

HOUSEHOLDS, STANDARD OF LIVING, AND INEQUALITY

BY STEIN RINGEN

Oxford University

The standard of living of individuals does not depend so much on the income they themselves earn as on the total income of the household to which they belong and how the household organizes the use of its income. It is important to develop methods of income analysis which incorporate the household factor. In income distribution analysis, it is now common to take into consideration household size and composition in relative interpretations of income levels. In this paper it is suggested that the same methodology can be used for the purpose of absolute interpretations of income levels. The result is an alternative to per capita measures of standard of living which is sensitive not only to national income and population size, but also to household formation. This approach is applied to Norwegian data for the period from 1970 to 1986 as to trends in the average standard of living and standard of living inequality, and the redistributive impact of transfer and tax policies.

1. A NEW APPROACH TO STANDARD OF LIVING MEASUREMENT

The concept of "standard of living" belongs to the family of welfare concepts, i.e. concepts of how well people live. Within this family, it belongs to the category of "economic" concepts. Economic welfare concepts are based on the theory that welfare derives from consumption. The standard of living concept is, in addition, associated with the use of income data for empirical measurement. The problem in standard of living measurement, then, is how to organize income data for welfare measurement under the assumption that welfare is derived from consumption.

Standard of living estimates are usually established with the per capita approach. The most used of all measures of standard of living is undoubtedly GDP per capita. The equivalent in micro-analysis is household income per household member. This makes good sense intuitively: a given income can buy a given consumption and this total consumption must be divided between the individuals it supports.

On closer scrutiny, however, the per capita approach turns out to be unsatisfactory. In households, income is not split up between household members for each to use his or her share, at least not all of it. In large measure, household members cooperate on the use of income and thereby get more out of their income than they could if each had been on his or her own. This is ignored in the per capita approach which is thereby biased towards underestimating welfare. In the present paper an alternative approach is suggested and applied.

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2. ASSUMPTIONS

1

The basic unit of analysis in welfare measurement is the individual. There are two reasons for this. First, it is taken axiomatically that since only individuals can, in the real and ultimate meaning of the term, be consumers, only individuals have welfare. Secondly, by using the individual as the basic unit of analysis we can analyse welfare in such a way that all persons weigh equally when we describe the welfare of the population as a whole. Equal weighting is a preferred principle of welfare analysis in democratic societies, analogous to the "one person, one vote" principle.

2

To measure welfare by income, we should measure the consumption people could have given their income (potential consumption). It is significant that the consumption value of income depends on the consumption it *can* buy, and not on the consumption that is in fact bought. If one person chooses to save half of his income and another person to spend all of his, they are still equal in welfare terms if they have the same income. By using potential rather than actual consumption as the basis for welfare judgements, we avoid giving priority to certain uses of income before others, for example consumption before saving, and hence have a measure which is neutral with regard to different preferences for the use of income.

In income terms, potential consumption is best expressed in disposable income (the sum of income from all sources, minus taxes). For simplicity, I disregard "free" consumption, such as public health care and education, gifts, fringe benefits, and the like, and assume that households purchase all their consumption in the market.

3

People who belong to households with more than one member pool (some of) their incomes and use the pooled income collectively. This follows different patterns in different households and is more true of some households than of others, but in all households there is some pooling of income. (If not, it is not a household.) In households with several members and only one income earner, for example, all household members have consumption that is financed out of the single income. Consequently, the consumption value of income for individuals does not depend directly on the income they themselves earn but on the total income of the household to which they belong, how this income is used, and how the consumption it buys is distributed within the household. (For single persons, obviously, the distinction between individual and household breaks down.)

Although the individual is the unit of analysis in welfare measurement, the income which determines the standard of living of the individual is not the income he or she earns, but the total disposable income of his or her household. Welfare analysis should therefore start with household income. But since the unit of analysis should be the individual, we need a methodology for establishing the consumption value for individuals of household income.

4

In households with more than one member, there are economies of scale in consumption. A family of four, for example, rents one and not four houses, yet this one house provides housing services to all four family members. Except for single person households, the aggregate consumption value derived from the household's disposable income is higher than the disposable income.

5

In income distribution research, the household factor is incorporated into income measurement by re-estimating household income to "equivalent income." Equivalent income is estimated as a function of household income and household size and composition so as to allow for economies of scale in larger households. This parameter has usually been interpreted as a *relative* measure of the economic standard of households.

An alternative interpretation is to take equivalent income as a measure of the economic standard of each *individual* member of the household, rather than of the household as a whole. This interpretation has recently been argued convincingly for the purpose of income distribution analysis (cf. e.g. Danziger and Taussig, 1979; van Ginneken, 1982; Cowell, 1984; Gustafsson, 1984; Uusitalo, 1985; Kakwani, 1986). I here argue, in addition, that once equivalent income is associated with the individual, the parameter can, in principle, be taken as an *absolute* measure of standard of living, i.e. as expressing the consumption value for each household member of a given household income. This rests, it is true, on some radical assumptions, the most important of which is that consumption is always distributed equitably within households. With present knowledge of within-household economic transactions this is a necessary assumption. As knowledge on this improves, the equivalent income concept may be refined and this and other "unrealistic" assumptions relaxed.

To enable absolute interpretation, the equivalence scale should be based on the score of 1.0 for single persons/first adults and scores lower than 1.0 for subsequent household members. The 1.0 score for single persons sets the value of their potential consumption equal to disposable income (assuming no waste) and the consumption value equal to market value (assuming no efficiency gains in single-person households). The lower scores for subsequent household members reflect the efficiency gains in consumption through economies of scale in households with more than one member. The resulting equivalent income, therefore, gives the market value of each household member's potential consumption, given household disposable income and consideration taken of efficiency gains through economies of scale.

6

In this section the rationale for an alternative to the per capita approach to standard of living measurement has been explained. The principles are

- the individual as the unit of analysis,
- potential consumption expressed by disposable income,
- the analysis starts from household income,
- within-household efficiency gains in consumption are incorporated

—equivalent income is taken to be a measure of the individual's standard of living and estimated so as to allow absolute interpretation.

By following these principles, and given that certain necessary assumptions are accepted, we can establish the standard of living of individuals from household income information in a theoretically satisfactory manner and with a methodology which is an alternative to the less satisfactory per capita approach. It is recognized and taken into consideration that welfare is a property of individuals, that welfare should be analysed with equal weighting of individuals, and that the standard of living of individuals depends, in part, on within-household economic processes.

3. STANDARD OF LIVING IN NORWAY 1970-86

Let "equivalent STL" be standard of living as measured by the equivalent income approach and "per capita STL" be standard of living as measured by the per capita approach.

Further, let equivalent STL be estimated with the use of a simple equivalence scale based only on the number of household members. The equivalence scores are 1.0 for single persons/first household members, 0.7 for second household members, and 0.5 for subsequent household members. This is an adaptation of the "OECD equivalence scale" of 1.0, 0.7, and 0.5 for first adult, subsequent adults, and children. It is here based on the number of persons only because the Norwegian data sets that are analysed have information on household size, but not on the age or household position of all household members. It is clear that the results of equivalent income analyses are strongly sensitive to the choice of equivalence scale (cf. Buhman *et al.*, 1988). Due to limitations in the data, experiments with notably different specifications of the equivalence scale have not been possible. This problem is, therefore, left aside for the present and I simply assume that the equivalence scale that is used is realistic.

Data

The data are from income surveys conducted by the Norwegian Central Bureau of Statistics. These are tax return data which are collected for representative population samples, cf. Appendix A.

These data have been analysed in similar ways before, for example in the current income survey publications by the Central Bureau of Statistics, but the present study is different from and goes beyond earlier studies. Here we analyse six annual data sets simultaneously. All data sets have, for this purpose, been carefully rearranged according to common income and tax concepts and demographic variables in order to achieve the highest possible comparability over time. We hence now have longer and more reliable time series than have previously been available.

The use of tax return data in income analysis is not without problems in that tax-purpose concepts are not necessarily the most relevant ones for all analytic purposes. Definitions that are determined specifically by tax purposes are therefore avoided as far as possible, and income is generally recorded gross

of deductions, for example private interest payments which are fully deductible in taxable income. Earlier studies using the same data (with the exceptions of Ringen, 1986; Aaberge and Wennemo, 1988) have analysed income net of deductions.

The study is limited to cash income (except for the incorporation of certain non-cash compensations in work and imputed income from home ownership) and to direct transfers and taxes. Indirect transfers, for example educational or health care services, and indirect taxes, for example VAT, are not considered. The analyses of redistribution are in terms of first order effects only.

How Well Off?

The standard of living development in Norway is shown in Table 1, in current prices and in fixed prices adjusted by the consumer price index.

TABLE 1
TRENDS IN MEAN STANDARD OF LIVING IN NORWAY

	1970	1973	1976	1979	1979	1982	1986
Current Prices							
Equiv STL	14,703	17,216	29,339	38,740	40,895	59,720	89,177
Per Cap STL	10,851	12,992	21,736	29,320	30,829	45,354	67,947
Fixed Prices							
Equiv STL	29,643	28,362	36,266	38,740	40,895	42,566	48,740
Per Cap STL	21,877	21,403	26,868	29,320	30,829	32,326	37,109
Growth Index							
Equiv STL	76.50	73.20	93.60	100.00	100.00	104.10	119.10
Per Cap STL	74.60	73.00	91.60	100.00	100.00	104.90	120.10
Pers Per Housech	2.81	2.59	2.74	2.49	2.49	2.48	2.41
Cons Price Index	49.60	60.70	80.90	100.00	100.00	140.30	183.10

Note: There is an interruption in the time series in 1979, cf. Appendix A.

We see here that equivalent STL is a great deal higher than per capita STL. The per capita measure, which ignores within-household economic transactions, underestimates the consumption value of the available income.

These two measures differ not only in levels but also in trends. Equivalent STL shows a weaker rate of growth than does per capita STL. This difference has to do with changes in household size, which affect the equivalent measure but not the per capita measure. From 1970 to 1986, mean household size fell from 2.81 to 2.41 persons. Since there are fewer persons per household, there will be less efficiency gains in consumption and this will slow down the growth of equivalent STL, compared to per capita STL. The difference in trend between the two measures is not insignificant during the period from 1970 to 1979, when mean household size fell from 2.81 to 2.49 persons. For the period from 1979 to 1986, when mean household size fell only from 2.49 to 2.41 persons, there is less difference between the two measures. Over the period as a whole, equivalent STL has grown less than per capita STL, but from 1973 to 1976, when mean household

size increased, equivalent STL shows a stronger rate of growth than does per capita STL.

How Much Inequality?

Earlier studies of income inequality trends in Norway have found close to total stability in the distribution of income from about 1970 (cf. Andersen and Aaberge, 1983; Bojer, 1987; Aaberge and Wennemo, 1988). Since this stability has been observed in several more or less independent studies, as well as in current income statistics, this conclusion has been regarded as firmly established.

These earlier studies have used the same data as are used here, but have treated the data differently and are hence not directly comparable to the present study. They have either not covered the entire population (e.g. only the gainfully employed), analysed income inequality between "income earners," or defined income net of tax deductions. None have used the equivalent income method applied here, nor data sets as carefully coordinated.

The distribution of equivalent STL between persons in Norway from 1970 to 1986 in terms of decile distributions (with separate figures for the top 5 percent and 1 percent groups) and Gini coefficients is given in Table 2. An examination of this table shows that the degree of inequality has not been stable during this period and that the trend in inequality has been different in different sub-periods.

From 1970 to 1976, the trend is in the direction of greater inequality. The year of 1973 is exceptional with a higher level of inequality than in any of the other years during the 1970s for which data are available. This is a result, mainly, of a peculiarity in that year's taxation which caused a relatively large number of households to pay more in taxes than they had pre-tax income so that there were this year a relatively large number of households with zero or negative disposable income. (Of all households, 1.3 percent paid income and wealth tax in excess of gross income.)

TABLE 2
DISTRIBUTION OF EQUIVALENT STL IN NORWAY

Decile	1970	1973	1976	1979	1979	1982	1986
1	2.0	0.7	1.9	2.0	1.9	2.0	1.9
2	4.3	3.6	4.1	3.9	3.7	3.9	3.8
3	6.2	5.6	6.0	5.8	5.5	5.6	5.6
4	7.6	7.3	7.4	7.5	7.1	7.2	7.3
5	8.8	8.8	8.6	8.9	8.4	8.5	8.7
6	9.9	10.0	9.9	10.1	9.7	9.7	9.9
7	11.2	11.6	11.4	11.5	11.0	11.0	11.3
8	12.9	13.3	13.0	13.1	12.6	12.6	12.9
9	15.2	15.7	15.3	15.4	14.9	15.0	15.3
10	21.8	23.8	22.4	21.8	25.2	24.3	23.4
Top 5%	12.7	14.0	13.3	12.8	16.1	15.1	14.1
Top 1%	3.6	4.8	4.2	3.8	6.8	5.3	4.2
All	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Gini	0.305	0.348	0.319	0.314	0.346	0.334	0.330

Note: There is an interruption in the time series in 1979, cf. Appendix A.

From 1976 to 1986, the trend has turned towards more equality. The trends observed here are not strong—there is not *much* more inequality in 1976 than in 1970 and not *much* less in 1986 than in 1976—but they are sufficient to say that the distribution has not been stable.

Since the trends in these two sub-periods go in opposite directions and more or less balance each other out, the degree of inequality in 1986 is more or less the same as in 1970. Had we looked at these two years only, we would have said that there had been little or no change, but between these two points in time, there have been sub-periods with noticeable change in standard of living inequality.

Nordic Comparisons

The apparent stability of income inequality in Norway has set this nation apart from the other Nordic nations. In Denmark (cf. Hansen, 1984, 1985; Egemose, 1985), Finland (cf. Uusitalo, 1988), and Sweden (cf. Åberg, Selen and Tham, 1987; Gustafsson, 1987), during about the same period, income inequality has been observed to change and to do so in a non-linear pattern with different trends within different sub-periods. With the results from the present study, we can now say that Norway is no different in this respect from the other Nordic countries.

Until recently, reliable comparisons of income inequality in the Nordic nations have not been available because income statistics have not been fully coordinated. With the use of rearranged and coordinated data for the early and mid-1970s, Sandström (1980) and Nygård (1984) compared Finland and Sweden, but were unable to determine in which country there was less inequality since the results differed with different specifications of the estimates. Ringen (1986) compares Norway and Sweden in 1982 and 1979/1980, again with the use of rearranged and coordinated data. This study found there to be less inequality in Sweden than in Norway, but was unable to establish any trend in inequality in the short period studied.

Comparable estimates for Finland, Norway, and Sweden, based on the equivalent income approach, are now available for a fairly long period from the present study and from those of Gustafsson (1987) and Uusitalo (1988). The results of these studies are comparable, although there are slight differences in some details of data and methodology which make the comparability less than perfect. All studies give Ginicoefficient results for trends in equivalent STL inequality. The comparability is probably relatively good as far as trends go, whereas there is more uncertainty as to the level of inequality. The estimates are reproduced in Figure 1.

This comparison shows that although inequality has not remained stable in Norway, this country is still distinctly different from Finland and Sweden. The three nations have in common that there is a shift in the trend in inequality towards or around 1980—in Finland the curve flattens out, in Norway and Sweden the direction changes—but the most striking thing in the comparison is still that the development in Norway is very different from the more or less parallel developments in Finland and Sweden. First, there is apparently a higher level of

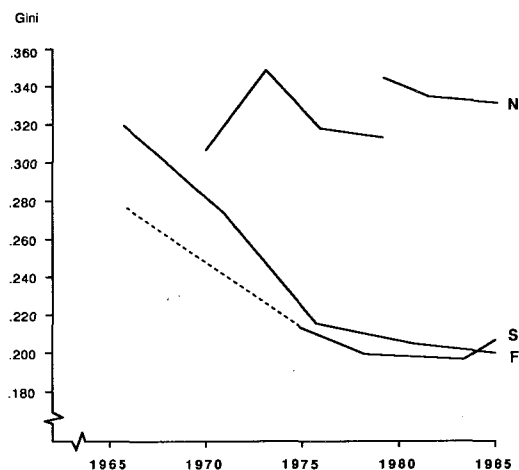


Figure 1. Trends in Equivalent STL Inequality.

Sources: Finland: Uusitalo 1988. Norway: Present study. Sweden: Gustafsson 1987. The Swedish curve before 1975 is a 'guesstimate' based on Åberg, Selen and Tham, 1987.

Note: There is an interruption in the Norwegian time series in 1979, cf. Appendix A.

inequality in Norway (although one should be cautious with direct comparisons of the Gini levels). Second, the degree of inequality has changed less in Norway than in the two other countries. And third, the directions of the inequality trends are in some respects different. During the 1970s, the trends in Finland and Sweden are towards equality and in Norway towards inequality. After 1980, the trends in Finland and Norway are towards equality and in Sweden towards inequality. While particularity should no longer be claimed for Norway on the basis of stability, it can still be claimed on the basis of the degree of inequality and to some extent the direction of change.

The relative positions of these three nations in terms of inequality has changed significantly over the last 20 years. The early comparisons are slightly speculative, but it seems likely that towards the end of the 1960s, Sweden was the deviant case with a lower level of inequality and that Finland and Norway were on about the same level. From around 1970, the trends are more firmly established. During the 1970s, inequality fell sharply in Finland and Sweden and rose slightly in Norway. By the middle of that decade, Finland and Sweden were on about the same level and Norway had become the deviant case. The difference between Norway and Finland/Sweden was now significantly greater than the earlier difference between Finland/Norway and Sweden. During the 1980s, inequality declined in Norway but not enough to have much impact on the relative position of this country compared to the two others. In Finland, inequality continued to decline while it started to rise in Sweden so that by the mid-1980s, Finland had the lowest level of inequality.

Redistribution

There are a number of controversies in the literature on the redistributive quality of transfers and taxes in contemporary industrial welfare states (cf. Ringen, 1987). Three such issues are the following.

- Is the system redistributive at all?
- If so, is it redistributive on the tax side as well as on the transfer side?
- Do changes in the level of transfers and taxes change the redistributive effectiveness or does it all wash out in circularity in the system?

Estimates on the first order redistributive impact of transfers and taxes on equivalent STL in Norway from 1970 to 1986 are presented in Table 3.

TABLE 3
REDISTRIBUTION OF STANDARD OF LIVING IN NORWAY

	1970	1973	1976	1979	1979	1982	1986
Inequality							
Factor Inc	0.369	0.422	0.392	0.400	0.418	0.406	0.401
Gross Inc	0.325	0.364	0.342	0.345	0.365	0.350	0.344
Equiv STL	0.305	0.348	0.319	0.314	0.346	0.334	0.330
Redistr Impact							
Transfers	11.9	13.7	12.8	13.8	12.7	13.8	13.7
Taxes	6.2	4.4	6.7	9.0	5.2	4.6	4.1
Trans+ Taxes	17.3	17.6	18.6	21.5	17.2	17.7	17.7
Levels							
Transfers	11.1	13.5	13.1	14.0	13.5	13.6	13.9
Taxes	19.6	25.0	25.7	26.8	25.8	23.7	23.8

Note: There is an interruption in the time series in 1979, cf. Appendix A.

Inequality: Gini coefficients.

Redistributive impact (cf. Kakwani 1986)

—of transfers: $100 * (\text{factor Gini-gross Gini})/\text{factor Gini}$

—of taxes: $100 * (\text{gross Gini-equivalent Gini})/\text{Gross Gini}$.

—of transfers and taxes: $100 * (\text{factor Gini-equivalent})/\text{factor Gini}$.

Levels: per cent of gross income.

As to the first question, the system is shown to be redistributive, and the direction of redistribution is towards equality.

As to the second question, this system is shown to be redistributive on the tax side as well as on the transfer side. The impacts of both types of policy are uniformly in the direction of equality. Transfers have a stronger redistributive impact than do taxes, but taxes are not insignificant from a redistributive point of view.

As to the third question, observe first that there have been quite significant changes over this period in transfer and tax policy. From 1970 to 1979, the average level of both transfers and taxes relative to gross income rose, while after 1979 the level of transfers remained stable and the level of taxes dropped. If policy changes such as these matter in terms of redistribution, we would expect to observe corresponding changes in standard of living inequality and/or in measures of redistributive impact.

As we have seen above, during the period there has been a shift in the trend in standard of living inequality, from a development towards more inequality to one towards more equality. Does this suggest that the shift in the trend in inequality is the result of an underlying shift in transfer and tax policy? The answer is, no; the present observations do not fit this hypothesis. The shift in inequality occurred before the shift in policy. Also, inequality increased while the transfer and tax level rose and decreased when these levels ceased to rise or fell, which is the opposite of what one would expect to find if trends in standard of living inequality were directly sensitive to trends in transfer and tax levels. It therefore appears that there is in this case no direct causal effect from trends in transfer and tax policy to trends in standard of living inequality.

If we turn from the observations on inequality to the observations on redistributive impact, we see in Table 3 a number of changes over the period. The redistributive impact of both transfers and taxes increased from 1970 to 1979 (although neither trend was uninterrupted), and the same, obviously then, goes for the system as a whole (and this trend was uninterrupted). From 1979, the redistributive impact of transfers continued to increase until 1982, the impact of taxes started to go down, and there was virtually no change in the impact of the system as a whole. These trends fit fairly well with what one should expect under the hypothesis that there is an effect of the level of transfers and taxes on their redistributive impact. While transfer and tax levels rose, from 1970 to 1979, the redistributive impact increased; when the transfer level ceased to rise, between 1979 and 1980, the redistributive impact ceased to increase (although in this case with some lag); when the level of taxes went down, from 1979 to 1982, so did their redistributive impact.

We have found the hypothesis of an effect from transfer and tax levels on standard of living inequality not supported, but the hypothesis of an effect on redistributive impact supported. Are these apparently contradictory findings consistent? The estimates in Table 3 show that they are. The trends in standard of living inequality follow the trends in factor income inequality closely. From 1979 to 1986, for example, standard of living inequality is reduced in spite of no increase in the redistributive impact of the transfer/tax system because factor income inequality is reduced. From 1970 to 1976 (ignoring the somewhat atypical year of 1973), there is a trend towards standard of living inequality in spite of an increasing redistributive impact of transfers and taxes because of an increase in factor income inequality. The trends in standard of living inequality, then, are explained mainly by changes in the distribution of factor income, and hence by basic economic and social forces, while the impact of transfer and tax policies has mainly been to modify the effects of these basic forces. From 1970 to 1976, for example, standard of living inequality increased less than did factor income inequality because the redistributive impact of transfers and taxes increased. From 1976 to 1979, factor income inequality continued to increase but standard of living inequality decreased because of the stronger egalitarian impact of transfers and taxes. From 1979 to 1986, the redistributive profiles of both transfers and taxes changed but these changes balance each other out so that they together have virtually no impact on the trend in standard of living inequality (although they, of course, have a considerable impact on standard of living inequality at any point in time).

To conclude, then, the transfer and tax system is redistributive and this impact is sensitive to the level of these policies. However, this is only one of several factors which determine the distribution of standard of living. The changes which have occurred in standard of living inequality in Norway during the period from 1970 to 1986 do not follow mechanically from changes in transfer and tax policies, but are instead strongly linked to changes in the distribution of factor income and, consequently, need to be explained, above all, in the light of economic and social developments during this period.

4. CONCLUDING REMARKS

Each individual member of a population has a standard of living which is a function of the disposable income of the household to which he or she belongs and the within-household economic transactions which determine how efficiently the household goes about translating its disposable income into consumption and how this consumption is distributed among household members. The standard of living thus defined is equal to disposable income for those who live in single person households and on average higher than disposable income per person for those who live in households with more than one member. Standard of living is usually measured with the per capita approach (GDP per capita, household income per person). This approach ignores within-household economic transactions. It is shown in this paper that an alternative which incorporates the household factor is available in what is called the equivalent income approach. Equivalent income is estimated as household income per unit of consumption rather than per person. The key to using equivalent income for the purpose of standard of living measurement is to give this parameter an absolute, and not merely a relative interpretation. It is argued that the equivalent income approach is theoretically superior to the per capita approach for the purpose of welfare measurement.

The application of the equivalent income approach will have several important implications compared to per capita estimates. First, since there are efficiency gains in consumption in households with more than one member, the equivalent income approach will show the average standard of living to be higher than according to the per capita approach.

Second, all comparisons between groups will be affected when there are differences in household composition. Generally, if average household size is larger in one group than in another, the standard of living of the members of the group with larger households will be better relative to those in the other group when measured with the equivalent income approach than with the per capita approach. This will affect comparisons such as between families with children and other families, urban and rural populations, and populations of developed and developing nations. For example, since households are on average larger in developing than in developed nations, the per capita approach will exaggerate the difference between these populations in standard of living.

Third, all estimates of changes over time will be affected when there are changes in household formation. Generally, if average household size decreases, the per capita approach will exaggerate the rate of change if there is economic growth and underestimate the rate of change in the standard of living if there is economic decline (and the other way around if household size increases). This

will, for example, have consequences for trend estimates of standard of living in the Western nations presently, since there are now significant changes in household formation.

There are several methodological problems involved in the operationalization of the equivalent income approach which are as yet unresolved. These have to do with a lack of knowledge and information about within-household economic transactions. What precisely are the efficiency gains in consumption within households? Are all households equally good at translating income into consumption so that standard of living depends only on income and household size/composition, or are there also differences in technology? Who benefits from household savings? How is consumption distributed within households, equitably or are there discriminations? How can one take into consideration that households obviously differ a great deal in these respects? About questions such as these, we as yet know very little. It is an important area for future research to gain better knowledge about what goes on within households so that we can proceed on a firmer empirical basis. For the present, we are confined to using assumptions about these matters, and the assumptions we have to resort to are, clearly, rather rough and make the estimates we can now produce somewhat speculative.

APPENDIX A: DATA AND DEFINITIONS

The data are from sample surveys. Sample size is between about 6,000 and 10,000 households. The data are tax return data. Non-taxable incomes included: child allowance, housing allowance, and cash educational grants (the latter two not included in 1970 and 1973). Social assistance and tax free unemployment compensation are not included.

Households: All persons living in the same dwelling and having common board.

The household definition in the 1979 and earlier data sets is an approximation to this definition.

Wage income: Cash and selected non-cash payments in employment. Sick pay is included. Recorded gross, including tax-deductible income.

Self employment income: Income from self employment, including taxable sick pay. Net of business expenses (with the exceptions causing an interruption in the time series, as explained below), but gross before tax-purpose deductions.

Capital income: Interest, dividends, profits on sales of property, imputed income from home ownership (2.5 percent of tax assessment value), and net income from other property.

Private transfers: Occupational pensions, alimony, etc.

Public transfers: All cash transfers from *Folketrygden* (the integrated public pension system), child allowance, housing allowance (not 1970 and 1973), and educational grants (not 1970 and 1973).

Taxes: Income tax, central and local, payroll tax, and wealth tax.

The interruption of the time series: The data sets for 1970, 1973, and 1976 do not contain information on deductions for appreciations and tax-free transfers to funds. For these years, self employment income is recorded net of these

deductions, whereas for 1979 and later it is recorded gross before these deductions, which is the preferred alternative for the present purpose. This is a significant difference in definitions which causes the time series to be interrupted. For this reason, figures for 1979 are estimated in both ways; one set of figures being comparable backwards to 1970, 1973, and 1976, and the other set of figures being comparable forwards to 1982 and 1986.

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