

EVALUATING THE DISTRIBUTION OF PUBLIC EXPENDITURE*

BY GERRIT JAN VAN'T EIND, HANS VAN FULPEN, EVERT POMMER AND
LEENDERT RUITENBERG

This article evaluates the distribution of public expenditure on subsidized goods and services over income categories. It is argued that undifferentiated application of usual measures of dispersion must be rejected when judging the distribution of these expenditures, because there are hardly any subsidized goods and services for which the government aims at equal consumption. Such an application requires a normative distribution of expenditure. The normative distribution of expenditure is derived from a normative distribution of consumption and the distribution of normative charges. Central elements are needs of consumers and their financial capacity. The normative distribution of consumption is based on government intentions with respect to the goods and services under consideration.

EVALUATING THE DISTRIBUTION OF PUBLIC EXPENDITURE

1. INTRODUCTION

The ranking of households by income is mostly done by comparing freely disposable ("net") or secondary income. However, when the position of households is compared on the basis of "command over goods and services," the secondary income concept will only partially reflect the "true" income position, as it does not, for instance, include benefits from public expenditure.

The distribution of benefits from public expenditure over income categories was analysed for the Netherlands in 1977 (SCP, 1981). That study describes the statutory incidence of public expenditure on some sixty impure public goods over secondary income deciles.¹ Impure public goods are subsidized goods and services of which consumption is rival and exclusion is feasible. Wolfson (1983) has discussed the history of the SCP study and some methodological problems of empirical benefit incidence studies.

A statistical description of income distribution is a natural starting point for a discussion of income distribution and policy relating to it. In such a discussion statistical information is used as a basis for value judgements regarding the fairness of the distribution. Value judgements about primary or secondary income distribution are considered to be relatively easy, because statistical information can be reduced to a measure of income inequality like Theil's information measure. These measures seem to have an advantage; they are easy to interpret. But they are too simple to describe the distribution of benefits from government expenditure on impure public goods, because the distribution of needs for the impure public goods must also be taken into consideration; they too should be part of the measure. Normative distributions must therefore be defined. This

*The first author is from the Ministry of Employment and Social Security, The Hague; the remaining authors are from the Social and Cultural Planning Office (SCP), Rijswijk. We are grateful to Prof. J. M. M. Ritzen, Prof. D. J. Wolfson, C. A. de Kam, and an anonymous referee for valuable comments on an earlier version of this paper. Remaining errors are of course ours.

¹The study ignores substitution effects. These effects are only accounted for in effective incidence studies. See McLure (1971).

article discusses the construction of a normative distribution of benefits from public expenditure and compares it with the actual distribution (in 1977).

Defining standards to construct a normative distribution is a task for politicians. Researchers, however, can deduce the implications of (normative) policy statements and intentions, and compare them with the actual world around them (cf. Blaug, 1980, pp. 134, 135). This is the aim of this article.² Explicit government statements and policy intentions relating to the intended effects of the provision of impure public goods are "translated" into quantitative standards. The resulting normative distribution is compared with the actual distribution of expenditure.

In this article we are particularly interested in the *distribution* of public expenditure. The amount of the various categories of public expenditure is taken to be constant. This is obviously an important restriction,³ as categories of public expenditure are not weighed up against one another. Another restriction is that all impure public goods are considered to be consumer goods, yielding utility direct to the consumer, rather than as augmenting physical or human capital in any way. When such arguments are taken into account, the distribution of expenditure as well as the judgement on fairness would be different. Let us assume, for example, that education would be distributed over all individuals instead of children (as we do in this article). Such a distribution should follow when assuming that education benefits all individuals, because of externality or life-cycle (investment) arguments. This changes the distribution drastically. However we chose the direct benefit approach.

In section 2 we describe the distribution of public expenditure on impure public goods over secondary income deciles. Because the shape of income distribution depends in part on the definition of "household", this definition is also discussed in section 2. Section 3 gives a general outline of the standards underlying the normative distributions. Public expenditure equals the cost of goods or services minus user-charges (fees and other contributions). This section also discusses a concept of income-related prices (in short: income-prices). These income-prices play an important role in the calculations. When a price is charged, there will normally be a "distortion" in the distribution because well-off people are less hampered in their use of the goods and services by the price charged. An income-price is used to eliminate this distortion. The total cost of goods and services is termed the "cost price" which equals public expenditure plus user-charges. Section 3 pays no attention to practical problems relating to income-prices. Furthermore, no attention is paid to the aggregate of income-prices, which can lead to combined marginal rates of taxes and charges being too high. The empirical part of the article is contained in section 4, where the normative

²This article is a summary of a report issued by the Social and Cultural Planning Office (SCP, 1983); see also Van't Eind and De Kam (1983).

³Bebbington and Davies (1983), in a paper on personal social services, present an analysis in which not only the distribution but also the level of consumption is taken into account. They are concerned with horizontal and vertical equity and efficiency. Our article is only concerned with vertical efficiency and equity. Bebbington and Davies do not consider the distribution of personal social services by income category, but only by sex and region.

distributions are compared with the actual ones. The various impure public goods are also discussed. Section 5 summarizes our results.

2. THE DISTRIBUTION OF BENEFITS

2.1. Public Expenditure

From the Second World War until the eighties, the public sector has grown steadily. Both the number of subsidized goods and services and the proportion of the cost price being subsidized, as well as the level of consumption of goods and services, have caused this growth in expenditure. In 1977 public expenditure on impure public goods accounted for about 30 billion guilders, including administrative costs as far as they are directly related to the production of the impure public goods considered, about 10 percent of the Dutch national income. Table 1 shows public expenditure within various subsectors.

Total public expenditure in 1977 amounted to 85 billion guilders. About 35 billion guilders was excluded from the distributional analysis because it was spent on *pure public goods*. The transformation of this category of public expenditure into individual benefits is not possible. About 10 billion guilders was *practically* excluded from the distributional analysis because it was spent on capital goods, producing benefits related to future use. Transformation of such expenditure in one-year benefits is very complicated, and depends upon unknown

TABLE 1
SUMMARY OF PUBLIC EXPENDITURE AND ITS DISTRIBUTION OVER SECONDARY INCOME DECILES. (IN 1977 A GUILDER WAS WORTH APPROXIMATELY \$0.50)

	Million Guilders	Total Percent	Secondary Income Decile									
			1	2	3	4	5	6	7	8	9	10
Housing subsidies ^a	2,020	100	2	11	7	9	9	10	11	14	13	15
Education	19,074	100	29	1	2	3	6	9	11	12	13	15
Public transport	1,486	100	12	8	7	8	10	9	10	10	13	13
Social services ^b	2,429	100	3	39	19	11	11	5	4	4	2	2
Culture and recreation	1,859	100	7	4	5	6	7	10	13	14	16	18
Health care ^c	1,918	100	14	16	21	22	13	13	12	14	-12	-12
Other ^d	428	100	4	14	16	14	16	11	11	6	4	4
Average number of individuals per household		2.3	1.2	1.1	1.4	1.7	2.1	2.6	3.0	3.2	3.1	3.1
Total expenditure	29,214	100	20	6	6	6	7	9	11	12	11	12

(a) Expenditure (3,957) less housing-related taxes (1,937)

(b) Includes expenditure on "homes for the elderly."

(c) The difference between expenditure and premiums for medical insurance insofar as they fall under the Health Insurance Act.

(d) Includes disability provisions, incidental social assistance, legal assistance.

Source: SCP, 1981

parameters. About 10 billion guilders was *empirically* excluded because information about the users was lacking. The transformation of the remaining 30 billion guilders into individual benefits is not without methodological problems. Two problems need to be mentioned: the problem of *externality* and the problem of *valuation*. Both problems are related to the size of the individual and collective benefits generated by public expenditure on impure public goods. Empirically this splitting up of expenditure into an individual and collective part, however, is very difficult and it is therefore assumed that benefits are related to individuals.

2.2. *The Household*

The SCP study (1981) mentioned above analyzes the distribution of government expenditure over secondary income deciles. Studies of income distribution are intended to describe relative positions. It is usually assumed that the income position of an individual depends on income of the household to which he or she belongs. In other words, the position of all members of a household is the same, and depends on household income, whoever earns the income.⁴ Three criteria can be used to define a household (see Ritzen, 1979, p. 86 and Wolfson, 1983, p. 186): 1) interdependency by law, 2) pooling of income, and 3) income dependency. All these criteria, together indicating the interdependence of utility, are taken to be important for the definition of a household. A household, in line with these criteria, is defined as a unit consisting of individuals of 18 and above with their partner and children below 18. All children of age 18 and above are considered to constitute an independent household; in other words they are considered to be "entitled" to an independent utility function. Everyone within a household is assumed to enjoy the same income level. We realize that this assumption is a limiting one (see also Piachaud, 1982). The definition of a household is somewhat extreme. If some of the children of 18 and above continue to share the benefits of their parents' income and these children are more likely recipients of certain public activities such as higher education, then the definition of households used would result in a misleading distribution of these benefits across households. However Dutch law treats children of 18 and above in many ways as independent units.

2.3. *The Secondary Income Distribution*

Secondary household income is taken as the indicator of the position of a particular household relative to that of others. Households are ranked in deciles (10 percent groups) according to secondary income. The first decile comprises the 10 percent poorest households, while the tenth decile comprises the 10 percent richest households. All deciles contain by definition the same number of households. Because of the definition of households the first decile contains predominantly students of 18 and over. Students, as a rule, have no secondary income; their publicly provided grants are considered to be benefits. The second and third deciles contain young people receiving a minimum youth wage and

⁴This welfare definition does not take into account the number of persons within a household. Equivalence scales can be used to standardize income. See for example Kapteyn and Van Praag (1976).

pensioners. Households with factor incomes and households dependent on transfer payments may fall in the fifth decile and above. Households with more than one wage income predominantly belong to the top two deciles.

2.4. *The Distribution of Public Expenditure*

The distribution of public expenditure over secondary income deciles is shown by subsector in Table 1.

Table 1 shows that households in the first decile receive, on average, the largest share of public expenditure as a whole, because of the benefit they receive from expenditure on education. Social services and health care go more than proportionally to households in the second and third deciles (the elderly). Expenditure on culture and recreation go more than proportionally to the highest deciles.

3. OUTLINE OF A NORMATIVE DISTRIBUTION

Public expenditure on impure public goods equals the total cost of the goods and services (cost price) less charges. The normative distribution of *expenditure* is derived from a normative distribution of *consumption* (in terms of cost price) and the distribution of normative *charges*.

3.1. *The Consumption Standard*

When evaluating a distribution, one has to adopt, implicitly or explicitly, a normative distribution. The usual measures of inequality such as Theil's information measure, the Gini coefficient or Pareto's "alpha," at their simplest level, consider a distribution to be equal when all households have the same income. However this is a technical standard, rather than a policy one. Complete equality—as such—is usually not a stated policy goal. Differences, for example, in the number of working hours, in the number of persons within a household, in age, and in position on the labour market are important factors in the discussion on the distribution of secondary income.

For an evaluation of the distribution of benefits from public expenditure, the undifferentiated application of measures of dispersion must surely be rejected, because there are hardly any impure public goods for which the government aims at equal consumption by every household. The normative distribution of consumption has to be deduced from more specific policy intentions with respect to the use of particular goods and services by particular households. Such policy intentions can be translated into consumption standards that are assumed to depend only on objective characteristics of a household, such as the number of persons, or number of children. Subjective aspects ("tastes") of the beneficiaries do not play a role, but the government's ideas of what constitutes utility do. The government may, for example, state that the distribution of book-lending ought not to depend on income, but ought to be proportional to the number of individuals above a certain age. The consumption standard of book-lending then equals the number of persons within a household and consequently the normative distribution equals the distribution of the number of persons over income deciles. This is not to say that all individuals *should* consume, but that consumption

should, as a policy intention, *not* be related directly to income (unless that is a political aim in itself).

There are theoretical arguments in favour of subsidizing particular goods and services (see for example Musgrave and Musgrave, 1979, ch. 3). First there are benefit externalities: such benefits are not provided for in the market place, and public expenditure is required to correct this imperfection. Another argument is the “merit” aspect: the use of specific goods and services has more value for the user than he or she realizes. Finally there are “distributive considerations”: if education were not subsidized at all, children from lower income households would not receive enough education as it would be too expensive for the household. Both civil servants and politicians use these arguments in order to justify expenditure programmes (see, for example, Ministry of Education and Science, 1978, p. 11). However, such theoretical arguments by themselves can hardly be used to specify quantitative distributions. We therefore need specific government distribution goals.

Government distribution goals with respect to impure public goods are developed from qualitative statements and converted into quantitative standards. The empirical results in this article, however, as far as they relate to standards and the resulting normative distribution, should be handled with care, because no unique mathematical transformation exists. Other standards and consequently other normative distributions can also be perfectly feasible.

3.2. *Income-Prices and the Expenditure Standard*

User-charges can be applied as an instrument to achieve the normative distribution of consumption as defined in section 3.1. It is assumed that a household *can* be persuaded to consume a particular impure public good through charging a relatively low fee. The fee is defined as the difference between the cost of the good (cost price; taken to be fixed) and public expenditure per unit (taken to be variable). It is also assumed that there is a fee and that the price elasticity is less than zero. A specified normative distribution of consumption can—on these assumptions—be achieved with a fee per unit that is different for households in different income categories. When fees are not differentiated, households in higher income categories consume more units of (non-inferior) impure public goods than households in lower income categories.

Following this line of argument, income-prices persuade households to consume according to the consumption standard. Together with the consumption standard, the income-prices lead to the expenditure standard:

$$e(i) = c(i) \cdot (p - p(i))$$

in which $e(i)$ is the expenditure according to the standard which favours household i , $c(i)$ consumption, p the cost price per unit, and $p(i)$ the charge or fee per unit ($p - p(i)$ then represents public expenditure per unit). This standard can be used—by summing up—to construct the normative distribution of public expenditure.

3.3. A Global Outline of the Quantification

It is theoretically easy to argue in favour of income-prices when non-inferiority of the goods and services as well as a negative price elasticity is assumed. However, the problem is to identify the necessary differentiation in prices; demand equations for impure public goods are, because of well known empirical problems, in most cases not quantifiable. This section briefly outlines how income-prices are calculated.

The consumption standard is quantified for every single household within the surveys used.⁵ The prices are only defined for the household with *average* characteristics within a decile. The difference in charge between two deciles is presented by a "normative price elasticity" (n.p.e.), which equals the difference between the elasticity indicating the effect of income on consumption and the elasticity indicating the desired consumption (consumption standard). The elasticity of income indicates—in percentages—the difference in price necessary to persuade a household to consume at the same level as a household which is 1 percent poorer. The desired consumption elasticity indicates the price reduction, necessary to persuade the richer household to consume at a 1 percent higher level, when the desired consumption level for the richer household is higher.

Elasticity of income equals the ratio between income elasticity and price elasticity and is a function of the money flexibility (see Frisch, 1959), the marginal budget share, and the average budget share of the impure public goods in question.⁶ Elasticity of income is always positive. Some implicit assumptions are made concerning the value of the marginal budget share and money flexibility. The first centres on a value Theil (1975, p. 304) found for the Netherlands for a residual of a 14-commodity model of consumer behaviour, called "other goods and services." The second is calculated by assuming a certain relation between the elasticity of the marginal utility of income and the marginal tax rate. These assumptions can be improved when empirical estimates of demand equations for impure public goods are available.

The elasticity indicating desired consumption, however, may be positive (when desired consumption increases with income) or negative, when the opposite is true. When it is positive the n.p.e. may also be positive, though it need not be. When desired consumption for higher income households is distinctly higher, the n.p.e. will be negative. It can be shown empirically that in most cases the n.p.e. exceeds zero; the charge will then increase with income.

N.p.e.'s indicate the relative differences in prices between successive income categories needed to achieve the desired distribution of consumption. The price level, however, remains unknown; it depends upon the level of consumption desired by the government. This article is, however, only concerned with the

⁵These surveys are also used for computing the distribution of government expenditure (Table 1). The surveys used are from the Central Bureau of Statistics (CBS) and from the Social and Cultural Planning Office (SCP) and concern housing needs for the year 1977 (WBO77, 17709 respondents), living conditions (LSS77, 4159 respondents), public transport consumption (OVG78, 34434 respondents), and a survey on consumption of impure public goods (AVO79, 17232 respondents).

⁶This equality results if an additive utility function is assumed (utility independence between the impure public good under consideration and other goods). See Van't Eind and De Kam (1982) for derivations.

distribution and not with the *level* of consumption and expenditure. The average level of equitable prices calculated using the n.p.e., therefore, is fixed at the average level of the actual fees or charges.

4. NORMATIVE DISTRIBUTION OF PARTICULAR IMPURE PUBLIC GOODS

4.1. *Some Technical Remarks*

This section discusses the quantification of the normative distribution of consumption and expenditure within various subsectors. Before doing this, some definitions need to be discussed. First is the definition of goods and services. This is not as straightforward as it looks at first sight. Sometimes the government subsidizes only certain parts of commodity markets. For example, housing subsidies only cover a part of the housing market. In our definition, the housing sector includes the non-subsidized part. Second, charges and the definition of the cost price. Charges are defined as expenditure by the household for direct consumption (fees for schooling) or for access to consumption (premiums for sickness insurance) of subsidized goods and services. Total cost price per unit is defined as the charges plus public expenditure per unit. We shall briefly discuss the standards for every subsector as well as the definition of goods and services, the fees, and total costs. The public transport sector and other miscellaneous commodities (disability provisions, occasional social assistance, and legal assistance) are not further discussed in this article.

4.2. *The Definition of the Consumption Standards*

The government influences the *housing sector* with subject-related (rent relief) and object-related (bricks-and-mortar) public expenditure for tenants, and object-related public expenditure and tax expenditure (mortgage interest tax allowances and deliberate undervaluation of the imputed rent) for owner-occupiers. The charges are taken to be rents less subject-related public expenditure for tenants and mortgage payments, plus imputed rent, minus mortgage interest tax allowances. The normative distribution of consumption is taken to be proportional to the number of persons within a household plus one, since we wish to take economies of scale into account.

The *education sector* is divided into direct educational services (schools and universities), and indirect educational services (grants and child benefit). The consumption standard of direct educational services is based on the number of school age children within a household. However, age differences are taken into consideration because some educational services are more expensive than others. The consumption standard expressed in costs allows for differences in the cost of education; university education (age category 18–26) is more expensive than primary education (age category 4–11).⁷ Grants are income-related. A normative parental charge, equal to the maximum possible public expenditure less actual expenditure, is assumed. The consumption standard is defined for school children.

⁷The average cost price per age category is as follows (1977): age (4–5, 6–11, 12–15, 16–17, 18–26) and corresponding average cost in guilders (2,220, 2,670, 4,400, 4,710, 12,250).

In the *social services sector* we define consumption standards for home-help services, general social services, services for the elderly, and information bureaux (see also Pommer and Ruitenberg, 1981). The home-help services are intended for families in which the person who runs the household is temporarily or permanently unable to do so for medical, social, or emotional reasons. The probability of such an event is assumed to be higher in households including old people or young children and in single-parent households. The consumption standard is constructed according to these assumptions. Elderly people over the age of 75 as well as households with children under 5 are arbitrarily assumed to have 50 percent more needs. The actual charge is related to income. General social services provide assistance to people with some individual problem, usually financial or marriage related. The consumption standard is considered to be equal for all households except low-income and single-parent households; they are assumed to have 50 percent more needs. Services for the elderly are intended to keep old people out of residential care. There are no compulsory charges. The services are meant for old people living on their own. Singles are assumed to have twice the consumption standard of persons who are part of a couple. Information bureaux are completely free of charge. These bureaux provide information on social regulations, social security etc. Everyone, except those with a low level of education, is assumed to have the same need. Less educated people are assumed to have 50 percent more needs.

Culture and recreation includes many different kinds of goods and services: public libraries, museums, recreational facilities, public expenditure on youth associations, the performing arts, and so on. We have constructed consumption standards for 11 groups of goods and services, which can broadly be divided into three sections: recreational facilities, educational facilities, and cultural facilities. Recreational facilities include professional sport organizations, sports facilities, facilities such as parks, man-made landscapes, and forest maintenance. Everyone over the age of 5 is assumed to have the same consumption standard. Some categories of public expenditure are especially meant for children and in such cases the consumption standard is zero for people of 18 and over. The total charge is defined as equaling the estimated total of receipts. Educational facilities include youth associations, public libraries, community centres, and "out of school education." The consumption standard is taken to be equal for everyone in a specific age category depending on the goods and services in question. The age category for public libraries is taken to be 6 years of age and over. Out of school education is particularly meant for people of 18 and over. Youth associations and community centres are meant for the 6-17 year olds and 6-24 year olds respectively. Membership fees are charged for public libraries as are subscriptions for youth associations. Cultural facilities include the performing arts, art galleries and museums. These facilities are meant for everyone above a certain age (6 for art galleries and museums and 13 for the performing arts). Charges equal total receipts and admission fees.

The Dutch *health care system* is financed partly through a public health insurance system and partly by private medical insurance companies. The public insurance system covers about 70 percent of the population. Income is the main determining factor for access to the system and the level of premiums. People in

employment are compulsorily publicly insured if their income is below a certain level; others can be insured in related systems with different charges (voluntary system and the system for the elderly). The government subsidizes the whole system through the general budget, and part of the deficit of the voluntary system and the system for the elderly is financed from premiums from the compulsory insurance. The insurance is taken to be the service; it includes private insurance schemes. The consumption standard is defined as the financial risk of an individual falling ill, measured by means of consumption in a given age and sex category. The financial risk is taken to equal the average cost of illness in the different age and sex categories concerned.⁸

Babies' and children's clinics and district nursing services do not form part of the health care insurance system, and are treated separately. Households pay a subscription and are "insured" for the consumption of the facilities. We have defined a consumption standard for both the district nursing services and the clinics. Risk categories are defined in the same way as in the health care insurance system. There is one important difference from the health care insurance system: the consumption standard is defined per household in the case of the district nursing services and the clinics whereas in the case of medical insurance the indicator is defined per individual.

4.3. Normative and Actual Distribution Compared

The results of the analysis are shown in Table 2. The normative distribution of consumption is given for each sector in line 1. The normative distribution of public expenditure (line 2) is compared with the actual distribution of public expenditure in line 3. The actual distribution of expenditure does not always equal that in Table 1, because in Table 2 not all expenditures are taken into account. Furthermore the expenditures in Table 1 are aggregated by sector, while in Table 2 expenditures in some sectors are shown separately.

The difference between the distributions in lines 1 and 2 is determined by the influence of the normative price elasticity (n.p.e.), which can only operate where charges are levied. If, for instance, a large charge were to be made to the public for direct educational services, then the consumption standard (line 1) would remain the same, but the expenditure standard would be changed (more public expenditure for the lower deciles, slightly less for the higher deciles).

In the housing sector (a) the normative distribution for households in the higher deciles is above average; such households should therefore pay even more than the costs on account of the normative price, which for deciles 9 and 10 is more than 100 percent of the cost of the service. In reality they pay on average 90 percent of the costs. However it is rather unrealistic to propose a system in which users pay more than the cost price for goods or services. The sensible limit is a 100 percent charge. Consequently, the housing objectives formulated here can only be realized with a much larger amount of public expenditure. Calculations indicate that some 4 billion (1977) guilders extra would be needed, while expenditure in the housing sector that year amounted to 2 billion guilders.

⁸In the surveys used consumption of the various health services is known. The insured goods and services and the cost price per unit are also known from other sources.

TABLE 2
THE NORMATIVE AND THE ACTUAL DISTRIBUTION OF
EXPENDITURE IN THE DIFFERENT SECTORS
(HORIZONTAL PERCENTAGES)

Total	Decile of Secondary Income									
	1	2	3	4	5	6	7	8	9	10
Housing										
a1 100	2	5	5	6	9	12	14	16	16	16
a2 100	13	21	17	15	18	28	26	18	-4	-51
a3 100	2	11	7	9	9	10	11	14	13	15
Education—direct educational services										
b1 100	16	7	9	9	9	10	10	9	11	11
b2 100	16	7	9	9	9	10	10	9	11	11
b3 100	31	1	2	3	6	9	11	13	12	13
Education—public expenditure on student/pupil maintenance										
c1 100	3	1	3	5	8	10	14	16	17	23
c2 100	6	2	5	6	12	9	15	16	13	17
c3 100	6	2	4	5	10	8	12	14	16	23
Home-help services										
d1 100	6	19	12	7	8	11	13	11	8	6
d2 100	6	20	12	8	8	11	13	11	7	5
d3 100	4	18	15	11	20	8	8	7	4	5
Other social services										
e1 100	9	14	12	13	9	9	8	9	9	8
e2 100	8	14	12	13	9	9	8	9	9	8
e3 100	10	15	17	12	13	10	7	8	5	4
Recreational facilities										
f1 100	5	6	7	9	10	12	13	13	13	13
f2 100	7	7	8	10	11	12	13	13	11	8
f3 100	7	4	5	6	8	11	14	15	15	15
Educational services in the recreational field										
g1 100	6	5	6	8	10	13	15	15	12	10
g2 100	7	5	6	9	10	14	16	15	11	8
g3 100	7	4	5	6	7	10	14	14	16	17
Cultural amenities										
h1 100	6	6	7	9	10	12	12	13	13	13
h2 100	7	7	7	9	10	12	12	13	12	11
h3 100	7	5	6	6	7	9	9	12	15	25
Health care insurance										
i1 100	4	6	7	10	10	12	13	13	13	12
i2 100		56		53		56		28		-93
i3 100		36		52		38		56		-81
District nursing services and child and baby clinics										
j1 100	4	13	12	12	10	11	11	11	10	6
j2 100	5	17	15	14	11	11	10	9	6	1
j3 100	-1	13	26	13	13	8	13	9	6	-0

Key:

1. Normative distribution of consumption.
2. Normative distribution of public expenditure.
3. Actual distribution of public expenditure.

Source: Social and Cultural Planning Office (1981) and sources mentioned in note 5.

With regard to direct educational services (b), households in the highest deciles receive just over the desired proportion of benefit from public expenditure. Because of the low fees (on average 0.7 percent of total costs), the normative price has hardly any influence on the normative distribution of expenditure (which is more or less equal to the normative distribution of consumption). The difference in normative and actual distribution is largely determined by the fact that the use made of educational facilities by children in deciles 2-6 falls short of the consumption standard. The highest deciles also receive more than the norm in respect of the provisions for students' maintenance grants (c). Here the charges, as a percentage of the costs, are considerable (on average 51 percent). The normative price therefore plays an important part in the result.

As far as social services are concerned (d and e), it is notable that the higher deciles (with the exception of the highest) receive less than the expenditure standard. A possible reason is that in reality income-prices already exist for home help services.

For all categories of services in the cultural and recreational sector (f, g, and h) the highest deciles appear to receive more than the expenditure standard allows. The main reason is that some households do not make use of all the services, though they are taken to have a positive consumption standard. This can be observed in the recreational sector (f), in educational services (g), where it is more pronounced, and, most markedly, in cultural services (h).

In the case of health insurance (i) the four highest deciles benefit more than the expenditure standard allows. Although in reality the highest deciles already pay more than the cost of the insurance, it seems that the user-charges are too low. With regard to the non-profit organizations which run district nursing services and child and baby clinics (j), deciles 2, 5, 7, and 8 benefit more than the expenditure standard allows. This is mainly the result of the revealed distribution of consumption.

5. SUMMARY AND CONCLUSIONS

In this article we compared the actual distribution of public expenditure with the normative distribution of public expenditure. Expenditure standards were derived from consumption standards for impure public goods, and the influence of income was eliminated by introducing "income-prices". A number of important assumptions were made:

—The subsidized goods and services discussed or impure public goods are assumed to be non-inferior (positive income elasticity) and to have a non-zero price elasticity (negative). These assumptions are vital to our calculations. A zero income elasticity would lead to a situation in which prices are equal for all income categories. Consequently the expenditure standard would equal the consumption standard. A zero price elasticity would not allow an income-price policy at all.

—Income-prices are assumed to be technically possible. However, in the case of some impure public goods application of such a policy would technically be very difficult, if not impossible (e.g. museums and public transport).

—The utility function is assumed to be additive with regard to the impure public good under consideration and all other goods. This preference independence assumption implies that only substitution is allowed for; complementarity between impure public goods and private goods then is implicitly assumed not to exist (see for example Philips, 1974, p. 63).

—The most important assumption is that qualitatively stated government intentions can be quantified, and that the government would agree with the chosen quantification. Some choices are in fact arbitrary. This means that the empirical results must be treated carefully. The results may act as a starting point for a discussion on standards for government expenditure. The analysis offers a possibility of rationalizing the discussion of the distribution of public expenditure.

When the standards are a correct translation of government intentions, the empirical results lead to the following conclusions. Households in the 9th and 10th decile receive too much in comparison with poorer households in the following sectors:

- housing subsidies (1.7 billion guilders out of a total of 1.9 billion);
- education subsidies (0.6 billion guilders out of a total of 1.9 billion);
- public transport subsidies (0.2 billion guilders out of a total of 1.4 billion);
- subsidies on social services and subsidies on culture (0.2 billion guilders out of a total of 1.7 billion);
- subsidies on health care (0.2 billion guilders out of a total of 1.3 billion).

On the other hand, households in the 9th and 10th deciles actually receive less than the standard in the case of preventive medical care and (medical) home help services (0.1 billion guilders out of a total of 1.2 billion). The actual distributions are far from equitable; households from higher income deciles actually do receive more than the standards allow in most of the cases. As to the cause of this we can put forward a number of hypotheses:

—Without income dependent charges, higher income households can be expected to consume more non-inferior impure public goods. The cost per household in terms of utility loss will be less the higher the household's income is.

—The level of income correlates more or less with the level of education. The more education received, the more information one has about the availability of goods.

—Political choices concerning public expenditure may be influenced by accepted notions in the higher strata of society. Educated politicians may think libraries are important, because they know the importance of reading and assume the same preferences prevail among the less well-educated individuals.

These conclusions should not automatically be taken as advocating the introduction of income-prices, which could involve serious problems. First, income-prices cannot always be applied. Second, the marginal share of taxes plus charges might become too progressive. Third, the price elasticity could be zero—e.g. when consumption is compulsory (education for children aged 16 and below, and to some extent consumption of health care facilities). The analysis in this article is based on mechanical formulae where the demand for all goods and services is regarded as elastic. However, in situations where income-prices are not possible the results of this kind of analysis can be used to defend other,

possibly less expensive, policies than the 1977 subsidization policy. Furthermore when income-prices cannot be applied, other kinds of price discrimination policies may be possible, policies in which some indirect relation to income exists (age-related prices for example).

REFERENCES

- Bebbington, A. C. and Davies, B., (1983), Equity and Efficiency in the Allocation of Personal Social Services, *Journal of Social Policy*, Vol. 12, 309-329.
- Blaug, M. (1980), *The Methodology of Economics (or how Economists Explain)*, Cambridge.
- Frisch, R. (1959), A Complete Scheme for Computing all Direct and Indirect Cross Demand Elasticities in a Model with Many Sectors, *Econometrica*, Vol. 27, 177-196.
- Kapteyn, A. and van Praag, B. M. S. (1976), A New Approach to the Construction of Family Equivalence Scales, *European Economic Review*, Vol. 7, 315-335.
- McLure, C. E. (1971), The Theory of Public Incidence, *Finanzarchiv*, Vol. 30, 431-453.
- Ministry of Education and Science (1978), *Memorie van Toelichting bij de begroting 1979* (Explanatory Memorandum accompanying the Ministry of Education and Science Budget for 1979), Tweede Kamar (Lower House) session 1978-1979, White papers nr. 15300, The Hague.
- Musgrave, R. A. and Musgrave, P. B. (1979), *Public Finance in Theory and Practice*, New York.
- Pommer, E. J. and Ruitenberg, L. W. (1981), Profijt van overheidsvoorzieningen in de welzijnssector (Benefits from public spending in social welfare), *Beleid en Maatschappij*, 370-388.
- Phlips, L. (1974), *Applied Consumption Analysis*, Amsterdam.
- Piachaud, D. (1982), Patterns of Income and Expenditure within Families, *Journal of Social Policy*, Vol. 11, 469-482.
- Ritzen, J. M. M. (1979), De meting van de tertiaire inkomensverdeling (The measurement of tertiary income distribution); in: Van Niekerk, N.C.M., *Tertiaire inkomensverdeling* (Tertiary income distribution), Deventer.
- Social and Cultural Planning Office (1981), *Project van de overheid in 1977* (summary available in English: *Distribution of benefits from public expenditure*), The Hague.
- , (1983), *Profijtbeleid van de overheid* (Redistribution in kind, a policy analysis), Rijswijk.
- Theil, H. (1975), *Theory and Measurement of Consumer Demand*, Vol. 1, Amsterdam.
- Van't Eind, G. J. and de Kam, C. A. (1982), *How to Relate Prices and Income* (unpublished working paper), Rijswijk.
- , (1983), De lange weg naar een profijtbeleid van de overheid (The long road towards a government policy on redistribution in kind), *ESB*, 56-61.
- Wolfson, D. J. (1983), On the Social Selectivity of Public Spending Programmes, *The Netherlands Journal of Sociology*, 181-197.