.4
Canada	1981	2.7	7.6	14.0	21.5	30.1	39.9	50.9	63.7	78.8	87.8
	1987	2.8	7.8	14.1	21.5	30.1	39.8	50.7	63.3	78.4	87.5
Finland	1987	4.5	10.8	18.1	26.4	35.6	45.6	56.6	68.6	82.2	90.0
	1990	4.3	10.5	17.7	26.0	35.1	45.1	56.0	68.1	81.8	89.7
France	1979	3.1	8.4	14.6	21.9	30.0	39.2	49.7	61.6	76.0	84.9
	1984	3.0	8.3	14.6	21.8	29.9	39.1	49.5	61.6	76.3	85.5
New Zealand	1984	3.3	8.7	14.9	22.2	30.5	40.1	51.2	64.1	79.2	n.a.
	1988	3.2	8.5	14.7	21.9	30.2	39.9	51.0	63.9	79.1	n.a.
Norway	1979	4.1	10.2	17.4	25.6	34.6	44.4	55.2	67.2	80.9	88.9
	1986	3.9	9.8	16.9	24.9	33.9	43.7	54.6	66.7	80.6	88.7
The Netherlands	1983	4.4	10.6	17.4	25.0	33.4	42.8	53.3	65.3	79.4	87.8
	1987	4.1	10.1	16.9	24.5	33.0	42.5	53.2	65.3	79.4	87.8
Sweden	1981	4.0	10.6	18.3	26.7	36.0	46.1	57.2	69.2	82.9	90.6
	1987	3.3	9.5	16.9	25.3	34.6	44.8	55.9	68.2	81.9	89.7
United Kingdom	1979	3.5	8.7	15.1	22.6	31.1	40.8	51.8	64.4	79.2	88.0
	1986	2.5	7.5	13.5	20.5	28.7	38.2	49.1	61.8	77.1	86.4
United States	1979	2.1	6.4	12.4	19.7	28.4	38.3	49.6	62.7	78.3	87.6
	1986	1.9	5.7	11.2	18.0	26.2	35.7	46.9	60.2	76.3	86.2

Sources: Atkinson, Rainwater, and Smeeding, 1995, Table 4.7.

are consistent with those reported above, the differences being explicable largely by differences in definitions.

We also wanted to compare our findings from the LIS dataset with those from other types of data. In two cases (Finland and France) we compared the LIS data and the results from household budget surveys. In the Finnish case the differences were reported to be small; in the case of France the comparison suggested that there might be a difference of some 1+ percentage points in the proportion estimated to be below 50 percent of the median. In two cases (United Kingdom and West Germany), a comparison was made with synthetic estimates drawing on other data, such as tax records. The differences here were large, the Gini coefficients in the synthetic estimates being 6-8 percentage points larger, although part of this could be explained by differences in definitions and applications. One could therefore arrive at much higher figures for recorded inequality by changing to an alternative source of data or strategy for measurement (choice of income definition, inequality measure and software used to generate that measure, survey, weighting procedure, equivalence scale, etc.).

To extend the range of countries, we brought in evidence for Austria, Japan, Portugal, and Spain (some of which we allude to earlier). In the former two cases, the coverage of the data sources did not allow comparison with estimates for other countries (Japan) or permitted only limited comparisons (Austria), so that while the results for Austria and Japan are of considerable interest in their own right, firm conclusions cannot be drawn about the relative degree of inequality. The data for Portugal and Spain are more comparable in form and, as indicated above, the estimates suggest that the degree of inequality is in broad terms between that in Italy and Ireland, and probably closer to the former.

Lastly, we sought to more fully develop our analysis of trends over time. The national studies provide typically a longer run of years, and therefore allow us to place in temporal context

the two years considered in Section III above. The findings are summarized in Table 7, discussed below.

Conclusion

The LIS results indicate that for the nations which we can study for two periods, inequality rose in the majority of the nations studied and particularly in the United States, the United Kingdom, and Australia. The results in other nations were more mixed.

Our examination of other nations is summarized in Table 7. The results for the LIS nations for which we have two periods of data are corroborated by the summary comments in Table 7. We can further add Japan and the Netherlands to the list of nations experiencing rising income inequality. Several nations appear to have little trend or conflicting evidence, albeit for different periods of time with most of these periods in the earlier 1980s (Austria, Canada, Finland, France, Italy, Ireland, Norway). At least two nations (Italy, Portugal) seem to have experienced modest declines in inequality. Of the 16 nations shown, three (Belgium, the Netherlands, West Germany) show a "modest" rise in inequality, something on the order of a 1 to 2 percentage point increase in the Gini. Five countries (Australia, Japan, Sweden, the United Kingdom and the United States) show larger increases in income inequality during the 1980s. Thus, the overall evidence, particularly for nations where we could observe the entire 1980s period, tends toward increasing inequality, but it is somewhat mixed and certainly not universal.

V. ANALYSES OF COUNTRY DIFFERENCES: PRIMARY AND MARKET INCOMES, TAXES AND TRANSFERS

The accepted approach to analysis of income inequality since the 1960s is to begin with primary income (earnings) and market income inequality and then to analyze the direct effects of government taxes and transfers on market driven income inequality. This is the approach that we

Table 7. Summary of National and Academic Studies of Income Inequality in OECD Countries[a]

Country (Period)	Trend in Income Inequality Over the 1980s
Australia (1981/82-1989/90)	rise in inequality
Austria (1981-1987)	little apparent trend (in earnings distribution)
Belgium (1985-1992)	modest rise
Canada (1979-1983)	little change in the early 1980s
Finland (1981-1985)	little change in the early 1980s
France (1979-1984)	little change in the early 1980s
Ireland (1980-1987)	little change in the early 1980s
Italy (1980-1991)	downward trend with cyclical behavior
Japan (1980-1991)	rise in inequality
The Netherlands (1981-1989)	little change in first half of 1980s, rise in inequality in second half
Norway (1982-1990)	little apparent trend
Portugal (1980-1989)	modest fall in inequality
Sweden (1980-1990)	rise in inequality
United Kingdom (1980-1990)	definite rise in inequality
United States(1980-1991)	rise in inequality
West Germany (1983-1990)	modest rise in inequality

[a]See source for a complete listing of studies and sources consulted.
Source: Atkinson, Rainwater, and Smeeding, 1995, Chapter 5.

follow in our report (Atkinson, Rainwater, Smeeding, 1995, chapters 6 and 7). We briefly review the results of each of these steps in the exercise.

Primary Income and Market Income Inequality

Primary income (or earnings) is the traditional foundation of family incomes, meeting the consumption needs of workers and providing the bulk of the tax base that supports redistributive social welfare programs. Market income adds property income (interest, rents, and dividends received on a regular basis) and transfers intermediated by other than governments: occupational pensions from former employers, regular interhousehold cash transfers and court-ordered payments in the form of child support and alimony. Our analyses here concentrated only on households with non-zero levels of primary or market income.

Because of differences in labor force behavior (school leaving, unemployment, disability) and differences in type and receipt of occupational pensions, child support and property income, the percentage of the entire population with non-zero primary and market incomes in each country varies substantially across nations (Table 8). Households with non-zero primary income regardless of age average 82 percent, with the United Kingdom and the Netherlands at about 73 percent and Canada, France, and the United States at 87 to 89 percent. Households with non-zero market incomes jump on average to 92 percent of all units, with Belgium at 79 percent, the Netherlands at 83 percent and Sweden and Switzerland at 98 percent coverage. While the overwhelming majority of households have at least some earnings, almost 20 percent have no earner. In fact, on average only 63 percent of all households headed by prime age (25 to 54) adults have non-zero earnings for some member of the household unit. As little as 57 to 59 percent fit this definition in Sweden and the United Kingdom.

Receipt of primary (or market) incomes does not always translate into dependence on such income sources; the percent of households with market incomes being half or more of disposable

Table 8. Households with Nonzero Primary and Market Income as a Percent of all Households

Country	Nonzero Primary Income, Prime Age Households[a]	Nonzero Primary Income, All Households	Nonzero Market Income, All Households
Australia, 1987	65.4	81.4	93.8
Belgium, 1988	69.7	76.8	78.9
Canada, 1987	68.1	87.7	95.6
France, 1984	67.2	84.0	90.6
Germany, 1984	62.6	81.1	94.7
Ireland, 1987	60.2	81.2	88.4
Italy, 1986	63.1	83.3	88.9
Luxembourg, 1985	67.9	82.3	85.5
Netherlands, 1987	63.0	74.2	85.5
Norway, 1979	61.7	87.9	94.6
Sweden, 1987	58.6	83.3	97.6
Switzerland, 1982	65.1	85.2	98.3
United Kingdom, 1987	56.7	72.5	90.6
United States, 1986	65.6	85.9	94.6
Overall Average	**63.9**	**81.9**	**91.3**

[a]Prime age households are headed by a person aged 25 to 54.

Source: Atkinson, Rainwater, and Smeeding, 1995, Table 6.1.

income is smaller still (Table 9). On average, little more than 60 percent of all households are headed by a prime age adult with half or more of their income from earnings, with fractions near half (53 percent) of all households in Ireland, Sweden, and the United Kingdom. More than 20 percent of all households receive less than half of their income from market sources; more than 25 percent do not rely on earnings as their major income source. Clearly a substantial fraction of all households now depend on government transfers for all, or at least a majority share, of their household incomes.

Among households with primary and market incomes, we find patterns of income distribution that are similar to those found for disposable income.[18] Ireland and the United States have the most inequality, while Finland, the Netherlands, and Germany have the least. The only major changes are for the United Kingdom and Sweden, which have a relatively higher ranking in earned income inequality than in disposable income inequality. In Sweden, this ranking is due to the high fraction of part-time workers, particularly women. The trend is toward greater inequality in market incomes in most nations, and particularly in the United Kingdom, United States, Canada, and Sweden, corroborating earlier LIS studies by Coder et al. (1992), Gottschalk (1993), and Gottschalk and Joyce (1992). Australia, France, and Germany show no trend over the two periods for which we have evidence. Market incomes show much the same pattern and trend, but with an even greater trend toward inequality, with one exception (Belgium).

In fact, it is very difficult to pinpoint the exact source of these patterns both in level and change in primary and market income inequality. Examination of the composition of earnings (husband, wife, other adult, self-employment income) among the bottom half and the top 10 percent of primary income recipients indicates that while husbands' earnings dominate, with 75 percent of total primary income among the bottom 50 percent of households, they are only about 55 percent at the top, with wives' earnings (18 percent) and self-employment income (17.4 percent) assuming a large share (Figure 3). Moreover, there is a wide variance across nations. For instance, self-

Table 9. Households with Primary and Market Income Greater than Half of Gross Income as a Percent of all Households

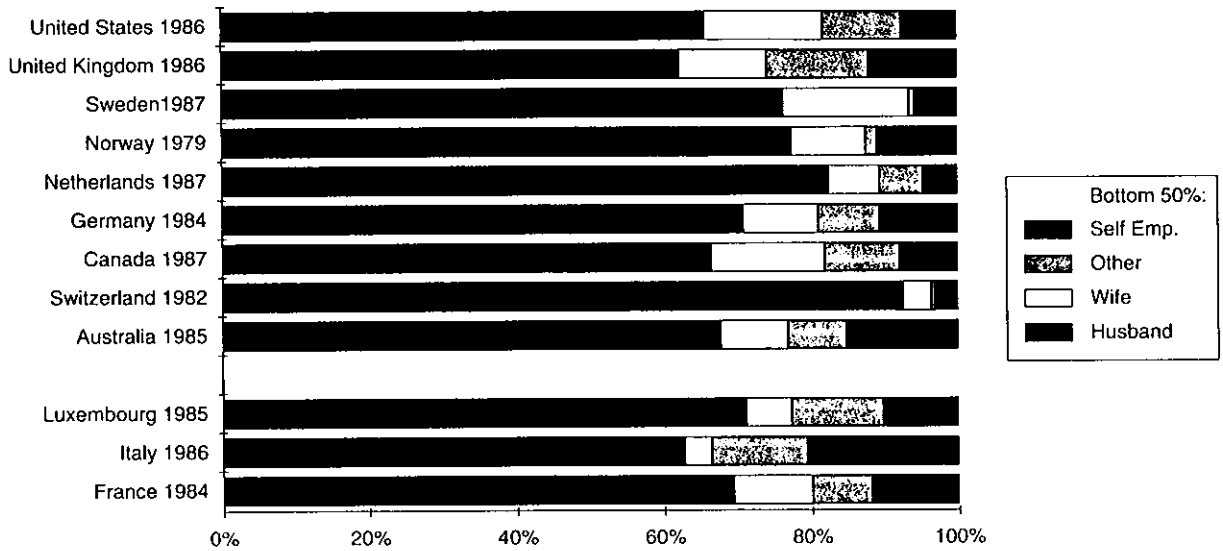
Country	Primary Income, Prime Age Households[a]	Primary Income All Households	Market Income All Households
Australia, 1985	62.2	75.9	83.8
Belgium, 1988	66.1	70.2	72.3
Canada, 1987	64.6	80.2	87.1
France, 1984	62.4	74.6	77.6
Germany, 1984	60.7	76.5	78.7
Ireland, 1987	52.8	69.3	73.0
Italy, 1986	61.0	76.5	77.9
Luxembourg, 1985	66.3	77.7	79.5
Netherlands, 1987	61.2	70.9	76.1
Norway, 1979	59.5	80.0	82.6
Sweden, 1987	53.2	69.4	72.0
Switzerland, 1982	64.0	81.1	88.1
United Kingdom, 1987	53.3	65.7	73.3
United States, 1986	62.2	78.3	86.2
Overall Average	**60.7**	**74.7**	**79.2**

[a]Prime age households are headed by a person aged 25 to 54.

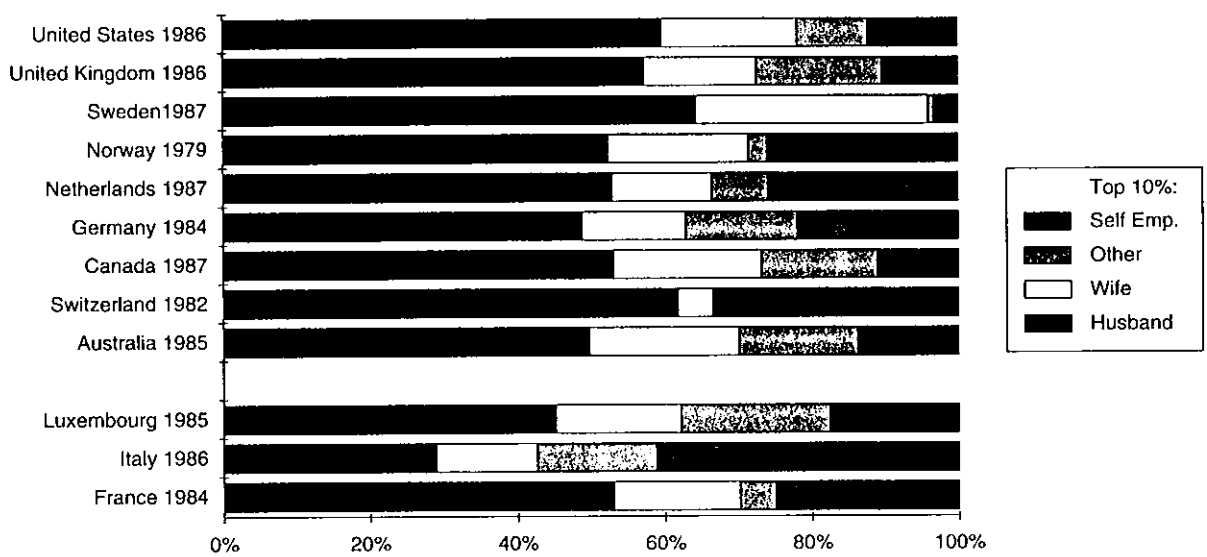
Source: Atkinson, Rainwater, and Smeeding, 1995, Table 6.0.

Figure 3

Shares of Primary Income in the Mid-1980's for All Households:
Husbands, Wives, Other Earnings and Self-Employment Income[1]



Average for the first nine countries: Husband: 74% Wives: 11.5% Other: 6.4% Self-Employed: 8.2%



Average for the first nine countries: Husband: 55.4% Wives: 17.7% Other: 9.5% Self-Employed: 17.4%

Source: Atkinson, Rainwater and Smeeding, 1995, Table 6.9

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[1]Households with only one earner count earnings for heads as husbands.

employment income makes up 40 percent of the primary incomes in the top decile in Italy but less than 5 percent in Sweden. There is no one primary explanation that fits all cases—a combination of factors is likely to be at work in most countries. Women's labor force participation and earnings are rising in all countries. Early retirement, part-time work trends, increasing returns to school and other human capital variables, and cyclical and structural economic change all play a role in explaining these patterns, with relatively greater or lesser importance depending on the country being examined. While we feel that the trend is clearly toward greater inequality, sorting these factors out must remain for future analysis.

Taxes and Transfers

Finally, we consider the distribution of taxes and transfers, and the relative importance of each as components of disposable income. Our results are necessarily approximate since information of taxes and transfers in the LIS datasets are not exactly comparable from country to country. For example, in France unemployment payments are included in salaries; in some other countries all (Switzerland) or part of child allowance is included in salaries. In some countries occupational pensions are included with public pensions—in any case the dividing line between public and "private" pensions is often ambiguous and the mix of taxes among direct (which we count) and indirect (which we do not count) varies greatly by country. We accomplished the best description possible with existing data (Atkinson, Rainwater, and Smeeding, 1995, Chapter 7).

Our analysis examined the role of tax and transfers by quintiles of equivalent income, and their role at different relative income levels measured in terms of ratios to median equivalent income, in order to focus on issues of poverty and low income. Because transfer payments for retirement are such a large part of total transfers, we examined separately the role of transfers to households with heads under age 60 and those with heads aged 60 and over. What follows is only a brief overview of part of this chapter.

Taxes as measured in LIS include income tax and employee social insurance contributions. There are no LIS income tax data for Italy and Luxembourg, so no results are presented for these countries.[19] Overall, taxes amounted to around one-fifth of aggregate gross income in low tax countries (Canada). High tax countries paid 30 percent or more of gross income in direct taxes. To compare the average level of direct taxes paid in different countries we calculated equivalized taxes as a percent of median equivalent income. Direct taxes were progressively distributed in all countries, particularly in Sweden and the Netherlands, but also in the United States, Canada, and the United Kingdom.

We analyzed transfers as they affect low incomes for those households headed by persons aged 60 and over and those under age 60 to separate the working age population from those in retirement for 15 nations. Transfers are a principal source of income for the latter (42.3 percent of median equivalent income) while much smaller (16.9 percent) for those of working age (Table 10, Panel B). The proportion of persons who have low income—defined as less than half of median adjusted income (Table 10, Panel A) showed a range of from 4.7 to 4.9 percent (Belgium and the Netherlands) in the low income category to 18.4 percent (the United States), with the average being 8.8 percent. Persons in households with a head aged 60 and over were more likely to be poor (11.3 percent) than were persons in younger households (8.1 percent), but these differences varied widely across countries (e.g., compare Luxembourg, Norway, or Australia to Ireland, Sweden, or the United Kingdom). The United States had the highest low income rate for both groups.

In order to determine to what extent differences in these rates are related to the size of transfers, we again examined transfers received by working age persons with below median equivalent incomes and those in the retirement years separately (Figure 4). For those of working age there is no clear relation between rates of low or modest income and the level of transfers. Figure 4 (bottom) charts the relation of transfers to low-income rates for the nonelderly. Three

Table 10. Low Income and Average Transfer Rates in OECD Countries

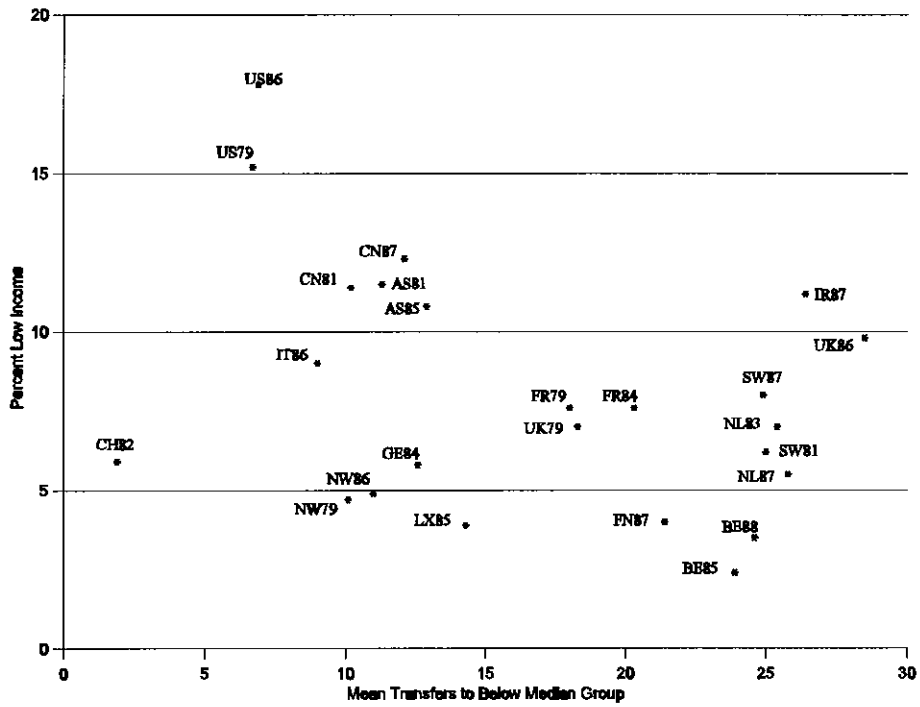
	A. Percent Low Income[a] By Age Group			B. Average Transfers as a Percent of Median Equivalent Income for Persons with Low Income		
	Total	**Under Age 60**	**Age 60 and Over**	**Total**	**Under Age 60**	**Age 60 and Over**
Australia, 1985	12.3	10.8	18.7	16.2	12.9	30.2
Belgium, 1988	4.7	3.5	8.9	31.9	24.6	57.5
Switzerland, 1982	8.0	5.9	15.7	9.4	1.9	29.9
Canada, 1987	12.2	12.3	11.5	15.9	12.1	30.3
Finland, 1987	5.0	4.0	9.8	32.2	21.4	65.3
France, 1984	7.5	7.6	7.2	25.3	20.3	41.9
Germany, 1984	6.5	5.8	8.5	20.9	12.6	43.3
Ireland, 1987	12.3	13.2	9.2	29.7	28.3	34.7
Italy, 1986	10.5	9.0	15.5	17.5	9.0	41.1
Luxembourg, 1985	5.4	3.9	11.7	22.1	14.3	50.6
The Netherlands, 1987	4.9	5.5	2.5	30.9	25.8	51.2
Norway, 1986	7.3	4.7	15.6	18.3	10.1	43.6
Sweden, 1987	7.6	8.0	6.5	39.0	24.9	65.4
United Kingdom, 1986	9.1	9.8	6.7	31.5	28.5	38.4
United States, 1986	18.4	17.8	20.7	10.8	6.9	26.0
Average	**8.8**	**8.1**	**11.3**	**23.5**	**16.9**	**44.3**

[a]Low Income is percent of persons with less than half median adjusted disposable income.

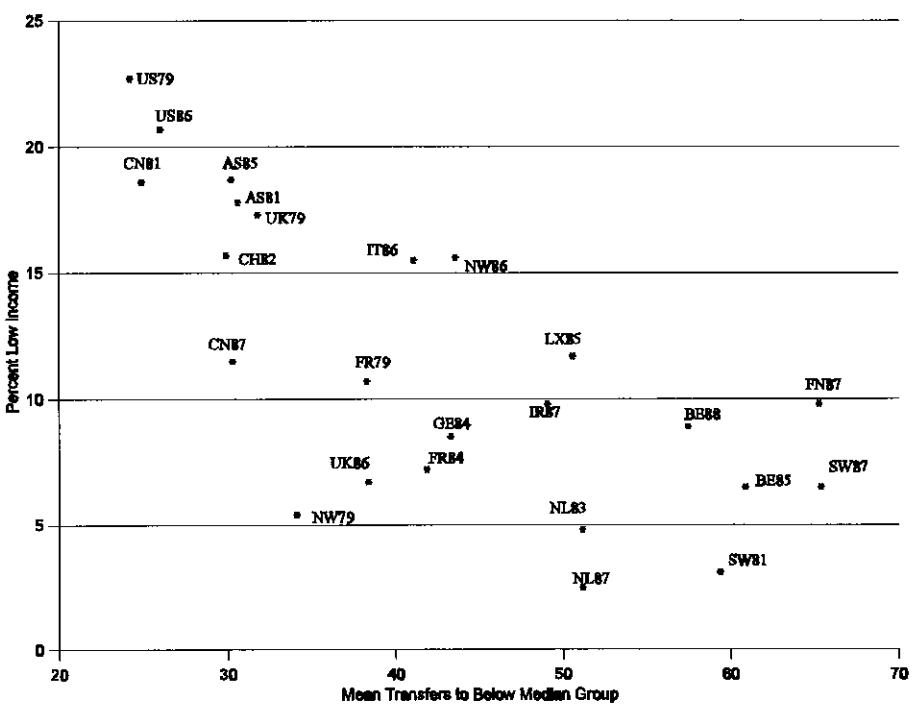
Source: Atkinson, Rainwater, and Smeeding, 1995, Tables 7.2 and 7.7.

Figure 4

Low Income Rate of the Nonelderly by Transfers as a percent of Median Equivalent Income.



Low Income Rate of the Elderly by Mean Transfers as a Percent of Median Equivalent Income



Source: Atkinson, Rainwater and Smeeding, 1995, Fig. 7.1 and 7.2.

countries with high low-income rates—Australia, Canada, and the United States—transfer 13 percent or less of median equivalent income to persons with below median incomes, while one country with a similar low-income rate (Ireland) transfers 28 percent of its income to this group. There is a wide range in transfer ratio that bears very little relation to low-income rates. For example, both Ireland and the Netherlands have transfer ratios around 30 percent, yet Ireland's low-income rate is higher than Australia's and Canada's, while the Netherlands low-income rate is quite low. Four countries have very low working-age low-income rates, and below average transfer ratios—Germany, Luxembourg, Norway, and Switzerland. These rates are necessarily the result of low work income inequality. Belgium, Finland, France, the Netherlands, and Sweden also have low rates, but much higher transfer ratios. Here it is the combined effect of earnings and transfers which produces the low rates. For those of working age we conclude that most of the explanation of differences in low-income rates must come from differences in the inequality of work income, or perhaps more exactly, in the different ways of combining transfers and work income in different countries—the issue of income packaging.

Since transfers are the principal source of income for older persons it is to be expected that the level of transfers to the below median group is highly related to the low-income rate (Figure 4, top). Countries with relatively low average transfers to older persons have high low-income rates—the United States, Australia, Switzerland, and Canada. At the other extreme we find the countries with very low rates and high levels of transfers—Sweden, the Netherlands, Belgium, France. Italy, Norway, and Luxembourg have more low-income elderly than would be expected given the high levels of transfers to this group.

Conclusions

The proportion of households with non-zero primary incomes varies considerably across LIS countries, with prime-age households with earnings averaging only about 63 percent of all

households in each nation. While larger shares of all age households have some income from earnings (82 percent) or from market incomes, including private and employer mediated transfers (92 percent), a large fraction of households in every country rely heavily on nonmarket income sources, particularly government income transfer payments.

In most countries there seems to be a trend toward increasing inequality of primary and market incomes over the 1980s, much more than was apparent in similar comparisons of after-tax-and-transfer disposable incomes in these same nations. These findings are consistent with other LIS-based studies (e.g., Smeeding and Coder, 1993). We also investigated the role of the wage and salary income of different family members, and the role of self-employment, in total primary income for the lower half of the distribution, and for the upper decile. The primary income sources of the latter are generally much more heterogeneous, with self-employment income and wives' earnings playing a more important role.

We also considered the role of direct taxes, and government transfers on income distribution. While patterns of direct tax payment were consistent with prior knowledge and accepted wisdom, transfer payments were not so straightforward. The results show marked divergences across countries not only in the level of transfers but also in the degree to which transfers are targeted to the lower quintiles.

To focus on the impact on low-income groups, only those with below median income were considered. As expected, government transfers are the major source of income for older persons in many, but not all, countries. They play less of a role for households with younger heads, but here too the range is wide, with transfers making up a quarter of income in some countries and well under 10 percent in some others.

The relationship between the pattern of transfers and the share of the population who are low-income was not particularly clear among those with heads under age 60. Here the role of

earnings seems dominant, but other forms of social income—child allowances, unemployment and disability benefits, etc.—are also important in determining the family income package (Rainwater, 1993). As expected, there is a strong relation between average transfers to below median older persons and the low-income rate among the aged.

VI. SUMMARY, CONCLUSIONS, AND FUTURE RESEARCH

This paper has reviewed various facets of the distribution of income and its components using the micro-data available in the Luxembourg Income Study and, where LIS data have not been available, special tabulations prepared from national survey data. Not all OECD countries have been covered because in some countries adequate data are not available or national authorities have not been able to make the tabulations required.

We have reviewed issues of comparability in the LIS datasets and have considered particularly the definitions of income used in different surveys, and of the component sources of total income. Where studies comparing aggregate income statistics with survey results for the national surveys used in LIS are available, we have discussed the extent to which surveys capture total aggregate income in the country. The reader's understanding of the strengths and weakness of the national datasets is important for a proper assessment of the significance of the results reported in the substantive sections of this paper.

Our results for the subcomponents of disposable income—primary and market incomes, taxes and transfers—were reviewed. They showed considerable heterogeneity across countries. These patterns reveal that not only earnings but also the proportion of the population with primary income, and the level and distribution of transfers to those without work income, may be important in explaining how the disposable income distribution is calculated (or derived). A recent paper

(Atkinson, 1993) indicates that a decomposition of inequality over time for the United Kingdom suggests that complete explanations of the level and trend in disposable income inequality depend on both the time period being analyzed (because different explanations are required for different periods), and on the determination of transfer payments which affect both the level and distribution of income among those without work income.

Breakdown of the Kuznets Hypothesis

The evidence presented above suggests that there is considerable diversity of experience among OECD countries. A number of countries have exhibited a significant rise in income inequality over the 1980s, but others have shown little change, and in a few inequality has declined. Nor is there any apparent relation to the groupings identified by their initial income inequality reading. Inequality has increased both in the United States, near the bottom of the rankings even before the increase, and in Sweden, still near the top during the 1980s.

We can no longer assume that all OECD countries are comfortably on the downward part of the Kuznets curve, with inequality falling over time. We suspect that Kuznets himself would scarcely have been surprised by the finding that the inverse-U shape no longer applies, since he referred frequently to the balancing of conflicting effects on income distribution. Changes in income distribution are the result of several forces—economic, demographic and policy-related—which may operate in different directions. As the balance of these forces varies, we may expect the resulting trend in inequality to change direction. Since alternative explanations will have differing importance at different dates, time periods must also be considered.

It is also clear that the Kuznets' analytical framework needs to be extended to understand income inequality in present-day OECD countries. Kuznets focused on the generation of factor incomes: the evolution of inequality over time was driven by changes in the sectoral and cyclical structure of incomes from production. Yet today a significant proportion of the population has no

labor income, and although part of their income may derive from capital (directly or indirectly), government transfer payments are their major source of income. As the population in OECD countries continues to age, and as households with lone parents grow in number, this pattern will intensify (OECD, 1988; 1991).

Primary income distribution and the distribution of property incomes (factor income) is still important for the distribution of disposable income. But since the days when classical economists could identify payments to factors with payments to individuals, there has been a steady growth in the role of intermediaries, including the company sector, financial institutions such as pension funds, and the state (legally, via child support orders and enforcement; and fiscally, by direct income transfer). The explanation of differences in inequality, and in changes over time, may be found not just in the economic mechanisms determining factor incomes but also in the behavior of these intermediaries, including the policy decisions of government.[20] Perhaps it is better to reverse the traditional approach, not working from factor incomes to personal incomes, but back from the elements that directly affect the distribution of disposable incomes (Atkinson, 1994). However, such exercises are beyond the scope of work in our study.

Next Steps: Better and More Recent Data

Over the past decade substantial progress has been made in improving household income survey information and in making it more standardized and, hence, comparable across nations. Because of the willingness of nations to share their data and to help standardize concepts and measures, vast improvements in the quantity and quality of cross-national data analysis are being realized. We are happy that the Luxembourg Income Study (LIS) project has been able to contribute to this effort.

However, there is still much room for improvement, both in data quality and quantity. Concepts and measures need to become even more standardized across nations. The quality of

income data need be more carefully monitored and reported. Those nations that are reluctant to join cross-national research projects such as LIS need to be persuaded that they have more to gain from such an exercise than they have to lose. If progress can be made along these lines a report like this will be better still in another decade.

LIS is currently adding a third wave of data for the 1991-93 period to its database, while bringing Poland, Hungary, the Czech and Slovak Republics and other nations into the database.[21] A third data point for most nations will help to better identify trends that could only be hinted at with the information we now have on hand. Moreover, new projects in the United States and Luxembourg are beginning to make longitudinal household "panel" income data sets comparable across the handful of nations which have such surveys; and new income data collection efforts are underway in many EC nations, Japan, and Korea. Thus, the quantity, quality, and flexibility of income comparisons across nations will improve in coming years.

Next Steps: Unanswered Research Questions

Further important research thrusts need not await new data. The major purpose of our paper and volume has been to carefully and systematically lay out the facts of the cross-national level and trend in income inequality as best we could given the available data. But we have not come very far at all in explaining the root economic, demographic, and social policy related factors which underlie these trends. Several analyses of specific subtopics await further research. These include at least the following topics:

a. The long-term impact of increased market work by women. Clearly both labor force participation and long-term commitment to market work among women has been growing in all OECD nations, albeit at different speeds and trajectories. A set of gender-based studies which examine for the impact of these changes on family income inequality is called for.

b. The distributive effect of population aging on labor force participation, social budgets, trends in work, occupational pensions, and related issues need be studied. This would complement the aggregate data and some sub-aggregate data already available in this area.

c. The behavior of earned income inequality both secularly and cyclically is of great interest. How different are returns to additional years of education across nations and how will this affect unemployment, worker dislocation, job loss and related issues?

d. Changes in the structure of the personal income tax are also important. Shortly after the most recent data year included in this study (1987), several European nations severely reduced their top marginal income tax brackets. This no doubt had an effect on both the level of income and on overall income inequality that needs to be studied.

e. Changes in the relative effectiveness of social policy, family income packaging and anti-poverty effectiveness are all in need of re-examination in light of new redistributive mechanisms such as the Earned Income Credit (EIC) in the Untied States and the Allocation Parent Isolê (API) program in France.

Because the Luxembourg Income Study data are freely available to social scientists throughout the world there is ample opportunity for interested researchers to move from the findings reported in this report to explorations of important policy and basic science issues.

LUXEMBOURG INCOME STUDY
A Division of CEPS/INSTEAD

INSTEAD CEPS

Centre d'Etudes de Populations, de Pauvreté et de Politiques Socio-Economiques
International Networks for Studies in Technology, Environment, Alternatives, Development

INTRODUCTION AND OVERVIEW OF LIS

Fall 1995

The Luxembourg Income Study (LIS project) began in 1983 under the joint sponsorship of the government of Luxembourg and the Center for Population, Poverty and Policy Studies (CEPS) in Walferdange. It is now funded on a continuing basis by the national science and social science research foundations of its member countries and by CEPS/INSTEAD.

The LIS Project has four goals:

1) test the feasibility of creating a database containing social and economic data collected in household surveys from different countries;
2) provide a method allowing researchers to use the data under restrictions required by the countries providing the data;
3) create a system that will allow research requests to be received and returned to users at remote locations;
4) promote comparative research on the economic status of populations in different countries.

Since its beginning in 1983, the experiment has grown into a cooperative research project with a membership that includes countries in Europe, North America, the Far East and Australia. The database now contains information for more than 25 countries for one or more years. Negotiations are underway to add data from additional countries, including Korea, Mexico, and South Africa.

The LIS databank has a total of over 60 datasets covering the period 1968 to 1992. During 1995, additional surveys have been added to more fully represent the period of the early 1990's for most of the nations. Starting in 1996, a fourth wave of data for the middle 1990's will be added. A list of countries and years for which data is available is attached. The dataset is accessed globally via electronic mail networks by over 300 users in 28 nations. A new operating system for our remote access network was implemented in May 1995. It is much more flexible, faster and provides additional user options, including SAS. Extensive documentation concerning technical aspects of the survey data, and the social institutions of income provision in member countries is also available to users. This work has been supported by the U.S. National Institute on Aging, the Statistical Office of the European Community, the Office of Economic Cooperation and Development, The Ford Foundation, U.S. Agency for International Development, the Russell Sage Foundation, and by our member nations.

Reports by participants in the LIS project have appeared in books, articles and dissertations. Each completed study is published in the LIS working paper series, which currently numbers more than 130 papers. Abstracts of working papers are available on the Syracuse University home page (http://gerosun.syr.edu then choose Luxembourg Income Study). The project conducts annual summer workshops to introduce researchers to the database, and to give scholars experience in cross-national analysis of social policy issues related to income distribution. Over 200 students attended the 1988 through 1995 sessions. Our second US Workshop was held Washington, D.C. for 25 participants in May 1995. The first Russian/Eastern European Workshop was held in Luxembourg during July 1995. Two workshops will be held in Luxembourg in July 1996. A LIS newsletter is published twice yearly and mailed to over 1300 scholars in 30 nations. Additional information on LIS is available from either letterhead office, most easily by electronic mail (caroline@post.ceps.lu).

LIS at CEPS/INSTEAD
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LIS DATABASE LIST: Country and Year[1]						
COUNTRY[2]	Historical Databases		Wave I	Wave II	Wave III	Wave IV
Australia			1982	1986	1990	1994□
Austria				1987	1991	1994□
Belgium				1985	1988/1992	1994□
Bulgaria					1991*	1993*
Canada	1971	1975	1981	1987	1991	1994□
Czech Republic					1992	1995□
Denmark				1987	1992	1994□
Finland			1981*	1987	1991	1994□
France[3]			1979	1984/1984*	1989*/1990*	
Germany[4]	1973	1978	1981/83	1984	1989/1993*	1995□
Hungary					1991	1994*
Ireland				1987		
Israel			1979	1987	1992	1995□
Italy				1986	1991	1994□
Luxembourg				1985	1991	1995□
Netherlands			1983	1986*/1987	1991	1994□
Norway			1979	1986	1991	1994□
Poland				1986	1992	1994*
Portugal			1980*	1989*		
R.O.C.-Taiwan			1981	1986	1991	1994□
Russia					1992	1994*
Slovak Republic					1992	1995□
Spain			1980-81		1990-91	
Sweden	1968	1975	1981	1987	1992	1994□
Switzerland			1982		1992*	
United Kingdom	1969	1974	1979	1986	1991*	1993*
United States	1971	1975	1979	1986	1991	1994

1 Year given is reference year, not necessarily the year that the data were collected.

2 We are also in negotiation with Korea (1993), Mexico (1990),and South Africa (1993). Japan and New Zealand are unable or unwilling to join at this time.

3 France has an income survey (1979, 1984, 1990) and a budget survey (1984, 1989).

4 Germany has three different databases: an income and expenditure survey (1973, 1978, 1983); a transfer income survey (1981); and four cross-sections from the socio-economic panel (1984,1989,1993, 1995)

* Will be available in 1995 or early 1996.

□ Will be available in late 1996 or early 1997.

Table A-2. OECD Countries and LIS: Country (Acronym), Year of Data Entry, Source of Data, and Treatment in OECD Report[a]

A. Major OECD Countries		
Canada (CN)	1981, 1987	Household income survey
France (FR)	1979, 1984	Augmented income tax records
Germany (GE)	1984	Household panel survey
Italy (IT)	1986	Household income survey
United Kingdom (UK)	1979, 1986	Household income and expenditure survey
United States (US)	1979, 1986	Household income survey
B. Other OECD Countries in LIS		
Australia (AS)	1981/82, 1985/86	Household income survey
Austria (OS)	1987	Microcensus income survey
Belgium (BE)	1985, 1988	Household panel survey
Ireland (IR)	1987	Household income survey
Luxembourg (LX)	1985	Household panel survey
Netherlands (NL)	1987	Household survey of the use of public services
Norway (NO)	1979, 1986	Household income and wealth survey
Sweden (SW)	1981, 1987	Household income survey
Switzerland (CH)	1982)	Household income and wealth survey
C. Other OECD Countries Not in LIS, But with Available Data from Other Sources		
Finland[b] (FI)	1987, 1990	Household income survey
New Zealand[b] (NZ)	1983/84, 1987/88	Household income and expenditure survey
D. Other OECD Countries Studies via Primary or Secondary Sources		
Japan[c] (JA)	1987	Household income and expenditure survey
Portugal[d] (PO)	1981, 1989	Household income and expenditure survey
Spain[d] (SP)	1980/81	Household income and expenditure survey
E. OECD Nations Not Mentioned in the Study		
Denmark[e]	na	
Greece[e]	na	
Iceland[f]	na	
Turkey[g]	1987	

[a]All OECD nations who are part of the LIS project participated in this report.

[b]Finland joined LIS subsequent to the preparation of this report. For purposes of the report, however, Finland and New Zealand's statistical offices prepared fairly complete data.

[c]Japan's statistical officials provided minimal cooperation which was insufficient to directly include them in this study.

[d]Spain and Portugal participated via the work of academics in each nation. Since the resulting data analyses were not taken from official sources they were included as other country studies and appear only summarily in this paper. Both nations are in the process of joining LIS.

[e]Greece and Denmark's statistical offices did not provide any data. Denmark has since joined LIS.

[f]Iceland has no data on income distribution.

[g]Turkey was judged to be too dissimilar from other nations to be considered as part of this study.

Table A-3. Quality of Income Data: Ratio of Survey Estimates to Adjusted Administrative Data Estimates (in percents)

Income Item	Country and Year									
	Australia		Canada		Finland	Germany	Italy	United Kingdom	United States	
	(1981/82)[a]	1985/86	(1981)[c]	1987)[d]	(1987)[e]	(1983)[f]	(1989)	(1977)[h]	(1979)[i]	(1987)[j]
Wages and Salaries	92.2	100.6	101.6	100.0	101.5	108.8	106.9[y]	93.7	97.4	99.4
Self-Employment Income	124.9[l]	83.7	78.2	90.4	73.4	36.3[n]	53.1[o]	75.7	84.2	78.5
Property Income	50.7	66.7	60.5	47.7	82.5		78.4	50.6	45.1	55.2
Occupational Pension Income			85.4					74.5	81.5	81.6
Government Transfers	75.4	66.4	77.5	75.5	90.6	50.6	74.3	90.9	82.8	86.9
Total (All Income)[u]	83.0	81.7	92.4	90.1	93.5[v]	76.9	80.6[w]	89.0	89.0	89.2

[a]Comparisons between Survey and National Accounts provided by Bruce Bradbury of Social Policy Research Centre, University of New South Wales, Sydney, Australia.

[b]Comparison of Microcensus with social security administrative records (Lohnstufenstatistik) at the person level.

[c]Canada survey data from *Survey of Consumer Finances* for 1981; comparisons from unpublished tabulations based on family income data provided by Statistics Canada.

[d]Canada survey data from *Survey of Consumer Finances* for 1987; comparisons from SCF/National Accounts Reconciliation, Statistics Canada, Household Surveys Division.

[e]Salomaki, Aino. Comparisons with National Accounts.

[f]Comparison of SOEP Transfer Survey and National Accounts. In Kassella, Thomas, and Uwe Hochmuth (1989).

[g]Comparison of PSELL 1985 and Inspection Generale de la Securite Sociale (IGSS). National Accounts estimates are not an appropriate comparison, because of the large numbers of people, relative to the resident population, who live outside Luxembourg but commute daily to work in Luxembourg. Their income is included in the National Accounts, but were not part of the PSELL sample.

[h]United Kingdom data from *Family Expenditure Survey* for 1977; comparisons as reported by Atkinson and Micklewright (1983) using in part, methodology developed by Ramprakash (1975).

[i]United States survey data from the *Current Population Survey* for 1979, as reported in U.S. Bureau of the Census (1981, Table A-2).

[j]United States survey data from *Current Population Survey* for 1987 as reported in U.S. Bureau of the Census (1991, Table A-1, page 74).

[k]Net wages and salaries.

Table A-3 (Continued)

[l]In 1981-82 (but not 1985-86) wages received by persons from their own limited liability company have been grouped with self-employment income, whereas the convention followed by the national accounts is to classify this income as wages and salaries.

[m]Net wages in the PSELL have been adjusted to the semi-gross level which IGSS uses.

[n]Includes property income.

[o]Reference year: 1981. Source: Ministry of Finance, Italy.

[r]National Accounts information not separately available. The AVO87 estimates 3 billion Guilders, but this is underestimated.

[s]Estimate includes occupational pension income and government transfers.

[t]Includes occupational pension income and government transfers.

[u]Based on sum of items presented above only. Some income amounts, e.g., alimony and child support or private transfers, have no administrative data to which the survey data can be compared.

[v]Sum of items above.

[w]1982. Source: National Accounts of Italy.

[x]Includes property income.

[y]Brandolini (1993).

Endnotes

1. For discussion of the problems of comparability across countries, see, among others, Lydall (1979); van Ginneken and Park (1984); and Atkinson, Smeeding, and Rainwater (1994); Buhmann et al. (1988); Smeeding, Rainwater, and O'Higgins (1990). The issue of international standards for income distribution studies is also being addressed by the Luxembourg Income Study Project.

2. When dealing with primary and market incomes, we concentrate on the incomes of those individuals living in households with non-zero primary incomes, and no adjustments for family size are made. However, our comparisons of income distribution, and of the effect of taxes and transfers on inequality and particularly low incomes, use equivalence scales to adjust families for differences in economic need as reflected by family size. See also Buhmann et al. (1988).

3. The synthetic estimate in the United Kingdom is that usually known as the "Blue Book" estimate, which combines information from the tax records with household survey data and other information.

4. In the case of the United States, for example, Sawyer describes how he used the Current Population Survey published tables:
   "the income accruing to each income class is not reported and has been estimated by logarithmic interpolation. The post-tax income distribution has been estimated by applying the average tax rates by income class reported in *Statistical Abstract of the United States* and the social security contribution rates in force at the time" (1976, p. 32).

5. Synthetic data may well give a more accurate picture of the distribution; they are not, however, typically available as micro-data. It should also be noted that Canadian and United States LIS-based estimates are based, respectively, on 25 and 20 percent subsamples of the original surveys.

6. For example the after-tax data for Australia, New Zealand, and the United States used below are obtained using a tax imputation model at the level of the individual household to estimate direct taxes.

7. As it is put by the United States Bureau of the Census: "Deriving independent estimates of aggregate income for purposes of evaluating the survey data is difficult. The survey and administrative sources use different definitions, cover different universes, and are based on concepts that are not exactly the same. Therefore, adjustments to the administrative sources must be made to help correct for these inconsistencies and arrive at a valid independent estimate that can be used to make fair and accurate estimates of the quality of the survey estimates" (U.S. Bureau of the Census, 1991, p. 215).

8. The minor exception is that we have included New Zealand in some cases and included or excluded Austria in others. The New Zealand CSO provided sufficiently detailed data as to be included in most comparisons, though not for summary inequality measures such as the Gini. The Austrian dataset excludes the self-employed. However, comparisons with other LIS nations where self-employment income is excluded have led us to conclude that this feature of their database poses no serious problems for some income measures. See note 12, following. Finland, which was not a member of LIS at the time

this study was completed, has now joined the LIS project. Denmark, Portugal and Spain have also now joined LIS.

9. Were we to add Portugal (1989/90) and Spain (1990/91), they would have percentile ratios (P_{90}/P_{10}) of 4.16 and 4.38 with P_{95} values of 4.16 and 4.38 respectively, thus placing them between Canada, Italy, and Ireland/United States.

10. They are, however, used in international comparisons, such as that of van Ginneken and Park (1984). Sawyer discusses the per capita distribution, but his table (1976, Table 7) is a mixture of pre-tax and post-tax data.

11. The change in ranking for Sweden is most likely due to their unit definition (nuclear families, or immediate family excluding persons aged 18 and over who are treated as single-person families), which is more narrow than that used in other countries.

12. Austria is missing because while excluding self-employment income has little effect on percentile points, it does have a large effect on cumulative income shares, as can be seen by comparing the estimates below to those in Table 3.

Disposable Income (Excluding Self-Employment Income) Per Equivalent Adult

Austria	1987	4.1	10.1	17.2	25.4	34.4	44.2	54.8	67.2	81.1	91.8
France	1984	3.4	9.1	15.6	22.9	31.3	40.6	51.1	63.3	77.9	91.1
Germany (West)	1984	4.1	9.9	16.8	24.7	33.5	43.2	54.1	66.4	80.5	91.7
Italy	1986	3.3	8.4	14.6	21.7	30.2	39.6	50.5	63.2	78.3	90.9
Sweden	1987	3.5	9.8	17.4	25.8	35.2	45.4	56.5	68.6	82.2	92.3
United Kingdom	1986	2.9	8.1	14.1	21.2	29.4	38.8	49.8	62.5	77.9	90.9
United States	1986	2.0	5.8	11.3	18.1	26.3	35.9	47.2	60.4	76.5	90.2

Source: Atkinson, Rainwater, and Smeeding, 1995, Table 4.3.

13. It would clearly be possible to calculate the sampling errors associated with the Lorenz curve, and require that one curve be significantly different from another at a specified level of confidence. However, this focuses on sampling error to the exclusion of other, non-sampling, error, which may be quantitatively more important.

14. The Ginis reported by Portuguese and Spanish researchers are 31.0 and 32.1 respectively, indicating that if they were to be included, they would fall within the estimates given for Southern Europe of 29 to 32 percent. This is entirely consistent with the results in Figure 2 and in Tables 2 and 3. The Gini for New Zealand is not available.

15. The available partial (Austria) and unofficial (Portugal and Spain) evidence suggests that Portugal and Spain would be found somewhere in the southern European grouping, while Austria would be found closer to the northern European nations, though not at the low levels found in Finland, Norway, or Sweden.

16. Recent reviews of the evidence about trends in income inequality in different countries include Bourguignon and Morrison (1992), Smeeding and Coder (1993), Gottschalk (1993), Green, Henley, and Tsakalotos (1992), Taylor (1992), Gardiner (1993), Atkinson (1993), and Gottschalk and Smeeding (1995).

17. Portuguese evidence (Rodrigues, 1993) indicates that the comparable percentile ratio fell in Portugal as well.

18. France, Italy, Belgium, and Luxembourg only collect their data on an after-tax basis and hence can only be included in these comparisons on that basis.

19. In France there are no data on employee social security payments, which are large, so results were not presented for France.

20. Steps have been taken in this direction in the literature on computable general equilibrium models. See, for example, Bourguignon et al. (1989), and Robinson (1991).

21. Data from the 1970s are available for five nations: Canada, Sweden, the United Kingdom, the United States, and West Germany.

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