STUDIES OF INCOME REDISTRIBUTION IN DENMARK

For 1963 and 1971

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Income redistribution studies on the macro-economic level have been undertaken in Denmark for the years 1938–39, 1949, 1955, and 1963. By use of national accounts figures and all other available statistics, it was on certain assumptions possible to distribute public sector income and expenditure by income groups.

A quite different approach is used in a Danish redistribution study on the micro-economic level for 1971, which relies solely on the comprehensive data from the family budget survey for that year. Unfortunately this study only relates to employee households.

This paper deals with the 1963 and 1971 studies. First it describes and discusses the differences in methodology between the two studies and indicates some ideas for future studies in this field in Denmark. In the following sections some main results of the two studies are given, briefly for the 1963 study and more comprehensively for the 1971 study. The studies show the great and growing strength of the policy of redistribution through public sector income and expenditure in Denmark.

It is the opinion of the authors that the appearance of redistribution studies based on comprehensive family budget surveys makes for a substantial improvement of redistribution figures, and that the purely micro-level frame of reference makes it possible to interpret the results in a more satisfactory way than before. Furthermore, the appearance of detailed input–output based national accounts data should bring about further improvements in redistribution figures through better data on indirect taxes and subsidies as well as supporting data which are necessary to link the micro and macro levels in a consistent way.

INTRODUCTION

In *Income and Wealth*, Series X, a description can be found of some Danish studies of redistribution of income.[1] One of these studies refers to the period before the second world war (1937) and two refer to the period after that war (1949 and 1955).

Since then an analysis for 1963 concerning the same subject has been made by the Chairmanship of the Danish Economic Council,[2] and more recently an inquiry for 1971 has been conducted by Danmarks Statistik into the matter of income transfers to and from employee households.[3] The present paper presents some key results of these two studies, which will be dealt with in two separate chapters.

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[1]Kjeld Bjerke: Redistribution of Income in Denmark Before and After the War. *Income and Wealth*, Series X, 1964.

[2]The Chairmanship of the Danish Economic Council: The Distribution of Personal Incomes and Income Equalization Via the Public Sector. November 1967. Reprinted in 1971 (in Danish).

[3]"Economic Conditions of Employee Households. The Household Budget Survey for 1971", No. 34 in the series *Statistical Inquiries*. Danmarks Statistik, Copenhagen, 1977 (in Danish with a summary and list of tables and diagrams in English).

Methodology—a comparison between the methodology in the 1963 and the 1971 studies

The two studies are methodologically different. The one for 1963 is based on the national accounts statistics of the general government sector receipts and expenditures. These macroeconomic figures are analysed by income groups by means of tax statistics regarding number and distribution of assessed persons and the average assessed income for each of these income groups. The information is then supplemented by calculations based on either legal rules (e.g. calculation of the distribution of income taxes) or other available statistics. Thus indirect taxes and duties are allocated to the various income groups by means of consumption pattern data obtained by a household budget survey in that year (nearly 1,000 employee households); old-age, disability and widows' pensions by means of income data collected in connection with a sample survey of elderly people's living conditions; and government expenditures in the education sector by means of data on employment status of schoolchildren's fathers, linked with tax statistics for income distributions in the status categories involved.

By contrast, the extended household budget survey for 1971 is a micro-economic study based on interviewing and account keeping of 1,000 out of Denmark's more than one million employee households. The survey results directly give figures for total direct transfers from the individual household to the public sector (personal income taxes, taxes on real property, social security contributions, etc.) and direct cash transfers from the public sector to the households (old-age, disability and widows' pensions, family allowances, unemployment and sickness benefits, etc.). The calculations concerning direct transfers are based on the assumption that taxes are borne 100 percent by the households on which they are levied.

On the basis of detailed information on household consumption patterns it has moreover been calculated how much the individual household has paid by way of VAT and excise duties, the taxes and duties being included in the commodity prices at the rate of 100 percent. Taxes and duties paid by business enterprises on their inputs are excluded, e.g. petrol duty, motor vehicle weight duty and real property taxes.

The indirect transfers from the public sector to households have been analysed, as an experiment, for two selected services, primary health services and child care in day institutions. The households were interviewed on the extent of the services they received, and a valuation of the services was then performed for each individual household by means of highly detailed cost statistics. For the calculation of the income transfers in respect of these services it was assumed that the public sector's income and expenditure policy only influences the households through an income effect, so that the households would use the same amount of public sector services whether the services were free or offered at a cost-related price combined with cash subsidies to the households concerned, the subsidies being independent of whether or not the households use the services.

It should also be noted that the 1971 study of income redistribution must be seen in the context of a general description of economic affairs of employee

households, which means that it does not purport to show total redistribution, which was the purpose of the studies for 1963 and earlier years.

Concerning the reliability of the macroeconomic studies it was emphasized in connection with the publishing of the study results that they are based on different sources which do not employ uniform concepts. As it was not possible to solve the problem of the statistical units, information on individuals and on households was combined with information on the tax assessment units which again are "middle-concepts" between individuals and households. Moreover, the many statistical sources led to the situation that a large number of basic assumptions had to be adopted as a consequence of the nature of the available statistics. These drawbacks make it difficult to interpret the results. However, the authors of the macroeconomic studies permitted their publishing because it is generally estimated that they reasonably well indicate the order of magnitude of the redistribution, and comparisons in time show certain trends which seem to be relevant.

The 1971 study has the advantage over the previous studies that it refers to uniform concepts. On the other hand, the analysis of redistribution was not the principal purpose of the study, and as it only relates to a sample of 1,000 employee households it is not possible directly to compile grossed-up macroeconomic figures for the selected income groups.

Another advantage of the 1971 study is that its data material can be used for additional studies regarding transfers from households to other households; and by means of its data on household wealth and its breakdown into tangible and financial assets it is possible to study the redistribution of household wealth in times of inflation. These aspects are not included in this paper, but to some extent they are dealt with in the above-mentioned publication issued by Danmarks Statistik.

In a microeconomic budget survey it is also possible to select other criteria of redistribution than those applied to the tax statistics. In this connection the family life cycle factor presents itself as an obvious subject of analysis, because it explains part of the redistributive flows as well as a number of transfers from households to households and between households and the public sector, and also the size of wealth varies characteristically with life cycle groups.

Prospects for future studies

The 1971 study has been a sort of pilot study in relation to another Danish survey relating to 1976. The latter comprises all types of private households (a sample of 3,000 households), and consequently it is possible in principle to have its data grossed up to the macro level. At that level the sampling error will, of course, apply to the distribution by size of income, etc., of the known national aggregates. In addition, the field of public services to households has been extended to cover the hospital and education sectors.

The work of processing the primary data and storing them in a form suitable for analytical purposes is expected to be completed by the end of 1978, at which time Danmarks Statistik's annual input–output table for the nation is likely to be available for the year 1976.

The basis of the table is highly disaggregated (about 4,000 commodities) and enables a complete breakdown of indirect taxes and subsidies by commodity items for final consumption, since the system incorporates all necessary information concerning rates of taxes and subsidies and their distribution by commodities. Input–output calculations can thus be extended to cover not only the direct contents of taxes and subsidies but also taxes and subsidies on goods and services acquired by producing units. Moreover, the classification of private consumption according to the input–output table has been co-ordinated with the corresponding classification of household goods and services adopted for the budget survey. By means of these classifications, taxes and subsidies can be allocated to households in the various income groups, and by linking the results to the budget survey data on direct and indirect redistribution via the public sector it becomes possible to conduct a redistribution analysis that combines the micro and macro levels in a far more satisfactory and simple way than ever before.

The Study for 1963[4]

Introduction

In analogy with the previous studies, the 1963 study was based on computed distributions of taxes and duties, social services and health service expenditures by selected income groups. Contrary to the previous studies, however, the 1963 study also covered the subsequently introduced Government subsidies to agriculture[5] as well as current expenditure in the educational sector. It became possible to cover educational expenditures because the field of educational statistics had been extended to information on recruitment of students from different social groups, so that estimates could be made of the distribution of their parents' income by income groups.

The calculations and principles used for the distribution by income groups of taxes and duties on the one hand and public sector outlays on the other cannot be described briefly. Interested readers are referred to Annex 2 of the original report (in Danish), which deals with sources and calculation methods. Suffice it to say that on a number of points the calculations build on assumptions that are objectionable. A possible objection may, for instance, be raised against the assumption that the payment of expenses on long-term investment projects (e.g. in the educational sector) has a present-time counter value that can be allocated to various income groups. And even with income transfers in cash, such as old-age, disability and widows' pensions, it could be asserted that the distributive effects are impossible to calculate because nobody knows to what extent the

[4]The following is drawn from the study report of the Chairmanship of the Danish Economic Council, *op. cit.*

[5]Only the value of cash subsidies has been broken down by income groups, whereas the proceeds of the home market schemes are excluded from the study. This may be said to be unfortunate, since at least the statutory home market schemes are part of Government subsidies. But as world market prices are much influenced by foreign Government subsidies it is hard to decide whether the proceeds of the schemes should be included as subsidy payments, and if so at what sum.

public transfers replace private measures which would have influenced the size and distribution of factor incomes. However, it should be borne in mind that any attempt at ascertaining redistribution via the public sector necessarily involves the use of certain distribution keys (ratios) which also apply to those public services which cannot be attributed directly to specific population categories. Moreover, as the income groups of the study are few and large aggregates, the assumptions in question must be substantially changed in order to alter the calculated results to any significant extent.

About 90 percent of all collected taxes and duties, etc., have been distributed among the various income groups. The remaining 10 percent, which cannot be classified for distribution with reasonable certainty, comprise company taxes, fees, fines, penalties, stamp duties, etc.

With the extensions achieved compared with the previous studies, about half of total public current and construction expenditure has been separately allocated to specific income groups. The remaining expenditure items, consisting primarily of all construction expenditure and of current expenditure on armed forces, police, administration of justice, etc., are by nature not classifiable among the income groups. However, as indicated above, calculations regarding redistribution have to rely on certain assumptions of distribution keys, which also applies to this type of public expenditure. For this study it has been decided to calculate two *en bloc* distributions for the difference between the separately distributable revenues and the separately distributable expenditures, viz.:

(a) in proportion to the *number of persons subject to income tax assessment* in each group, i.e. on the assumption that all assessed persons ("taxpayers") derive the same amount of benefit from the services resulting from the expenditures, irrespective of level of income, and

(b) in proportion to the *size of the assessed incomes* for each group, i.e. on the assumption that the amount of benefit that a household obtains is directly related to the amount of its assessed income.

Calculations based on assumption (a) will always give higher figures for redistribution than similar calculations based on assumption (b). The latter assumption was adopted in the earlier studies for 1938–39, 1949 and 1955.

Results of the Study

Results of the study are given in Tables 1 and 2. Table 1 specifies items of public revenues and expenditure in relation to size-groups of taxpayers' incomes, expressed in millions of kroner. Table 2 shows the relative importance of the individual redistributive factor for the various income groups.

Tax payments to central and local governments totalled some 14.5 billion kr. in 1963. Of this amount, about 13 billion kr. has been analysed by categories for the purpose of this study, cf. Table 1.

Public expenditure in the calendar year 1963 was also in the neighbourhood of 14.5 billion kr., of which about half—some 7.3 billion kr.—consists of separately distributable items, i.e. items which are individually broken down into the income groups shown. These items are social welfare services, health services, education expenditures (excluding construction accounts), and outlays

relating to agricultural schemes, etc. As mentioned above, the remaining expenditures (13 billion kr. taxes and duties minus 7.3 billion kr. separately distributable outlays) are subject to *en bloc* distribution by two alternative methods.

In the last two lines of Table 1, which indicate net gain (value of public services received by a group minus taxes and duties paid by the same group), by far the largest positive amounts are found in the two groups with assessed incomes under 10,000 kr. The net gain turns out to be greatest for the group with assessed incomes between 5,000 kr. and 10,000 kr., in spite of the fact that it has paid much larger amounts of taxes and duties than the 0–5,000 kr. group. The reason is that a larger share of social services, especially social welfare services and health services, is accorded to the 5,000–10,000 kr. group.

For the third group (10,000–15,000 kr.) the net gain is very small; and for the rest of the groups, tax payments exceed the value of public services by considerable amounts.

Table 2 first considers the relative importance of cash benefits from the public sector at different income levels. In the lowest income group these benefits make up 59 percent of total income, and in the second lowest group 30 percent. For the rest of the income groups the cash benefits are of negligible importance, and for all taxpayers as a whole they account for 7 percent of aggregate total income.[6] Next, the table focuses on the relative importance of taxation and of the value of public services in the same income groups.

It appears that out of his total income the average person in the lowest income group had to pay 16 percent by way of direct or indirect taxes. This result is not caused by direct taxation, but almost exclusively by taxes on goods and services. For the two next income groups the share of taxes and duties rises sharply, but throughout the income ranges above 15,000 kr. the table shows a very modest continuous increase in the overall percentage charge for taxation.

For all income groups as a whole, taxes and duties amount to 37 percent of total income. However, the underlying amounts of total income (=100, cf. line 3) are set too low, because the starting point (line 1) is assessed income for the year plus direct taxes paid in respect of the previous year (the concept of assessed income excludes these taxes). Consequently, when the value of taxes and duties (as well as the value of public services) is expressed as a percentage of total income, the result is unrealistically high. If aggregate personal net income is set at 45 billion kr. for 1963, in accordance with a somewhat uncertain estimate derived from the national accounts statistics, the average overall tax incidence works out at about 29 percent.

Whether calculated by method (a) or by method (b), outgoings and ingoings are in balance for the 10,000–15,000 kr. group, i.e. the amount of taxes and

[6]The concept of cash benefits from the public sector is for this purpose restricted to pension benefits (payments of old-age, disability and widows' pensions), which constitute close on two-thirds of total income transfers from the public sector, according to the Danish national accounts statistics. The omission of one-third of the transfers in all likelihood does not essentially impair the data of the table concerning the proportional breakdown of total income into income transfers and other income, as the underlying figures for "income before tax and before cash benefits" are also somewhat too low compared with the true figures.

TABLE 1

INCOME AND EXPENDITURE OF CENTRAL AND LOCAL GOVERNMENTS IN THE CALENDAR YEAR 1963. DISTRIBUTION BY SIZE-GROUPS OF TAXPAYERS' ASSESSED INCOMES FOR THE FISCAL YEAR 1964–65 (INCOMES EARNED IN 1963)

	0–5,000	5,000–10,000	10,000–15,000	15,000–20,000	20,000–30,000	30,000–50,000	50,000 kr. plus	Total
Number of persons assessed	446,372	624,538	523,078	340,849	263,359	69,821	19,412	2,287,429
Assessed income (million kr.)	1,410	4,586	6,520	5,814	6,267	2,534	1,600	28,731
Average assessed income (kr.)	3,159	7,343	12,465	17,057	23,796	36,392	82,423	12,560
A. Taxes and duties (million kr.)								
1. Direct personal taxes (incl. wealth tax) minus family allowances	−51	65	1,041	1,136	1,456	973	1,002	5,622
2. Customs and excise duties	224	1,003	1,424	1,418	1,518	630	337	6,554
3. Taxes on real property	46	179	232	162	157	62	38	876
1+2+3. Allocated taxes and duties, total	219	1,247	2,697	2,716	3,131	1,665	1,377	13,052
B. Public services (million kr.)								
1. Old-age pensions	595	1,039	152	43	19	3	1	1,852
2. Disability pensions	211	367	54	15	7	1	—	655
3. Widows' pensions	17	29	4	1	1	—	—	52
4. Health services	440	615	515	336	259	69	19	2,253
5. Primary and lower secondary schools	50	206	358	299	250	57	15	1,235
6. Vocational training	5	21	37	32	28	7	2	132
7. Upper secondary schools	11	47	82	76	79	27	8	330
8. Institutions of higher education	9	21	40	40	65	48	16	239
9. Young People's Education Fund	1	7	12	12	16	1	—	49
10. Education, other	4	14	24	22	21	7	2	94
11. Agricultural schemes	7	135	182	66	27	8	2	427
1 through 11. Total	1,350	2,501	1,460	942	772	228	65	7,318
Other public services[a]:								
(a) in proportion to number of assessed persons (million kr.)	1,119	1,566	1,311	854	660	175	49	5,734
(b) in proportion to assessed incomes (million kr.)	281	915	1,301	1,161	1,251	506	319	5,734
Total public services (a) (million kr.)	2,469	4,067	2,771	1,796	1,432	403	114	13,052
Total public services (b) (million kr.)	1,631	3,416	2,761	2,103	2,023	734	384	13,052
Net gain (a) (million kr.)	2,250	2,820	74	−920	−1,699	−1,262	−1,263	0
Net gain (b) (million kr.)	1,412	2,169	64	−613	−1,108	−931	−993	0

[a]The amount subject to distributions (a) and (b) represents the difference between taxes and duties (A 1+2+3) and the separately distributable public services (B 1 through 11). In 1963, total taxes and duties, etc., paid to central or local governments amounted to about 14,500 million kr., and total public expenditures (on current and construction accounts) also amounted to about 14,500 million kr.

TABLE 2

TAXES AND DUTIES AND PUBLIC SERVICES AS PERCENTAGE OF TOTAL INCOME[a] FOR SELECTED INCOME GROUPS

	0–5,000	5,000–10,000	10,000–15,000	15,000–20,000	20,000–30,000	30,000–50,000	50,000 kr. plus	Total
Income before tax and before cash benefits	41	70	97	99	100	100	100	93
Cash benefits from public sector[b]	59	30	3	1	0	0	0	7
Total income	100	100	100	100	100	100	100	100
Taxes and duties paid	16	26	35	38	40	46	52	37
Remaining income	84	74	65	62	60	54	48	63
Value of public services,[c] certain services being allocated in proportion to number of assessed persons (a)	118	55	33	24	18	11	4	30
Final position (a)	202	129	98	86	78	65	52	93
Value of public services,[c] certain services being allocated in proportion to assessed income (b)	58	41	33	29	25	20	14	30
Final position (b)	142	115	98	91	85	74	62	93

[a] Total income equals assessed income plus direct taxes.
[b] Old-age, disability and widows' pensions only.
[c] Excluding payment of old-age, disability and widows' pensions.

duties paid is practically identical with the value of public services received, including cash benefits.

If the net gain (value of public services minus taxes and duties) of the groups is expressed as a percentage, not of total income, but of the original income before tax and before cash benefits, the final position for the lowest income group is about five times the original income according to distribution method (a), and about $3\frac{1}{2}$ times the original income according to distribution method (b).

For the groups of persons with assessed incomes from 5,000 to 10,000 kr., the average net gain from redistribution is 83 percent by method (a) and 64 percent by method (b).

As regards the groups comprising persons with assessed incomes above 15,000 kr., redistribution results in a net loss of between 13 percent and 48 percent of their income by distribution method (a) and between 8 percent and 38 percent by distribution method (b). These groups get a very small share of the cash benefits, so that nearly the same percentages are obtained when the percentage base is income after payment of cash benefits.

The 1963 study compared with previous studies

The redistribution calculated for 1963 is achieved by almost equal contributions from tax policy and social policy measures. In the 1949 study, the social policy element was clearly the more dominant factor, and also in the 1955 study it played a greater part in overall redistribution than did the tax policy element. But the 1955 study seemed to point in the direction of closer balance between the two elements, and the results of the 1963 study seem to confirm that trend.

Table 3 shows a comparison with similar previous studies.

TABLE 3

ABOVE HEALTH INSURANCE LIMIT (1938–39: KR. 3,000 LIMIT)

	1938–39		1949		1955		1963	
	Mill. kr.	Per cent	Mill. kr.	Per cent	Mill. kr.	Per cent	Mill. kr.	Per cent
Redistribution by way of social policy	233	95.5	424	67.6	693	60.1	1,591	51.0
Redistribution by way of taxes	11	4.5	203	32.4	460	39.9	1,506	49.0
Total redistribution	244	100.0	627	100.0	1,153	100.0	3,097	100.0

THE STUDY FOR 1971

INTRODUCTION

This section outlines a study of income transfers to and from employee households which Danmarks Statistik conducted for 1971. The study was based

on a sample numbering 950 households, of which 462 were headed by wage earners and 488 by salary earners (including civil servants). Before the study was undertaken Danmarks Statistik corrected for sample bias, so that the figures in Tables 4 and 5 do not show the relative size of the different groups among Danish wage and salary earners, but only the absolute number of observations. In Table 4 wage earner households and salary earner households are analysed by size of income.

TABLE 4

NUMBER OF HOUSEHOLDS BY INCOME GROUPS (HOUSEHOLD FACTOR INCOME), 1971

Factor Income (000 kr.)	Wage Earner Households	Salary Earner Households	Employee Households, Total
0–30	45	23	68
30–40	105	48	153
40–50	93	72	165
50–65	115	102	217
65–80	77	74	151
80–110	23	113	136
110 plus	4	56	60
Total	462	488	950

Table 5 shows a similar analysis of the households by life cycle groups.

TABLE 5

NUMBER OF HOUSEHOLDS BY LIFE CYCLE GROUPS, 1971

	Wage Earner Households	Salary Earner Households	Employee Households, Total
	Number of Observations		
Life cycle groups			
Single persons aged under 45 years	17	45	62
Single persons aged 45 years and over	24	35	59
Families without children, wife under 45	39	43	82
Families without children, wife over 45	126	100	226
Single persons with children	14	12	26
Families with children, oldest child aged under 8 years	97	92	189
Families with children, oldest child aged 8 and under 15 years	85	85	170
Families with children, oldest child aged 15 and under 19 years	60	76	136
Total	462	488	950

The sampling error of the study is substantial, and especially when the households are broken down by income groups, life cycle groups, etc., the results must naturally be interpreted with much caution. Nevertheless, the results have been subject to comprehensive processing and detailed analysis because the 1971 study is intended as pilot study for later studies with larger coverage, so that it has been endeavoured to present a large selection of the results that can be derived from that type of studies.

The following description of the study consists of five parts: (1) direct taxes and other direct transfers from households to the public sector, (2) indirect transfers from households to the public sector (VAT plus excise duties minus subsidies), (3) direct transfers from the public sector to households (family allowances, pensions, etc.), (4) indirect transfers from the public sector to households in connection with child care in day institutions and selected health sector services, and (5) a summary of the effect on the individual household of redistribution via the public sector.

Theoretically, it should in this way be possible to give a rather detailed picture of the public sector's redistributive role. It must be emphasized, though, that the study only refers to employee households, and that the results concerning indirect transfers from the public sector in the form of free or subsidized services are only based on a limited selection of these services, which are a difficult field of study due to conceptual and methodological complexities.

Direct transfers from households to the public sector

The following expenditures of employee households are classified as direct transfers to the public sector:

Direct personal taxes
Taxes on real property
Stamp duties
ATP (Labour Market Supplementary Pension) contributions
Sick benefit association contributions
Contributions to the sick benefit fund
Motor vehicle weight duty
Driving test fees, passport fees, etc.
Lottery tickets
Football pools
Fines and penalties

Table 6 gives some principal results, the text column consisting of aggregates of the items listed above.

Taxes on income and wealth are higher for salary earner households than for wage earner households, which was to be expected considering the income distribution of the two groups.

In Figure 1 this subject is considered by drawing lines for direct transfers from wage earner households and from salary earner households, respectively, in various ranges of household income. In the left-hand side the line for salary earners is only slightly above that for wage earners (nearly a straight line), but from an income of 65,000 kr. upwards the divergence becomes more pronounced.

TABLE 6

DIRECT TRANSFERS FROM EMPLOYEE HOUSEHOLDS TO THE PUBLIC SECTOR, 1971

	Wage Earner Households	Salary Earner Households	Employee Households, Total
		kr. per Household	
Personal taxes	14876	24636	19359
Taxes on real property	360	748	538
"ATP", contributions to sick benefit associations and fund	957	878	921
Motor vehicle weight duty	291	356	321
Other direct transfers	246	212	230
Total	16730	26830	21369

The tendency towards straight lines, as well as the difference between the lines of the graph, can largely be explained by the fact that the number of economically active persons per household increases with rising household income, which generally means that the higher the amount of household income, the smaller the share of household income accounted for by the "head" of the household—and this circumstance places the household in a more favourable position for taxation purposes. Furthermore deductions from income for interest

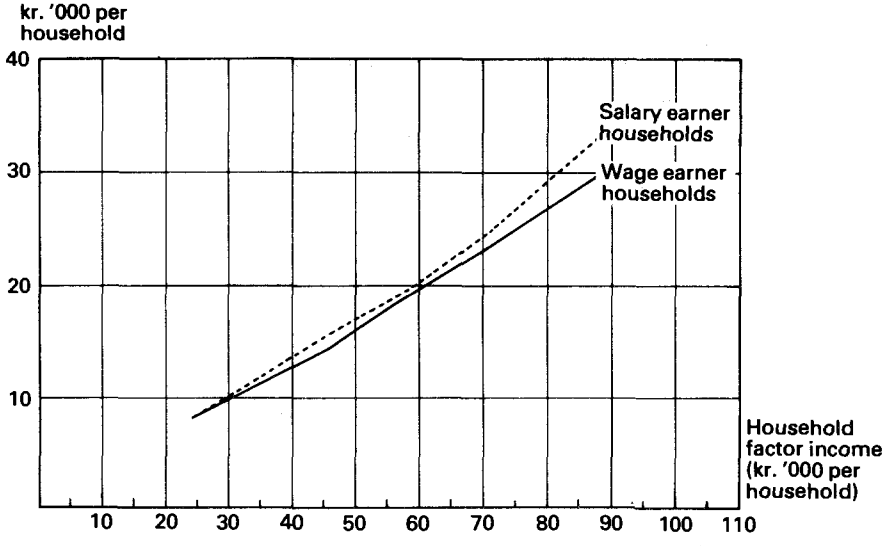

Figure 1. Direct Transfers to the Public Sector from Wage Earner and Salary Earner Households, by Income Groups (Household Factor Income), 1971

paid on owner-occupied houses and dwellings reduce the effect of the progressive personal tax scale.

Indirect transfers from households: excise duties and VAT

On the basis of the very detailed data of the household budget survey some computations were made concerning the size of the VAT and excise duty components of employee households' consumption expenditure in 1971.

It must be pointed out that the study does not take into account the indirect contents of duties in household consumption expenditures, viz. the duties paid by business enterprises on goods forming part of their intermediate consumption.

Figure 2 shows that VAT has a more evenly progressive incidence than excise duties. But even the VAT line is clearly not exactly straight (progressive), partly because total consumption cannot be described by a linear function of income, and partly because the composition of consumption varies over the income scale, as a large number of services are exempt from VAT. Moreover, housing expenditure, such as rent and (in the case of owner-occupied dwellings) mortgage interest, etc., also falls outside the VAT system.

The reason why the excise duty curve shows an accelerating trend up to household incomes of 65,000 kr., and after that the opposite, is primarily to be found in variations in car purchases for the income ranges referred to.

Another issue under consideration was whether or not the transfers were different for households with children and for households without children. In the case of VAT there was no marked difference between the two types of household, but as regards excise duties families without children generally paid

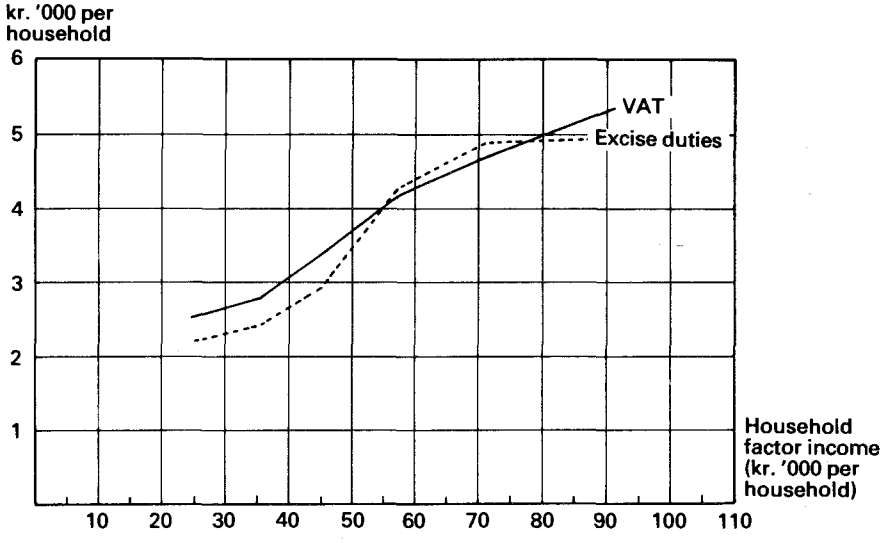

Figure 2. VAT and Excise Duties for Employee Households, by Income Groups (Household Factor Income), 1971

higher amounts than families with children in the same income ranges. The difference is mainly attributable to motor vehicle duties and duties on beer, wine and spirits.

Direct transfers to households

Whereas direct transfers to the public sector, personal taxes, etc., are primarily related to income conditions, direct transfers to households from the public sector are mainly related to other matters influencing a person's or a household's potentials for maintaining a given level of living on the basis of the income earned: age, sickness, unemployment, children, etc.

Comparisons between wage earner and salary earner households reveal that the largest differences are to be found in the transfers that refer to circumstances and incidents that are basically different for the two types of household. Transfers regarding unemployment and sickness are about eight times as large for wage earner households as for salary earner households, but transfers that are to a greater extent related to income, e.g. housing subsidies, are essentially much less different. For transfers like old-age and disability pensions, education allowances and family allowances, the study by and large gives the same average amounts for the two types of household, cf. Table 7.

TABLE 7

DIRECT TRANSFERS FROM THE PUBLIC SECTOR TO EMPLOYEE HOUSEHOLDS, 1971

	Wage Earner Households	Salary Earner Households	Employee Households, Total
	kr. per household		
Old-age pension, disability pension, etc.	533	477	509
Unemployment benefit, sick benefit	1185	159	712
Family allowance, etc., education allowance	1387	1331	1362
Social assistance, etc.	117	25	75
Housing subsidies, VAT refunds, etc.	223	144	188

Figure 3 gives an overall impression of the relationship between income and direct transfers for wage earner and salary earner households. For both groups there is a clear relationship between household factor income and transfers as regards the lowest income categories, which was to be expected as a higher level of transfers is often intended to compensate for a drop in earnings. But in the higher income categories the size of transfers no longer seems to be so much dependent on the size of income. Age and children are among the factors that break the dependency.

Indirect transfers from the public sector to households

As earlier mentioned, Danmarks Statistik has calculated the consumption values of some selected free or subsidized services to employee households from

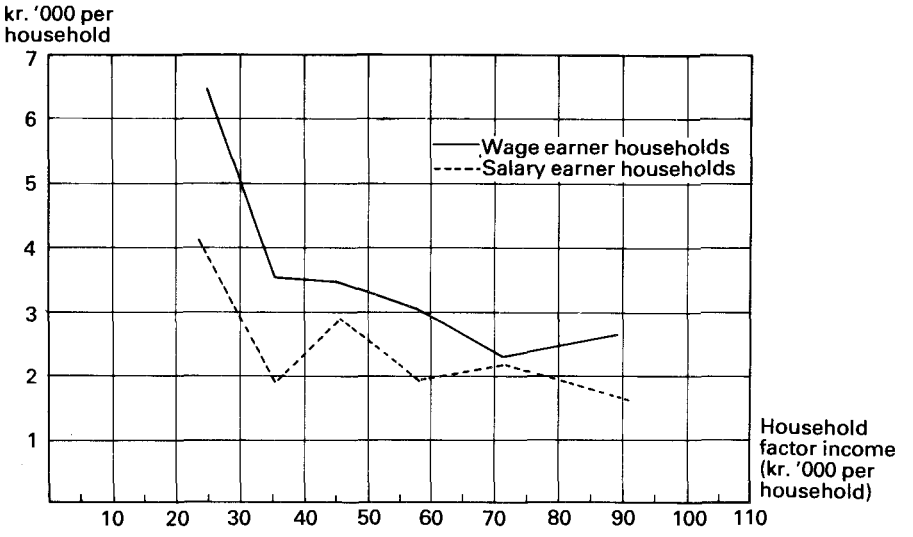

Figure 3. Direct Transfers from the Public Sector to Wage Earner and Salary Earner Households, by Income Groups (Household Factor Income), 1971

the public sector, and the proportions of the values that are borne by the households themselves.

Total consumption values, i.e. total direct costs to the households and to the public sector, have been calculated for child care in day institutions and for some health sector services which in 1971 belonged to the service field of the sick benefit associations.

The study of *employee households' use of day institutions for children in 1971* had two purposes: (1) to include the services in question in the statistics of the public sector's role in the redistribution process, particularly in relation to employee households (which can be said to widen the concept of household consumption), and (2) to investigate more specifically what or whose children used the day institutions in 1971 and thus benefited from these indirect subsidies. Only the first purpose will be dealt with in this article.

Some results are given in Table 8 for all employee households and for wage earner and salary earner households in selected income groups. The table shows not only the total value of these child care services—consumption of services by using nurseries and kindergartens as well as youth recreation centres and municipally organised day nursing in private households—but also the subsidy involved, i.e. the total value of services minus the households' own expenditures in this connection.

The main impression of the table is that households with medium-range incomes have the lowest consumption of child care services, and consequently also enjoy the smallest amount of the indirect subsidies. Moreover, in the lower income ranges the service level appears to be substantially higher for salary earners than for wage earners.

These differences can largely be explained by the relatively high number of single persons with children and single persons without children in the lowest income groups, by the fact that the majority of single persons with children are salaried employees, by different patterns of geographical distribution of wage earner and salary earner households, and finally by the natural fact that families in which both parents are gainfully employed are to be found in the higher income groups. It is possible to analyse these matters more profoundly by converting the data to averages per child in the relevant age groups. This eliminates the importance of different age compositions among the children and of differing numbers of children per household for the various income groups. Such analyses have been undertaken for the 1971 survey and they confirm the explanation above of the variation with household income in the child care figures.

TABLE 8

CHILD CARE IN DAY INSTITUTIONS: VALUE AND SUBSIDY PER EMPLOYEE HOUSEHOLD, WAGE EARNER AND SALARY EARNER HOUSEHOLD, BY INCOME GROUPS, 1971

	Household Factor Income						
	0–30,000	30–40,000	40–50,000	50–65,000	65–80,000	80–110,000	110,000 kr. plus
	kr. per Household						
Employee households, total							
Value	899	671	618	419	1125	1116	1125
Subsidy	841	511	494	187	702	663	590
Wage earner households							
Value	682	344	486	379	1226	677	—
Subsidy	657	233	347	137	738	576	—
Salary earner households							
Value	1483	1539	816	471	994	1228	1229
Subsidy	1338	1255	715	257	656	686	646

The study of *selected health sector services* has been a great deal more problematic than the study concerning day care institutions, for which exact information was obtained as regards the services received by households (name of day care institution, periods, etc.) and the costs involved. The data on services and costs concerning the health sector were less satisfactory, and for that reason the results should be interpreted with more caution.

On the basis of the available data (see Table 9) it would seem justified to conclude as follows:

When comparing wage earner households with salary earner households in the various income groups there is no major difference between the two household categories as regards medical services, except for the lowest income group and the highest income group. But regarding consumption of dental services the difference between the levels is substantial, and it is not caused solely by differing income distributions but also by other factors such as the geographical distributions of the two categories of households.

TABLE 9

MEDICAL AND DENTAL SERVICES TO EMPLOYEE HOUSEHOLDS: TOTAL VALUE AND SUBSIDY PER HOUSEHOLD, 1971

	Medical Services	Dental Services
	kr. per Household	
Value		
Employee households, total	432	429
Wage earner households	440	357
Salary earner households	424	514
Subsidy		
Employee households, total	353	202
Wage earner households	386	174
Salary earner households	316	235

Net transfers to the public sector

The 1971 survey is an innovation in Denmark in that it shows the total impact on the *individual* household of the public sector's redistributive functions, whereas the earlier mentioned previous studies are macroeconomic.

The study does not give a complete picture of income redistribution among private households, as it is limited to households headed by employees. On the other hand, these households are extremely important because they represent about 80 percent of the economically active households and close on 60 percent of all private households. As demonstrated in the study cited above (Redistribution of Income in Denmark Before and After the War) employee households—as well as households headed by self-employed persons—are net contributors to the redistributive flows through the public sector, primarily for the benefit of households headed by persons outside the labour force.

Furthermore, some degree of bias is inherent in the study because it deals with total direct and indirect transfers from employee households to the public sector, but apart from the direct transfers it only covers some selected indirect transfers from the public sector to households. What is more, for a study of this kind the costs of a great many government activities should not be allocated to specific categories of receiving households, for example defence, police, general administration of central government or local government organs, etc.

Summaries of the study results are given for all employee households by income groups in Tables 10a and 10b; and Figure 4 shows the transfers from households to the public sector broken down into personal taxes, other direct transfers, and indirect transfers (lines 1, 2 and 3), and illustrates how these are reduced to net results by direct and indirect transfers from the public sector to households in the income groups shown (lines 4 and 5).

It appears from Table 10b that the percentage share of factor incomes that is paid as personal taxes increases with rising incomes above 50,000 kr., in contrast to indirect transfers to the public sector, for which the percentage share of factor incomes tends to drop with rising incomes.

TABLE 10a

DIRECT AND INDIRECT TRANSFERS BETWEEN EMPLOYEE HOUSEHOLDS AND THE PUBLIC SECTOR, BY INCOME GROUPS, 1971. (KR. PER HOUSEHOLD)

	Employee Households						
	Household Factor Income						
	0–30,000	30–40,000	40–50,000	50–65,000	65–80,000	80–110,000	110,000 kr. plus
Number of households, per cent	7.8	16.7	18.4	22.8	15.6	13.5	5.4
Number of persons per household	2.1	2.6	2.9	3.0	3.2	3.2	3.5
Number of adults per household	1.4	1.7	1.8	2.0	2.1	2.2	2.2
Number of children per household	0.7	0.9	1.1	1.0	1.1	1.0	1.3
	kr. per Household						
Personal taxes	7298	10172	13225	16991	22034	31176	58782
Other direct transfers to the public sector	958	1337	1649	2106	2215	2822	3801
Direct transfers from the public sector	5812	3088	3248	2607	2248	1832	1658
Direct net transfers to the public sector[a]	2444	8421	11626	16490	22001	32166	60925
Indirect transfers to the public sector	4710	5211	6347	8473	9601	10307	13781
Certain indirect transfers from the public sector	1542	916	1128	788	1365	1287	1224
Total net transfers to the public sector[b]	5612	12716	16845	24175	30237	41186	73482
Average factor income	24349	35434	45556	57684	71372	91038	145280

[a] Personal taxes plus other direct transfers to the public sector minus direct transfers from the public sector.

[b] Direct net transfers to the public sector plus indirect transfers to the public sector minus certain indirect transfers from the public sector.

The same table shows that direct transfers from the public sector amount to a progressively smaller percentage of factor incomes with rising incomes, and a similar trend is found for the indirect transfers from the public sector. The overall tendency is therefore—in line with the results of the earlier studies—that the percentage for net transfers to the public sector increases considerably with rising incomes.

The diagram illustrates the increase for the individual variables with rising income. The bottom line (1) expresses the relation between household factor income and personal taxes. It can be described as an approximately straight line from the point of origin (0) through the lowest and medium-range income groups, continuing into another straight but steeper line throughout the highest income groups. The overall impression is therefore a slightly curved line, which means that both the average and the marginal tax rates are rather constant in the

TABLE 10b

DIRECT AND INDIRECT TRANSFERS BETWEEN EMPLOYEE HOUSEHOLDS AND THE PUBLIC SECTOR, AS PERCENTAGE OF HOUSEHOLD FACTOR INCOME, BY INCOME GROUPS, 1971

	Employee Households						
	Household Factor Income						
	0–30,000	30–40,000	40–50,000	50–65,000	65–80,000	80–110,000	110,000 kr. plus
	Percent						
Personal taxes	29.9	28.7	29.0	29.4	30.8	34.2	40.4
Other direct transfers to the public sector	3.9	3.7	3.6	3.6	3.1	3.0	2.6
Direct transfers from the public sector	23.8	8.7	7.1	4.5	3.1	2.0	1.1
Direct net transfers to the public sector[a]	10.0	23.7	25.5	28.5	30.8	35.3	41.9
Indirect transfers to the public sector	19.3	14.7	13.9	14.6	13.4	11.3	9.4
Certain indirect transfers from the public sector	6.3	2.5	2.4	1.3	1.9	1.4	0.8
Total net transfers to the public sector[b]	23.0	35.8	36.9	41.9	42.3	45.2	50.5
Average factor income	100.0	100.0	100.0	100.0	100.0	100.0	100.0

a and *b*. See Table 10a.

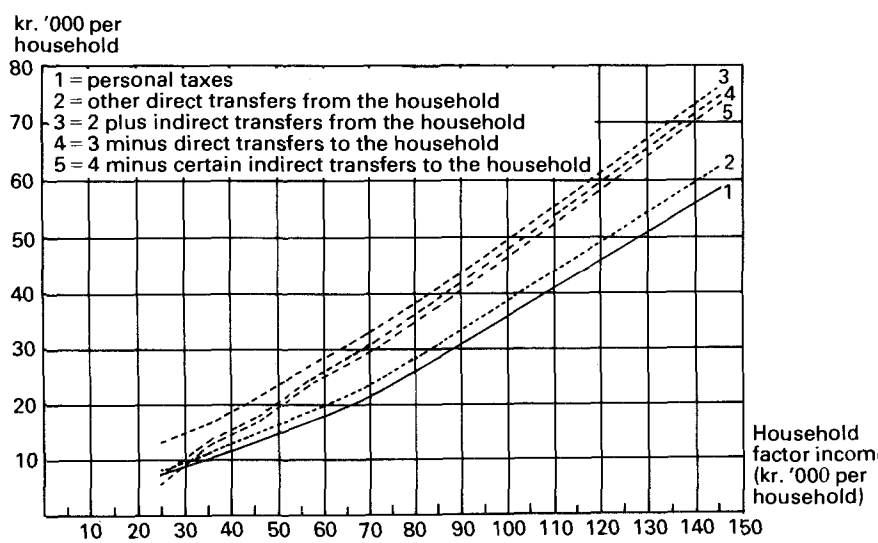

Figure 4. Direct and Indirect Transfers from Employee Households to the Public Sector and from the Public Sector to Employee Households, by Income Groups (Household Factor Income), 1971

left-hand side, whereas in the right-hand side personal taxation of the higher income groups accounts for a growing average and marginal share of total household factor incomes with rising incomes.

The curve is not changed by the inclusion of taxes on real property, contributions to sick benefit associations, motor vehicle weight duty and other direct transfers from households, but the level is generally raised, cf. line 2.

But when the indirect transfers are taken into account (line 3) the line changes not only its level but also its shape, so that—apart from the lower incomes—it resembles very much a straight line.

It is noteworthy that the sum of direct and indirect transfers to the public sector amounts to an almost unchanged share of income for households in the income ranges between 30,000 kr. and 80,000 kr.

The sum of direct and indirect transfers from households to the public sector is reduced first (line 4) by direct cash benefits from the public sector (pensions, unemployment benefits, family allowances, etc.), and then (line 5) by indirect subsidies for day-care institutions and primary health services. After these reductions, the result is very close to a straight line, which is now steeper than before.

This means that once a certain minimum income had been reached in 1971, any increase in the household factor income would empirically speaking be "taxed net" by largely the same percentage in all income groups, whereas the net tax amount as a share of household factor income would increase owing to the level of the line in the chart.

On the basis of the available data it is possible to compile marginal tax rates, cf. Table 11.

The personal tax reliefs correspond to a declining share of household factor income when this increases; and that is the most important reason why the marginal "net tax rates" do not rise sharply in step with household income, cf. Table 11, whereas the net tax amount as a share of household factor income goes up substantially, cf. Table 10b.

In Table 11 "empirical marginal tax rates" are calculated for direct net transfers to the public sector, for direct net transfers plus indirect transfers to the public sector, and finally for total net transfers to the public sector.

Like Figure 4, Table 11 should be interpreted with much caution, because the percentages state the proportion of an income rise which an average household in a given income group would have to pay by way of taxes and duties if it moved from one income group to the one immediately above and at the same time changed its characteristics (type, social group, etc.) so as to conform with the average characteristics of households in the higher income group.

The table demonstrates that a proportional tax scale generally results in marginal tax rates that are higher than the average tax rates. This fact is more clearly established when line one of Table 11 is compared with the line for direct net transfers to the public sector as a percentage of household factor income in Table 10b.

Among other things, the 1971 study reveals that out of household factor incomes in the highest group (110,000 kr. plus) some 50 percent was transferred to the public sector if both direct and indirect transfers are taken into account,

TABLE 11

"EMPIRICAL MARGINAL TAX RATES"[a] FOR EMPLOYEE HOUSEHOLDS, BY INCOME GROUPS, 1971

	0–30,000	30–40,000	40–50,000	50–65,000	65–80,000	80–110,000	100,000 kr. plus
	Percent						
Direct net transfers as percentage of income rise	53.8	31.7	40.1	40.3	51.7	53.0	
Direct net transfers and indirect transfers to the public sector as percentage of income rise	58.3	42.9	57.6	48.5	55.3	59.4	
Direct and indirect net transfers as percentage of income rise	64.0	40.8	60.4	44.3	55.7	59.4	

[a]The percentage share of the difference between the average incomes of two adjacent income groups that is paid as specified transfers to the public sector.

whereas the percentage for the lowest group was 23 and rising for the intermediate income groups.

Finally, it should be mentioned that the study for 1971 shows that about 60 percent of the income difference between the highest and the second highest income groups of employee households was transferred to the public sector in the form of direct or indirect net transfers. Similar results are found for the income differences between the second lowest and the lowest income groups, due to the strong negative correlation between household income and direct and indirect transfers from the public sector to households. For the following income groups the percentages are generally somewhat lower.

As regards the development with reference to life cycle groups, the data seem to indicate a certain life cycle effect when net transfers to the public sector are expressed as a percentage of household factor income (in a cross section analysis as the present one there might be included a generation effect which is substantial covering household income and consumption). Thus for young single persons and for young couples without children a smaller percentage was recorded than for the corresponding older households; and it also appears that this percentage for families with children was higher, the higher the age of the oldest child, cf. Table 12. It must be taken into account that VAT and excise duties are not compiled for this table due to practical reasons, but in Table 13 these indirect transfers are shown for families with children and for families without children; and according to that table it seems that VAT and excise duties are a rather constant fraction of household income for the two family types. So it is obvious that the inclusion of VAT and excise duties would mean practically no change in the differences between the total net transfer rates given for the selected life cycle groups in Table 12.

TABLE 12

DIRECT AND INDIRECT TRANSFERS BETWEEN HOUSEHOLDS AND THE PUBLIC SECTOR AS PERCENTAGE OF HOUSEHOLD FACTOR INCOME, FOR LIFE CYCLE GROUPS OF EMPLOYEE HOUSEHOLDS, 1971

	Single Persons Without Children		Families Without Children			Families with children		
	Aged Under 45 Years	Aged 45 Years and Over	Wife Aged Under 45 Years	Wife Aged 45 Years and Over	Single Persons With Children	Oldest Child Aged Under 8 years	Oldest Child Aged 8 and Under 15 Years	Oldest Child Aged 15 and Under 19 Years
	Percent							
Personal taxes	34.5	36.3	31.6	34.2	31.5	29.8	30.7	31.2
Other direct transfers to the public sector	2.2	2.6	2.8	3.7	2.9	3.3	3.4	3.6
Direct transfers from the public sector	1.9	1.2	2.4	3.8	22.1	5.0	6.3	5.1
Direct net transfers to the public sector[a]	34.8	37.7	32.1	34.1	12.3	28.1	27.8	29.6
Indirect transfers to the public sector	—	—	—	—	—	—	—	—
Certain indirect transfers from the public sector	0.9	0.5	0.7	0.8	16.5	2.9	2.0	1.6
Total net transfers to the public sector[b]	33.9	37.2	31.4	33.3	−4.2	25.1	25.8	28.0
Average factor income	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] and [b] see Table 10.

TABLE 13

DIRECT AND INDIRECT TRANSFERS BETWEEN HOUSEHOLDS AND THE PUBLIC SECTOR AS PERCENTAGE OF HOUSEHOLD FACTOR INCOME, FOR FAMILIES WITH AND WITHOUT CHILDREN, BY SELECTED INCOME GROUPS, 1971

	Household Factor Income							
	40–50,000 kr.	50–65,000 kr.	65–80,000 kr.	Total	40–50,000 kr.	50–65,000 kr.	65–80,000 kr.	Total
	Families Without Children				Families With Children			
	Percent							
Personal taxes	30.1	31.0	32.8	33.5	26.3	27.9	29.4	30.5
Other direct transfers to the public sector	4.3	3.7	3.2	3.5	3.9	3.8	3.1	3.4
Direct transfers from the public sector	7.5	2.9	2.0	3.4	8.6	6.1	4.0	5.5
Direct net transfers to the public sector[a]	26.9	31.9	34.0	33.5	21.6	25.6	28.5	28.4
Indirect transfers to the public sector	14.0	15.0	14.5	13.3	14.3	14.9	12.8	13.0
Certain indirect transfers from the public sector	1.1	0.9	0.8	0.8	2.8	1.7	2.7	2.2
Total net transfers to the public sector[b]	39.7	46.0	47.7	46.0	33.1	38.8	38.6	39.2
Average factor income	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] and [b] see Table 10.