

DIVIDING GOVERNMENT PRODUCT BETWEEN INTERMEDIATE AND FINAL USES

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This paper explores the possibility of using the Classification of the Functions of Government published recently by the United Nations (COFOG) in order to segregate intermediate from final use of government production in the national accounts. It is argued that the notorious difficulties of doing that can be traced to two reasons, one the multiplicity of theoretical concepts, and the other the lack of sufficient detail at the statistical level. The first can be removed by clarifying that on the production account of an economy only production and not welfare is to be measured. The second seems to be overcome by the three-digit detail of COFOG. It is shown that many of these categories are now sufficiently homogeneous for a panel of experts to agree in assigning them to either intermediate or final use, although for a number of categories this is still difficult. The question is whether consensus in the major categories is large enough to consider the remaining controversial ones as border cases, normal in any classification and solved in the last instance not by argument but by convention. Some preliminary figures for the intermediate part of government production are given.

I. COFOG

In its continual effort to improve official statistics the United Nations has recently issued a "Classification of the Functions of Government" (COFOG),² replacing the classification contained in the original System of National Accounts for the Government Sector.³ As compared to the early version three basic changes are introduced: first, an increase in the number of major groups from 9 to 14, second the recommendation that administrative expenditures be treated as integral parts of the functions which they serve, and third the isolation of a major group covering fuels and energy in the classification.⁴ Furthermore, titles and definitions of the categories have been refined to clarify their contents and remove ambiguities. Cross references have been introduced for the same purpose. The new manual has kept and possibly intensified the character of a functional breakdown of government expenditure. Such a breakdown permits the analysis of trends independent of changes in time or national differences in the organisational structure of governments.

We would argue that the new classification serves more than this conventional purpose. In our view, the appearance of COFOG marks a decisive step towards solving the long-standing problem of isolating, within national accounts, the intermediate uses of government product. Ever since the classical debate

¹This research was funded in part by a grant from Deutsche Forschungsgemeinschaft (DFG).

²United Nations, Department of International Economic and Social Affairs, Classification of the Functions of Government, Statistical Papers Series M, No. 70 (New York, 1980).

³United Nations, *A System of National Accounts*, Studies in Methods, Series F, No. 2, Rev. 3 (New York, 1968), Table 5.3, p. 87 ff.

⁴United Nations (1980), p. 1.

between Hicks and Kuznets, documented in *Economica*,⁵ it has generally been agreed that such uses do exist. The last decade witnessed more than one attempt to subtract hidden intermediate product, including that of government, from national product proper.⁶ A solution has not been found. Rather the non-solution of assigning government product in total (net of sales) to final use is still standard practice and followed world-wide.

In view of the apparent resistance to change on the part of official statistics it may be futile to come up with another proposal. But COFOG is the work of official statistics. We want to show that on the basis of this new detailed classification a genuine SNA solution for identifying intermediate government production is feasible, if only the principles inherent in the classification itself are carried to their logical conclusions.

II. DEFINITIONS

Earlier studies have treated the government sector in terms of national accounts proper. We find it more convenient to start from the input-output table. SNA stresses the basic equivalence of the two, so that what is shown to hold in one should be valid in the other system.

The largest single number contained in a modern input-output table is government consumption, an undifferentiated block placed in final demand. Inputs from other sectors *into* government are well documented. They form a column (usually the last one) of the first quadrant. Still missing is the complement to this column, namely a row showing the uses of government product, in other words the inputs into other sectors *from* government. The row which is actually in the table accounts for the market share of government product only, that which is paid for by the other sectors. This being the minor and less important share, it is highly desirable to add the row for the major share of non-market government product. This problem is defined from the input-output system itself and should be solved from within the system. In order to do so we will not form any *a-priori* notion of intermediate product and insert it in existing classifications, but the other way around. We shall investigate the existing classification in order to abstract from it a notion of intermediate product that can be extended to the government sector. The question then is what definition of "intermediate" can be developed from present statistical practice which would make it possible to disaggregate the governmental sector?

In seeking this definition we will neglect government sales. Government sales must be accounted for as the classification is filled with numbers. But on

⁵Hicks, J. R., The Valuation of Social Income, *Economica*, Vol. 7 (1940), p. 115 ff; Kuznets, S., On the Valuation of Social Income—Reflections on Professor Hicks' Article, Part I, *Economica*, Vol. 15 (1948), p. 7 ff; Hicks, J. R., The Valuation of Social Income—A Comment on Professor Kuznets' Reflections, *Economica*, Vol. 15 (1948) p. 164.

⁶See, for example, the proposals by Juster, Ruggles and Ruggles, Olson, and Nordhaus and Tobin in M. Moss, ed., *The Measurement of Economic and Social Performance* (New York 1973), also P. Walser, *Volkswirtschaftliche Gesamtrechnung—Revision und Erweiterung* (Göttingen 1975), U. P. Reich, Ph. Sonntag, H. W. Holub, *Arbeit-Konsum-Rechnung—Axiomatische Kritik und Erweiterung der Volkswirtschaftlichen Gesamtrechnung* (Köln 1977), and others.

the purely conceptual level, which is the topic of this article, it is simpler and no loss of generality to leave sales aside.

With this assumption our problem can be represented in simple graphical form (Figure 1):

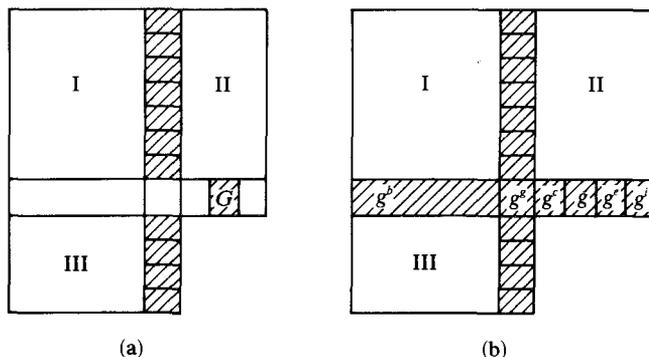


Figure 1

In an input-output table government production is described, at present, by a column in the first quadrant showing all inputs, and a row showing only one big output G , called government consumption. The task is to develop concepts which allow us to disaggregate this figure within the table. More precisely, it is to find concepts which enable us to fill in numbers in the—now empty—row within the first quadrant.

In this way there results a very simple notion of “intermediate product.” Intermediate product is the product which is used in the first quadrant. Since the first quadrant depicts productive use we may enrich this rather formal definition by saying intermediate product is the product used for production. Most of this will be used by business (g^b), but some will also be used by government itself for its production (g^g). We leave the question whether all of government product is intermediate aside for a moment in order to continue the formal development. If there is government product used for individual consumption we call it (g^c). Moreover, if not all of government product can be broken down in this way, we may need to use the category of general government services (g), replacing actual (overstated) government consumption (G). Finally, some government product may be exported (g^e).

One may also like to define the investment part of government production, in analogy to the other sectors. This would add another cell (g^i) to the row of government product uses. As with the other inputs, present statistics document investments *into* government (e.g. purchase of a building), but do not consider investments *from* government into other sectors. In rows like “General public services,” “Non-market services of education” or “Non-market services of health” the cell of the column “investment” is empty.⁷ The human capital approach proposes an alternative.

⁷Statistical Office of the European Communities, Input-Output Tables, Special series 1-9, Luxembourg (1976-1978).

But to question the convention that all of government product is consumed immediately (“for its own use”) would not aid our task here to redefine the purpose for which it is consumed. The time structure of the use can be left aside so that for simplification we abstain from defining an investment category (g^i) of government production.

Summing up this formal exposition the different symbols are assembled in a row of uses of government outputs (Figure 1b).

III. PRINCIPLES

The question is whether this formal set-up, devised to suit an input-output table, has any basis in actual statistical classifications. COFOG groups its functions under four headings (see appendix):

- “(a) *General government services* (major groups 01-03). This heading includes those activities required for the Government of the country that cannot be associated with services to persons or to business . . .
- (b) *Community and social services* (major groups 04-08). This heading includes the services supplied to the community and to households and persons directly . . .
- (c) *Economic services* (major groups 09-13). This heading covers government expenditures associated with the regulation, and more efficient operation of business . . .
- (d) *Other functions* (major group 14). This heading contains interest charges and underwriting costs of the public debt and transfers of a general nature to other organs of government . . .”⁸

The last function is no part of government production, and can be dropped here. There remain three major headings, which very naturally suit the formal pattern of an input-output table. COFOG singles out services in two directions, either to persons or to business, the first being booked under major heading (b), the second under (c). In addition, COFOG assumes expenditures which are *not* associated with services to others. COFOG distributes some, but not all of present government expenditures.

Furthermore, COFOG singles out an important principle. Many services may affect households indirectly, but the term “community and social services” is reserved for those services only that affect households directly. The principle of *directness* is a decisive tool in breaking up government product. We want to show how by refining and generalizing this principle COFOG can yield a pretty clear notion of the distribution of government product.

It has been a source of constant concern in such efforts that many transactions benefit more than one economic agent. Sometimes this may even be the typical case. At this point two different concepts of measurement emerge. In terms of welfare one would have to assess the value and the sum of the values of all these benefits to different agents. One of the important contributions of welfare theory is to have opened the mind of the economist to the indirect effects of transactions. Yet, within an input-output table such a concept cannot be made operational.

⁸United Nations (1980) p. 6.

The structure of such a table makes sense only under the premise that it is useful to attribute products to *specific* uses. If such attribution is contested in principle, the input–output system becomes void.

This can be exemplified by the notion of general government services (g). These services have an impact on many agents, but not on any sector specifically. Researchers with a welfare background will be inclined to break down this aggregate in the same way as the other government functions. But the principle of direct use suggested by COFOG hinders such imputations. According to it, a function can be assigned either to a specific use or to none at all. In the latter case, instead of spoiling the input–output structure by distributing inputs unspecifically to all agents it is preferable to keep a specific function undistributed. This is also the more conservative approach in that it continues part of the present practice, which follows this rationale.

In our opinion the introductory quotations from COFOG show that the very first-order breakdown of COFOG categories suggests their use in an input–output table. “Economic services” should prove to be the main category of intermediate goods (g^b, g^g), “community and social services” should contain the bulk of what we denote by (g^c), and (g) should be found under “general government services.” In short, COFOG suggests that there are three basic categories of use of government product, namely production, consumption and government. This hypothesis can be tested by scrutinizing each of COFOG’s 127 specific functions in terms of this aspect.

COFOG itself does not introduce the terms “intermediate” or “final.” The connection should not be difficult to establish. However, in taking this step a theoretical debate which has already been alluded to on the issue of intermediate government product must be clarified. Intermediate is logically opposed to the notion of final product. Thus by defining one, one also defines the other. It is usually the definition of final product which is of interest, the definition of intermediate product being derived from it. Within the framework just developed final product can definitely not include “economic services” of COFOG, for those are services “to business,” they enter the first quadrant and are thus intermediate by the definition of this quadrant. But final product may differ in two other ways. It may either contain or not contain COFOG’s “general government services.” This is what the theoretical debate is about.

Private consumption is undisputably taken as final product. As to general government services, however, both positions are held. One may classify these services as intermediate, assuming a welfare point of view. To include general government services in final product would then constitute “duplication” if not “fetishism with dangerous implications that should be obvious.”⁹ One may, on the contrary, consider general government services as final from the production aspect, for, they are part of what society has produced above keeping capital intact. The distinction between the welfare and the production point of view was introduced by Hicks;¹⁰ it has in part been formalised within national accounts

⁹Kuznets, S. Discussion of the new Department of Commerce Income Series, *Review of Economics and Statistics*, Vol. 30, No. 3 (1948) p. 156.

¹⁰Hicks (1940).

by the terms “product at market prices” and “product at factor cost,” and it is also helpful here.

Input–output tables are about production, not about welfare. Ideally, such a table contains pure quantities of goods, to be valued at different prices (purchasers’ prices, producers’ prices, etc.) and displaying the inputs used for production of each individual output. The welfare point of view may determine the valuation of these physical numbers, but it does not influence the classification or the use of outputs. If we want to be consistent, therefore, we must adhere to the principle of measuring *production* which is inherent in the structure of the existing input–output table.

In terms of production those services are intermediate that flow back into “business,” or more generally, into production. “General government services,” by their definition, do not do so directly, while “economic services” do. Were it not so the distinction would not have to be made in the classification. It follows that for the purpose of entering government production in a production account, its economic services can be considered intermediate, and its services for private consumption as well as general government can be considered final.

It also follows that a change in the notion of “domestic product” must be accepted if the notion of intermediate product is taken seriously. If one is successful in singling out the intermediate part of government product, this part must be deducted from final product. It is generally agreed that, at present, domestic product is overstated because of the inclusion of—hitherto undetected—intermediate services of government.

In terms of COFOG we are concerned with “government final consumption expenditure”¹¹ only; no subsidies or other monetary transfers, no gross accumulation, no acquisition of financial assets are entered here in the production account. “Government final consumption expenditure” consists of outlays on commodities and the value added in production.¹² This is the input side, the column in the input–output table. As within this system government is considered as productive there must be an output resulting from that production. But the output is not distributed over a market.

In order to assess the economic significance of a product outside the market one must examine the purpose of the product as embodied in its physical characteristics. The output method of constructing input–output tables, well known and used already for the market sector, is based on this principle. One tries to infer the use of a good from its properties (e.g. pencils, tires). This method is applicable only if the classification used is so detailed that each category is homogeneous in this respect. The finer the classification, the more specific the product, and the easier its allocation to a specific use.

It is at this point that COFOG builds an important bridge. COFOG is worked out at a three-digit level, comprising 127 categories into which the production of government services is to be registered. From a quantitative point of view, not all of these may be important, or can even be supplied with numbers at the present stage of statistical development. But conceptually, government

¹¹United Nations (1980) p. 4.

¹²United Nations (1968) p. 98.

production is disaggregated here to a degree which makes it possible to apply the output method in assigning products to their destinations, not in each and every case, as we shall see, but sufficiently to justify the effort.

IV. EXPERTS

A section of a technical report of the United Nations about the feasibility of welfare-oriented measures to supplement the national accounts and balances¹³ is devoted to intermediate and final expenditures of government. The difficulty of measuring a volume of output of some of these expenditures is mentioned but is deemed beyond the scope of the UN work as it is considered in this paper. The necessity for continuity and the difficulty in reallocating intermediate products away from government to other sectors are noted as objections to a change in practice. "But the even greater difficulty would probably be that of securing agreement—internationally or even among a group of national experts—about which government services are regarded as intermediate and which (if any) as final."¹⁴ Two studies on such intermediate products are then compared as an example and their difference in results taken as an indicator of "the inevitably subjective nature of any such rearrangement."¹⁵ On the other hand the area is deemed to be "certainly in need of active promotion."¹⁶

The discrepancy between different versions of re-arranging national accounts is not to be debated. On the other hand, if the main difficulty is to establish agreement among experts, then this is the area where some efforts have to be made. Our hypothesis is that experts differ in view not because of the "inevitably subjective nature" of the concepts, but because of the multiplicity of concepts that can be associated with the notion of final and intermediate from different theoretical points of view. The question is whether, once the multiplicity is reduced and a single meaning identified as the only one to be pursued, experts still disagree substantially.

For our investigation a panel was established, composed of experts from different fields related to the study of government. Scholars in public finance, in national accounting, in general economics, and also practitioners from statistical offices and ministries were invited. They were granted anonymity towards each other as well as in the publication of the research. The total was 20 experts, of which 16 answered. The experts were provided with a copy of COFOG,¹⁷ and were asked to allocate each of the COFOG functions to either intermediate (g^b , g^g), or final (g^c , g) use. The crucial point was the explanation of the criterion by which this allocation was to be performed. As indicated above, diversity of experts' opinion could only be expected to be reduced if every expert used the same criterion; this criterion was the principle of direct use for production. We explained this principle (in greater detail than in the foregoing section) illustrating

¹³United Nations, *The feasibility of welfare-oriented measures to supplement the national accounts and balances*, Studies in Methods, Series F, No. 22 (New York, 1977).

¹⁴Ibid., p. 32.

¹⁵Ibid., p. 34.

¹⁶Ibid.

¹⁷Actually this was an earlier version, "Draft Detailing of the Classification of the Functions of Government," Statistical Commission E/CN.3/510, 1 June 1978 New York.

each category by what we hoped to be an unambiguous case. Before asking the experts we formed our own judgment, which served as a reference when the answers of the experts came in.

The results are given in the appendix in full. For reasons of space it is not possible here to interpret them in every detail. But some conclusions can be drawn.

The first and most obvious result is that in substantial areas experts did agree about where to assign a specific function. In many cases they were almost unanimous. Education, for example, and health were assigned quite unambiguously to private consumption. On the other hand, there were also areas where experts did not agree or were uncertain in their judgment, e.g. some functions of general government.

After the answers of the experts had come in we reviewed each function again, trying to interpret and understand the experts' voting. The experts were asked to comment whenever they felt it suitable. Their responses in combination with our own hypotheses about intermediateness were used to make a second judgment which is indicated in the appendix by a round black dot. We intend to discuss this judgment with some selected experts in order to test whether they would agree once we have explained our decision. The technique is similar to the Delphi technique in that it reduces subjectivity of judgment as far as possible.

We begin our discussion with "community and social services" (major groups 4-8), because it is less difficult conceptually. Deviation among experts as well as between experts and ourselves was least in these groups. Actually, the unanimity in assigning these groups to private consumption is not a surprise. Studying the different proposals that have been made to disaggregate the government sector shows that in areas such as education and health the literature is in agreement about counting it as individual consumption.¹⁸

The reason is that most of the functions named in "community and social services" are aimed directly at private households. Consumption of private households is final product both from the welfare and the production points of view. There is no theoretical doubt therefore as to the final character of these expenditures.

Education (major group 4), health (5) and social security (6) are the cornerstones of the thesis that a detailing of the functions of government in national accounts of production is feasible. There is general agreement about the allocation of the product of these services to private households so that a change of conventions at least regarding these three major groups cannot be objected to on the basis of the argument of diversity of expert opinion or its inevitable subjectivity.

Within this general picture, four items deserve closer attention, for they help to better define and clarify the criterion of direct use. Function 4.22, "Secondary education—vocational and technical," was classed as intermediate consumption by some experts, more so than other education. This judgment can

¹⁸Support of this view comes from researchers interested in determining total household consumption, consisting of "private" and "collective" consumption. The latter should be very close to if not identical with g^c as defined here; see Ch. Saunders, Measures of Total Household Consumption, *Review of Income and Wealth*, Series 26, No. 4 (1980), p. 351-366.

probably be explained by referring to welfare theory. Vocational training is oriented more than other education to business, and business has an interest in this form of education more than in others. Thus, from a welfare point of view, vocational training influences the welfare of business and is therefore judged to be intermediate consumption.

On the other hand this example also shows what is meant by direct use. Vocational training is consumed directly by the student, who is a member of a private household, not of business. The fact that in a later stage of his career, in making use of what he has been taught, the former student offers qualified work to his employer constitutes an indirect effect, which cannot be taken account of in an input-output-system. Input-output requires that an approach be used which defines specific sectoral relationships of production. The principle of direct use serves this aim.

Function 4.50, "Subsidiary services to education," further clarifies this principle. It collects expenditures on items like transportation, food, lodging etc. chiefly for students regardless of level. One expert did not assign this function to private consumption (g^c) but as an intermediate product to government (g^g), contrary to the majority of experts and to our own initial decision. Yet we believe now that this is the correct allocation.

The alternative is drawn out more clearly in Figure 2.

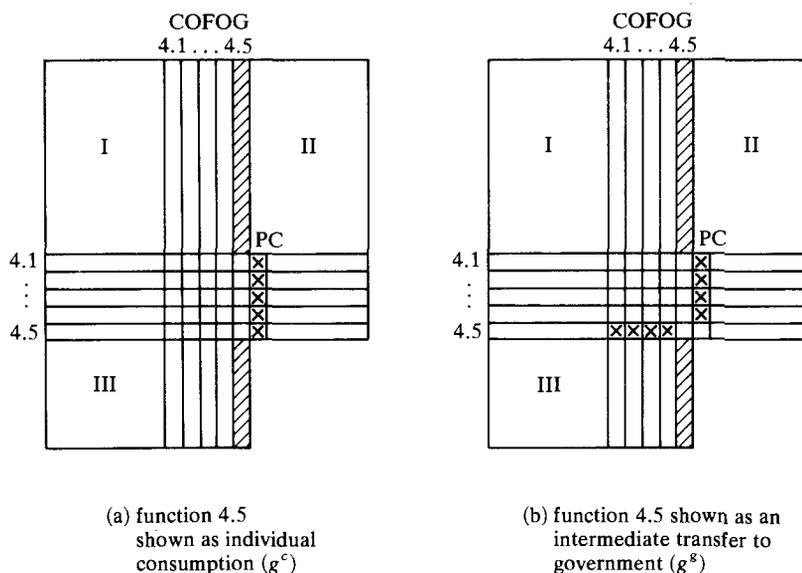


Figure 2

The figure shows how the usual single government sector in an input-output table is disaggregated into its COFOG functions, the functions relating to education (4.1–4.5) being enumerated explicitly here. The inputs (expenditures) are marked in the column; the outputs are to be assigned. For the first four of

these functions, namely education at different levels or not defined by level, the purpose is private consumption directly. Their output is registered in the corresponding column (PC) of the second quadrant. If the purpose of the fifth function, “subsidiary services to education,” were the same, its output would also have to be allocated there (Figure 2a). But as the function’s very title suggests, these services are subsidiary to the main purpose of education, their purpose is not alimentation or transportation directly, but only as far as it is necessary for the purpose administered in the governing functions of education. Thus, function 4.50 is an input into the other education functions, and the appropriate treatment is shown in Figure 2b. Its output is shown as costs in those sectors that perform the education service proper. Since the output of those services goes to private consumption, the output of the subsidiary category does so too in the end, but not directly (Figure 2a), but indirectly (Figure 2b) by increasing the cost value of the main functions 4.1–4.4.¹⁹

It is again the notion of directness that urges us to allocate function 5.50, “Applied research and experimental development related to the health and medical delivery system,” as intermediate (g^g) to other health functions. Although most experts did allocate this function to consumption of private households, the principle of directness forbids such treatment. Research cannot be consumed directly, but only via an actual health service into which it flows. The direct purpose of the research is not consumption but improvement of health services.

There may be a different category calling for this function, namely investment. For improving a service is normally shown as an investment except when rising standards require such improvement for the purpose of simple reproduction. But in this paper we do not question the standard distinction between consumption and investment. Whatever part of function 5.50 is shown as government consumption expenditure today is accepted here as being consumption. Hence, according to the principle of direct use it should be entered in the accounts of the other health services as one of their costs. If, at some time, it is decided to treat research as investment then a corresponding amount of depreciation will take its place.

¹⁹In the discussions following the presentation at the 17th IARIW Conference it was often objected that by accepting as intermediate, e.g. food supplies or health care provided at school one would commit an error in that these services are by their physical nature final, i.e. part of individual consumption. One would unduly differentiate between societies where all health care is provided outside school and societies where some of it is channeled through the school system.

The argument helps to clarify the notion of direct use that we find crucial in differentiating among government products. It is well known that “a car is not a car” in national accounting; it may be investment if bought by industry, it may be consumption if bought by private households. We are not classifying physical qualities but rather their economic use or purpose. In a similar, if not stronger, way, a statistician has to rely on the classification of purposes given to him by government or other official agencies. If a government explicitly considers a certain food or a health program as being required for education, possibly budgeting it to the ministry of education, then a statistician usually must accept this view, even if in other countries such services are not deemed necessary. If, on the other hand, government uses the school system as a distributive means for programs other than education, namely, to provide food or health care to the poor, then it would not be a question of whether category 4.50 is intermediate, but those programs should not be compiled under this heading in the first place. They should be included directly under health and welfare, respectively. It is important to distinguish between the assignment of a general category to either final or intermediate use on the one hand, and the inclusion of a particular government expenditure item under this category on the other.

Functions 7.11, "Housing affairs and services," 7.12, "Community affairs and services," 7.20, "Water supply affairs and services" and 7.32, "Pollution abatement and control affairs," have been marked intermediate, contrary to expert opinion and our own before the test. But none of these government services is consumed directly. The administration of housing affairs and services is directed not to the public but first of all to the sector "real estate" in the first quadrant. It is an input into this sector, not in the sense that it is this sector which causes the expense, but it is the sector which on the basis of government activity 7.11 produces its own product, namely housing. Given the artificiality with which this sector is peeled out of the institutional setting in order to fit the functional breakdown, there cannot be much objection to adding an additional input. That decision has the effect that indirectly this input is distributed in the same way as housing itself. Community development affairs and services (7.12) is also a specific input, not to housing but to the sector "Construction" and should be shown there.

Summing up major groups 7 and 8 without explaining all details, we find that it is necessary to deviate from the vote of the expert majority. The treatment of indirect use, derived from the principle of direct use made operational in an input-output table in the way shown in Figure 2, was not, in all probability, present in the experts' minds. Rather the titles of these functions suggested that the enterprises producing these goods were meant while in reality government support to those enterprises is registered here. Thus, there is double reason to discard the expert vote and follow consistently the principle of direct use in assigning this function as intermediate. A future test will show whether experts can be convinced of this view.

With respect to the groups included under "economic services," namely groups 9-13, there is the same general agreement of experts as is for individual consumption. The reason is probably the same, too. For, here again, the notions of "intermediate" rooted in welfare theory on the one hand and production on the other coincide. The few deviations that can be observed may be explained by the hypothesis of experts' inadvertency. For they are more marked in group 9, "Fuel and energy affairs and services," than in group 11, "Mining and mineral affairs and services etc." In the first group one may suppose that the product of the function is fuel or energy, which is used by final sectors indeed, while such a wrong assumption is not induced by the heading of group 11, where everybody visualizes the production activity itself. Also some notion of utility to other than the direct users may have played a role.

On the whole, the opinion of the experts is quite clear in supporting the COFOG classification. Major groups 9, 10, 11 are all classed as intermediate, confirming the classification in which they were assembled as being economic services to production.

We turn now to the last chapter of COFOG, which systematically is the first, the functions called general government services (1-3).

On first sight these are the candidates for that part of government production which is not carried back either via productive sectors or via private households into production, but remains g, government production in the strict sense, mainly for non-economic purposes. Here, expert judgment is rather diffuse,

reflecting the theoretical split over these functions. From the production point of view these expenses are final, even more so than private consumption because they use resources without producing them. From the welfare point of view on the other hand, these expenses are non-final, because they do not increase the welfare of the private consumer. A clear convention demands a decision between the two and it need not be repeated that it is the first which we deem appropriate as guideline for a national production account.

But even then, these groups remain tricky. Function 1.12, "Financial and fiscal affairs and services," are a government activity par excellence. Yet, from the production point of view they are not final but serve the purpose of collecting the means necessary to carry out other government functions. Thus, it is a prominent example of g^g , a government function, intermediate to government. Function 1.2, "Foreign economic aid," is not intermediate as the name might suggest but export, for it is aimed at foreigners. Function 1.3, "Fundamental research affairs and services," is a debatable issue. Many experts classed it as intermediate either to private production or to government. In our view, the systematic basis of COFOG qualifies it as government consumption in the strict sense. COFOG makes a distinction between fundamental and applied research. This distinction may be questioned, but as long as it is carried out, the two categories serve different purposes. Applied research is shown in COFOG within the specific function to which that research belongs (e.g. research related to the health system, 5.50). In contrast, fundamental research has no such specific purpose but is an aim in itself. And it is only the indirect effect of such research on production which induces governments to pay for it. Since indirect effects are excluded by the principle of direct use, these expenses fall under government consumption in the strict sense.

Defense (2.1) is the classical non-economic public good. On this function, experts are united again in calling it government consumption. The corresponding research should, of course, contrary to expert majority but in line with the principle of direct use, be booked as input into other military functions (if not as investment, see above).

Function 3.11, "Police duties," was allocated with almost statistical regularity to all possible uses. It is true, a traffic officer controlling the traffic flow over a crossroad is more like a producer of inputs into the traffic system than of a particular government service. And private households reporting lost dogs to the police station around the corner look very much like consuming the service of a friendly policeman.

The bulk of police activities, however, are not of this nature. In fact, these are generally judged a misuse of police functions, because they could be carried out by normal citizens not endowed with the special power of police. Being the carriers of public authority (and arms) qualifies the policeman not for controlling traffic or helping consumers but to keep law and order by means of force if necessary. He is similar in this respect to the military. From the point of view of welfare theory one may argue that such activity is in the interest of all citizens and that police activity should therefore be allocated completely to the other sectors. This is true, but it is a different criterion. "Being in the interest of" is not the same as "being the direct purpose of." It is not the direct purpose of

the police to produce goods nor to be at the service of private households. Police activity from the direct point of view is an end in itself and must be treated accordingly. Besides, in the particular example of traffic control one should be reminded that police activity here consists only to a small degree in directing traffic. The majority is engaged in detection and prosecution of trespasses of traffic rules, the typical purpose of authoritative power.

The same holds true for 3.20, "Law courts," which also has shown great ambiguity among experts. Interestingly enough the next function, 3.30, "Prison administration and operation," was less so. Here the authoritative, non-economic character is more evident. Law courts, some experts argued, may serve enterprises in regulating their conflicts or private households in suing government, and so on. Yet, on closer investigation, resolving of conflict is not the particular function of law courts. It is the resolving by means of public authority, resorting in the end to the public use of force, on which this particular form of conflict resolution relies. The direct purpose of any judgment is neither production in any way nor private consumption, but first of all the keeping of law and order, in the same way as is done by the police.

In spite of the arguments brought forward one must realize that general government is the most debatable major group in COFOG. The view that all of these expenditures should be distributed to other sectors in analogy to economic and consumption functions cannot be proven *a priori* to be wrong. COFOG has made the decision of tripartite classification, the third part comprising production not directed to either production or consumption. This decision continues a tradition of statistics in this area.²⁰ It also accepts that there is some rationale in the present convention which, after all, distributes none of government product. The demand to go to the other extreme and distribute everything has an utopian touch in that it hinders rather than furthers the distribution of those functions on which general agreement about their destination does exist. Finally, one should not discuss the desirability of a separate aggregate of government services on the basis of border cases which are normally problematic in any statistics, but of typical ones. The expenditure for the military is a typical case. The literature as well as the experts asked here agree about its being different in character from consumption or economic functions. Since the purpose of a classification is to bring out differences, the tripartition, retaining a non-distributable government consumption in a restricted sense, seems more appropriate than any alternative.

V. PROBLEMS AND PRELIMINARY FIGURES

National accounting has to serve many purposes. If we have followed rather strictly the purpose of measuring production, we did not intend to object in any way to other measurement goals.²¹ We focussed on how to measure production

²⁰See, for example, Statistisches Reichsamt, *Das deutsche Volkseinkommen vor und nach dem Kriege*, Berlin 1932. (Einzelschriften der Statistik des Deutschen Reiches, Nr. 24) p. 16.

²¹See, e.g., M. E. Levy, Improving the Analytical and Data Framework of the Government Sector for National Goals Accounting, *Review of Income and Wealth*, Series 26, No. 3 (1980), p. 293, and J. W. Kendrick, Expanding imputed values in the national income and product accounts, *Review of Income and Wealth*, Series 25, No. 4 (1979), p. 349.

consistently, given the premise that one wants to measure it at all. With this premise in mind we have advanced the hypothesis that the new classification of functional government elaborated by the UN is a tool for dealing with the old problem of intermediate use of government product. Our research has supported the hypothesis that the extension of detail envisaged in this classification allows a clearer identification of different uses of different government products. Experts did agree in many areas about where to assign these functions.

Yet this is only the first step in validating our hypothesis. There still remain some weighty problems to be dealt with.

First of all, COFOG has not yet been implemented statistically. It is an open question, therefore, how well the detailed categories can be filled with actual statistical figures of countries. A pilot study carried out by OECD²² on the basis of a similar but less detailed classification showed that for seven OECD member countries (Sweden, Finland, Denmark, U.K., Belgium, F.R.G., U.S.A.) the statistics were at least feasible. The questionnaire was answered to a greater or lesser degree and even if not all figures could be given, an improvement of national statistics was deemed possible. In the meantime, the Federal Statistical Office of the FRG has published government expenditure at a level of 24 categories²³ following the old SNA classification with 9 main functions. A further breakdown of statistical material is possible. Nevertheless, as long as COFOG has not been supplied with data, the task has not been completed and our hypothesis of identifying the intermediate parts of government product remains abstract.

The second more involved question concerns the notion of domestic product and its derivatives. Preliminary calculations of the OECD data show that the intermediate part of government production ranges around 15 percent of government production or 3 percent of domestic product in Sweden, U.K. and the Federal Republic.²⁴ A true net product would have to account for these costs and subtract them from gross product.

The question is whether an addition to the existing concepts of net output of an economy revealing the intermediate part of government production may prove useful. In all probability, the answer to this depends on the results of the statistical implementation of COFOG.

We have not mentioned at all the problem of valuation. Yet this is a problem crucial to consistent accounting. The government sector is well known for its intricacies in this field. Not only prices but even volumes of output are lacking, so that consistency cannot be achieved even in standard accounts. Following current conventions, the value of the output of each of the COFOG functions would be computed by adding up the costs within each function, these costs being valued at market prices. On the other hand, inserting rows of the use of government product in an input-output table implies that a new set of costs is

²²OECD, *Pilot Study on Public Expenditure and their Classification*, Working Party No. 2 of the Economic Policy Committee, Paris 1974.

²³Kopsch, G., *Ausgaben des Staates nach Aufgabenbereichen in den Volkswirtschaftlichen Gesamtrechnungen, Wirtschaft und Statistik* (1980), H.3, S.157 ff.

²⁴Black, A. P., Horz, K., and Reich, U. P., *Die Erfassung des Staatssektors in der Input-Output-Rechnung, Ifo-Studien* 1/1981, in press.

TABLE 1
INTERMEDIATE USE OF GOVERNMENT PRODUCT (REAL TRANSFERS)
PRELIMINARY FIGURES FOR SELECTED COUNTRIES

	Sweden Swedish Kronor	U.K. Pounds Sterling	F.R.G. D.M.
Value of intermediate real transfers from the government	9,967m	3,111m	35,068m
Total government consumption	70,691m	22,950m	215,290m
Share of intermediate real transfers in total government consumption	14.1%	13.6%	16.3%
Share of intermediate real transfers in GDP	3.5%	3.0%	3.4%

Source: Authors' estimates.

inserted, too, in the business sector as well as the government sector itself. The question arises how to deal with these costs in respect to the total value of output. Either one leaves the output value unchanged by subtracting the government costs in an additional row within the third quadrant, or one enlarges gross output. Both solutions have their advantages and their difficulties, but this is theoretically more involved than can be elaborated in the remainder of space here.²⁵

One final bias of the present study must be mentioned. Although originally planned as a comparative study between F.R.G. and U.K., the funding organizations supported only the first part. Due to this only West German statistics and West German experts were studied. It is very likely, therefore, that some national bias has come in the interpretation as well as the decision about the classification of government intermediate product. It would be most desirable, and is planned indeed as the next step, to internationalize the study.

We have dealt here mainly with the distinction between intermediate and final use of products, in terms of COFOG the distinction between economic services and others. The tripartition of government production laid out in COFOG requires that another distinction be investigated as well, namely, the distinction between individual and collective consumption within final use.²⁶ For the problems encountered in separating these two categories may have a repercussion on the distinction of final and intermediate product in general, which we were not able to cover here.

REFERENCES

- Black, A. P., Horz, K., and Reich, U. P., Die Erfassung des Staatssektors in der Input-Output-Rechnung, *Ifo-Studien*, No. 1, pp. 1-33, 1981.
 Hicks, J. R., The Valuation of Social Income, *Economica*, Vol. 7, 1940.
 ———, The Valuation of Social Income—A Comment on Professor Kuznets' Reflections, *Economica*, Vol. 15, 1948.

²⁵ Reich, U. P., Zur Berechnung der realen Staatsquote, *Ifo-Studien* H.1 (1981), pp. 75-102.

²⁶ Jean Petre, "The treatment in the national accounts of goods and services for individual consumption produced, contributed, or paid by government", Paper for the 17th General Conference of the IARIW, August 1981.

- Kopsch, G., Ausgaben des Staates nach Aufgabenbereichen in den Volkswirtschaftlichen Gesamtrechnungen, *Wirtschaft und Statistik*, pp. 155–169, März 1980.
- Kuznets, S., On the Valuation of Social Income—Reflections on Professor Hicks' Article, Part I, *Economica*, Vol. 15, 1948.
- , Discussion of the New Department of Commerce Income Series, *Review of Economics and Statistics*, Vol. 30, No. 3 1948.
- M. Moss, ed. *The Measurement of Economic and Social Performance*, New York, 1973.
- Petre, J., "The treatment in the national accounts of goods and services for individual consumption produced, contributed, or paid by government", Paper for the 17th General Conference of the IARIW, August 1981.
- Reich, U. P., Zur Berechnung der realen Staatsquote, *Ifo-Studien*, No. 1, pp. 75–102, 1981.
- Reich, U. P., Sonntag, Ph., and Holub, H. W., *Arbeit-Konsum-Rechnung*, Axiomatische Kritik und Erweiterung der Volkswirtschaftlichen Gesamtrechnung, Köln, 1977.
- Saunders, Ch., Measures of Total Household Consumption, *Review of Income and Wealth*, Series 26, No. 4, 351–366, 1980.
- Statistical Office of the European Communities, *Input-Output Tables*, Special Series 1–9, Luxembourg, 1976–1978.
- Statistisches Reichsamt, *Das deutsche Volkseinkommen vor und nach dem Kriege*, Berlin, 1932.
- United Nations, *A System of National Accounts*, Studies in Methods, Series F, No. 2 Rev. 3, New York, 1968.
- , Draft Detailing of the Classification of the Functions of Government (COFOG), Statistical Commission, E/CN.3/510, 1 June 1978, New York.
- , *Classification of the Functions of Government*, Statistical Papers, Series M, No. 70 New York, 1980.
- , *The Feasibility of Welfare-Oriented Measures to Supplement the National Accounts and Balances*, Studies in Methods, Series F, No. 22, New York, 1977.
- Walser, P., *Volkswirtschaftliche Gesamtrechnung-Revision und Erweiterung*, Göttingen 1975.

APPENDIX

ASSIGNMENT OF COFOG FUNCTIONS TO SPECIFIC USES (Figures indicate expert notes; black dots, authors' second decision)

Functions of Government [Corresponding to the United Nations "Classification of the Functions of Government" (COFOG).]	Intermediate Production		Final Domestic Demand		
	Intermediate Real Transfers from Government to		Real Transfers to Private Consumption (g ^c)	Residual Collective Consumption (g)	(g ^c) ² -
	Enterprises (g ^b)	Government (g ^a)			
<i>01. General Public Services</i>					
<i>01.1. Executive and legislative organs, financial and fiscal affairs, external affairs other than foreign aid</i>					
01.11. Executive and legislative organs	3	6	2	12 ●	—
01.12. Financial and fiscal affairs and services	1	12 ●	1	4	—
01.13. External affairs	4	4	4	12 ●	—
01.14. Executive and legislative organs, financial and fiscal affairs, external affairs other than foreign, n.e.c. ¹⁾	—	—	—	—	—
<i>01.2. Foreign economic aid</i>					
01.21. Economic aid to developing countries	4	1	12	—	●
01.22. Economic aid routed through international organiz- ations	2	1	12	—	●
01.23. Foreign economic aid n.e.c.	—	—	—	—	—
<i>01.3. Fundamental research affairs and services</i>					
01.31. Fundamental research into the natural sciences, engineering and technology	11	6	2	7 ●	—
01.32. Fundamental research into the social sciences and humanities	6	6	4	8 ●	—
01.33. Fundamental multidisciplinary research	9	6	4	8 ●	—
01.34. Fundamental research n.e.c.	—	—	—	—	—
<i>01.4. General Services</i>					
01.41. General personnel services	—	9 ●	—	7	—
01.42. Over-all planning and statistical services	5	9	2	9 ●	—
01.43. Other general services	1	8 ●	1	8	—
<i>01.5. General public services n.e.c.</i>					
01.50. General public services n.e.c.	—	—	—	—	—
<i>02. Defence affairs and services</i>					
<i>02.1. Military and civil defence administration and operation</i>					
02.11. Military defence affairs	2	2	2	14 ●	—

Functions of Government [Corresponding to the United Nations "Classification of the Functions of Government" (COFOG).]	Intermediate Production		Final Domestic Demand		
	Intermediate Real Transfers from Government to		Real Transfers to Private Consumption (g ^c)	Residual Collective Consumption (g)	(g ^e) ²
	Enterprises (g ^b)	Government (g ^a)			
02.12. Civil defence affairs	3	2	4	13 ●	—
02.13. Military and civil defence administration and operation n.e.c.	—	—	—	—	—
02.2. Foreign military aid					
02.20. Foreign military aid	1	1	—	12	●
02.3. Defence-related applied research and experimental development					
02.30. Defence-related applied research and experimental development	2	4 ●	—	12	—
02.4. Defence affairs n.e.c.					
02.40. Defence affairs n.e.c.	—	—	—	—	—
<i>03. Public order and safety affairs</i>					
03.1. Police and fire protection affairs and services					
03.11. Police duties	10	5	11	10 ●	—
03.12. Fire-protection services	12 ●	6 ●	13	6	—
03.13. Police and fire-protection affairs and services n.e.c.	—	—	—	—	—
03.2. Law courts					
03.20. Law courts	11	7	12	9 ●	—
03.3. Prison administration and operation					
03.30. Prison administration and operation	2	2	6	9 ●	—
03.4. Public order and safety affairs n.e.c.					
03.40. Public order and safety affairs n.e.c.	—	—	—	—	—
<i>04. Education affairs and services</i>					
04.1. Pre-primary and primary education affairs and services					
04.10. Pre-primary and primary education affairs and services	—	—	15 ●	1	—
04.2. Secondary education affairs and services					
04.21. Secondary education—general programmes	—	—	16 ●	—	—
04.22. Secondary education—vocational and technical	6	1	15 ●	—	—
04.23. Secondary education affairs and services n.e.c.	—	—	—	—	—
04.3. Tertiary education affairs and services					
04.31. Universities and other institutions providing similar education services	2	1	16 ●	—	—
04.32. Tertiary education services not leading to a university degree	3	1	16 ●	—	—
04.33. Tertiary education affairs and services n.e.c.	—	—	—	—	—
04.4. Education services not defined by level					
04.40. Education services not defined by level	—	—	16 ●	1	—
04.5. Subsidiary services to education					
04.50. Subsidiary services to education	1	3 ●	15	1	—
04.6. Education affairs and services n.e.c.					
04.60. Education affairs and services n.e.c.	—	—	—	—	—
<i>05. Health affairs and services</i>					
05.1. Hospital affairs and services					
05.11. General hospital services	2	2	16 ●	—	—
05.12. Specialized hospital services	2	2	16 ●	—	—
05.13. Medical and maternity centre services	2	2	16 ●	—	—
05.14. Nursing and convalescent home services	2	2	16 ●	—	—
05.15. Hospital affairs and services n.e.c.	—	—	—	—	—
05.2. Clinics, and medical, dental and para-medical practitioners					
05.21. General medical clinics and general medical practitioners (doctors)	2	2	16 ●	—	—
05.22. Specialized medical clinics including specialist medical practitioners (doctors)	2	2	16 ●	—	—
05.23. General or specialist dental clinics and dentists, oral hygienists or other dental operating auxiliaries	2	2	16 ●	—	—
05.24. Other clinics and para-medical personnel	2	2	16 ●	—	—
05.25. Clinics, and medical, dental and para-medical practitioners n.e.c.	—	—	—	—	—
05.3. Public health affairs and services					
05.30. Public health affairs and services	3	2 ●	15 ●	2	—
05.4. Medicaments, prostheses, medical equipment and appliances or other prescribed health-related products					
05.40. Medicaments, prostheses, medical equipment and appliances or other prescribed health-related products	1	—	16 ●	—	—

Functions of Government [Corresponding to the United Nations "Classification of the Functions of Government" (COFOG).]	Intermediate Production		Final Domestic Demand		
	Intermediate Real Transfers from Government to		Real Transfers to Private Consumption (g ^c)	Residual Collective Consumption (g)	(g ^e) ²
	Enterprises (g ^a)	Government (g ^b)			
05.5. Applied research and experimental development related to the health and medical delivery system					
05.50. Applied research and experimental development related to the health and medical delivery system	7	3 ●	10	3	—
05.6. Health affairs and services n.e.c.					
05.60. Health affairs and services n.e.c.	—	—	—	—	—
<i>06. Social security and welfare affairs and services</i>					
06.1. Social security affairs and services					
06.11. Sickness, maternity or temporary disablement benefits	—	—	14 ●	—	—
06.12. Government employee pension schemes	1	1	12 ●	3	—
06.13. Old-age, disability or survivors' benefits other than for government employees	—	—	14 ●	1	—
06.14. Unemployment compensation benefits	—	—	14 ●	—	—
06.15. Family and child allowances	—	—	14 ●	—	—
06.16. Other social assistance to persons	1	—	14 ●	—	—
06.17. Social security affairs n.e.c.	—	—	—	—	—
06.2. Welfare affairs and services					
06.21. Welfare services—children's residential institutions	—	—	15 ●	—	—
06.22. Welfare services—old persons' residential institutions	—	—	15 ●	—	—
06.23. Welfare services—handicapped persons	—	—	15 ●	—	—
06.24. Welfare services—other residential institutions	—	—	15 ●	—	—
06.25. Welfare services not delivered through residential institutions	—	—	15 ●	—	—
06.26. Welfare affairs and services n.e.c.	—	—	—	—	—
06.3. Social security and welfare affairs n.e.c.					
06.30. Social security and welfare affairs n.e.c.	—	—	—	—	—
<i>07. Housing and community amenity affairs and services</i>					
07.1. Housing and community development					
07.11. Housing affairs and services	7 ●	1	15	2	—
07.12. Community development affairs and services	12 ●	7	12	5	—
07.13. Housing and community development affairs n.e.c.	—	—	—	—	—
07.2. Water supply affairs and services					
07.20. Water supply affairs and services	16 ●	12	16	3	—
07.3. Sanitary affairs and services including pollution abatement and control					
07.31. Refuse collection and disposal operations, sewage system operation, street cleaning	15 ●	11	16 ●	3	—
07.32. Pollution abatement and control affairs	8 ●	4	13 ●	5	—
07.33. Sanitary affairs and services and pollution abatement and control n.e.c.	—	—	—	—	—
07.4. Street lighting affairs and services					
07.40. Street lighting affairs and services	11	9	14	3	—
07.5. Housing and community amenity affairs and services n.e.c.					
07.50. Housing and community amenity affairs and services n.e.c.	—	—	—	—	—
<i>08. Recreational, cultural and religious affairs and services</i>					
08.0. Recreational, cultural and religious affairs and services					
08.01. Sporting and recreational affairs and services	1	1	16 ●	1	—
08.02. Cultural affairs and services	—	—	16 ●	—	—
08.03. Broadcasting and publishing affairs and services	7 ●	4	16	1	—
08.04. Religious and other community affairs and services	— ●	—	16	1	—
08.05. Recreational, cultural and religious affairs and services n.e.c.	—	—	—	—	—
<i>09. Fuel and energy affairs and services</i>					
09.1. Fuel affairs and services					
09.11. Coal mining affairs; other solid mineral fuels coal processing affairs and services	16 ●	3	5	2	—
09.12. Petroleum and gas affairs and services	16 ●	3	5	2	—
09.13. Nuclear fuel affairs and services	16 ●	2	4	1	—

[Corresponding to the United Nations "Classification of the Functions of Government" (COFOG).]	Intermediate Production		Final Domestic Demand		
	Intermediate Real Transfers		to Private Households Consumption (g ^f)	Collective Consumption (g)	(g ^e) ²
	Enterprises (K ^b)	Government (K ^a)			
09.14. Fuel affairs and services other than fuels of 09.11	16 ●	3	5	2	—
09.15. Fuel affairs and services n.e.c.	—	—	—	—	—
09.2. Electricity and other energy sources	16 ●	3	5	1	—
09.2.1. Electricity affairs and services	16 ●	3	5	1	—
09.2.2. Energy affairs and services other than electricity	—	—	—	—	—
09.2.3. Electricity and other energy sources n.e.c.	—	—	—	—	—
10. Agriculture, forestry, fishing and hunting affairs and services					
09.30. Fuel and energy affairs and services n.e.c.	—	—	—	—	—
10.1. Agricultural affairs and services	16 ●	—	—	1	—
10.12. Agrarian reform and land settlement affairs and services	16 ●	—	4	1	—
10.13. Farm price and income affairs and services	16 ●	—	4	—	—
10.14. Agricultural extension affairs and services	15 ●	—	2	—	—
10.15. Veterinary affairs and services	16 ●	—	6	—	—
10.16. Pest control and similar services not included in 10.11 to 10.15 inclusive	16 ●	—	3	—	—
10.2. Forestry affairs and services	16 ●	—	5	—	—
10.3. Fishing and hunting affairs and services	15 ●	1	7	—	—
10.4. Agricultural research and experimental development	16 ●	2	—	2	—
10.5. Agriculture, forestry, fishing and hunting affairs and services n.e.c.	—	—	—	—	—
10.6. Services n.e.c. forestry, fishing and hunting affairs	—	—	—	—	—
11. Mining and mineral resource affairs and services, other than fuels, manufacturing and construction affairs and services					
11.1. Mining and mineral resource affairs and services, other than fuels					
11.10. Mining and mineral resource affairs and services, other than fuels	16 ●	—	—	—	—
11.2. Manufacturing affairs and services	16 ●	—	—	—	—
11.3. Construction affairs and services	16 ●	—	—	—	—
11.4. Mining and mineral resource affairs and services n.e.c. other than fuels; manufacturing and construction affairs and services n.e.c.	—	—	—	—	—
11.40. Mining and mineral resource affairs and services n.e.c.; manufacturing and construction affairs and services n.e.c.	—	—	—	—	—
12. Transportation and communication affairs and services					
12.1. Transportation system construction affairs and services	—	—	—	—	—
12.11. Highway construction affairs and services	—	—	—	—	—
12.12. Water transport facility construction affairs and services	—	—	—	—	—
12.13. Railway construction affairs and services	—	—	—	—	—
12.14. Air transport facility construction affairs and services	—	—	—	—	—
12.15. Pipeline and other transport facility construction affairs and services	—	—	—	—	—
12.16. Transportation system construction affairs and services n.e.c.	—	—	—	—	—
12.2. Transportation system operation affairs and services other than construction	16 ●	10 ●	15 ●	2 ●	●
12.21. Road system operation affairs and services	16 ●	6 ●	10 ●	2 ●	●
12.22. Water transport operation affairs and services	16 ●	7	13	3	—
12.23. Railway system operation affairs and services	16 ●	5 ●	12 ●	2 ●	●
12.24. Air transport operation affairs and services	16 ●	4	7	1	—
12.25. Pipeline transport and other transport system operation affairs and services	—	—	—	—	—
12.26. Transportation system operation affairs and services n.e.c.	—	—	—	—	—

Functions of Government [Corresponding to the United Nations "Classification of the Functions of Government" (COFOG).]	Intermediate Production		Final Domestic Demand		
	Intermediate Real Transfers from Government to		Real Transfers to Private Consumption (g ^c)	Residual Collective Consumption (g)	(g ^e) ²
	Enterprises (g ^b)	Government (g ^g)			
12.3. Communication affairs and services					
12.30. Communication affairs and services	15 ●	8	14	2	—
12.4. Transportation and communication affairs and services n.e.c.					
12.40. Transportation and communication affairs and services n.e.c.	—	—	—	—	—
<i>13. Other economic affairs and services</i>					
13.1. Distributive trade affairs and services including storage and warehousing; hotel and restaurant affairs and services					
13.11. Distributive trade affairs and services including storage and warehousing	16 ●	—	3	—	—
13.12. Hotel and restaurant affairs and services	16 ●	—	5	—	—
13.13. Distributive trade affairs and services, including storage and warehousing, n.e.c.; hotel and restaurant affairs and services n.e.c.	—	—	—	—	—
13.2. Tourism affairs and services					
13.20. Tourism affairs and services	16 ●	—	10	—	—
13.3. Multipurpose development project affairs and services					
13.30. Multipurpose development project affairs and services	16 ●	—	2	1	—
13.4. General economic and commercial affairs other than general labour affairs					
13.40. General economic and commercial affairs other than general labour affairs	12	4	2	3 ●	—
13.5. General labour affairs and services					
13.50. General labour affairs and services	11	5	9	2 ●	—
13.6. Other economic affairs and services n.e.c.					
13.60. Other economic affairs and services n.e.c.	—	—	—	—	—
<i>14. Other functions</i>					
14.0. Other functions					
14.02. Public debt transactions	1	8	—	9	—
14.02. Other functions n.e.c.	—	—	—	—	—

¹N.e.c. (not elsewhere classified) categories cannot be allocated by their specific purpose, but only according to the main expenses they actually contain.

²g^e includes all government services which are consumed by foreign economic agents (export).

POVERTY IN EUROPE¹

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In this paper a definition of poverty in terms of welfare is given. A method is developed to derive poverty lines from an individual welfare function of income. The model is extended to analyse the effect of several socio-economic characteristics on the level of the poverty line. An empirical application of the method is given based on data from a survey in eight European countries in 1979. Differences in the poverty lines both between countries and between socio-economic groups within each country are considered. Finally the number of people below these poverty lines is estimated for all countries in the group.

1. INTRODUCTION

During recent decades social scientists have paid increasing attention to the problem of poverty. Reduction of poverty has become one of the major aims of socio-economic policy, and is getting even more important in the present situation of worldwide decreasing economic growth.

In order to develop means to reduce poverty it is necessary to identify the poor in a society. The criterion used to distinguish the poor from the non-poor hence plays a crucial role in the measurement of poverty. Defining and measuring poverty will be the main subject of the present paper.

A *poverty line* is defined as an income level below which people are called poor, and above which people are called non-poor. Definitions of a poverty line can be broadly classified in two groups: absolute and relative definitions.

Absolute definitions of a poverty line take "objective" criteria as a point of departure. Nutritional experts are asked to assess the minimal needs of individuals with respect to food, clothing, housing, etc. The income level needed to meet these basic needs is called the poverty line. This method, first applied by Rowntree (1901) and afterwards used in many other poverty studies (see, e.g., Orshansky (1965) and (1968)), does not explicitly link the level of the poverty line to average welfare in society. Implicitly, however, the objectivity of this method is questionable: the choice of basic needs is obviously culture-bound. Townsend among others has shown that an absolute poverty line is both undesirable and impossible [Townsend, (1974) and (1979)].

Relative definitions of poverty are based on the concept of poverty as a state of relative deprivation, and take into account the general level of welfare in society. One might choose the poverty line as a fraction of median or average income in society, or as a specific percentile of the income distribution (see, e.g.,

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OECD (1976)). However, the choice of such a fraction or percentile is again arbitrary. Another approach is to base the level of the poverty line on the general opinion in society. One might for instance ask individuals what they think is the smallest amount of money a family of four needs to get along. Questions like this have been asked in a number of Gallup polls (see, e.g., Kilpatrick (1973) and Rainwater (1974)). It may, however, be difficult for respondents to assess the costs of living for a household of a size different from their own. A solution to this problem is to ask people what they consider to be a minimum income for *their own household*. When survey data of this kind are used, one needs a procedure to derive a national poverty line from the answers given. In Goedhart *et al.* (1977) a new method was proposed to define such a national poverty line. They applied the method to a large Dutch dataset. In Van Praag *et al.* (1980a) the same method was applied to small samples drawn in nine European countries.

The present paper differs from those papers in the following points. First, the poverty line concept is based on previous work on individual welfare functions of income (WFI). Instead of identifying feelings of poverty on a more or less *ad hoc* basis by what people consider to be a *minimum income*, which expression may have rather different connotations over countries, we define the poverty concept as a specific welfare level in terms of the WFI concept. This method of defining a poverty line has been introduced as a secondary method, called the "political poverty line", in Goedhart *et al.* (1977). Secondly, the large sample we use may be considered to be the first representative sample for the eight European countries concerned, from which estimates of the WFI may be derived. Third we not only estimate various poverty lines, but we also present here for the first time the percentage of the population in each country that is living below those poverty lines. Fourthly, due to the fact that we have large samples at our disposal we are able to estimate separate poverty lines for various subgroups of the population. The poverty lines assessed for the various countries appear to vary a great deal. However, it is also found that poverty ratios corresponding to the same welfare level do not correspond to the same quantile in the income distribution. Hence, defining the poverty line as a specific quantile of the income distribution does not yield correct international comparison. Finally, just to illustrate the difficulties of the poverty concept, we investigate how many people of a certain country would be considered poor according to the standards of the seven other countries, in order to shed some light on the pitfalls of cross-national comparison.

In section 2 a general method is described to derive a poverty line from a cardinal utility function. In section 3 a specific utility function is introduced. A method to differentiate the poverty line according to several socio-economic characteristics is described in section 4. In section 5 the data and results are discussed, while section 6 concludes.

2. DEFINITION OF A POVERTY LINE

In the previous section a poverty line was defined as an income level below which individuals are called poor, and above which individuals are called non-

poor. We will use a welfare level as a poverty criterion and will derive a poverty line from the relation between welfare and income.

Assume individuals evaluate income levels y according to an individual cardinal utility function $U(y)$, which is monotonically increasing in y and scaled on an interval $[a, b]$. Once this utility function is known for each individual t and a certain welfare level $\delta (a < \delta < b)$ is chosen, the income level $y_{\delta,t}$, for which

$$(2.1) \quad U(y_{\delta,t}) = \delta$$

holds, can be calculated for each individual t . As U is monotonically increasing in y there exists a unique solution of equation (2.1). Assuming that the evaluation of an income level y by individual t depends on his actual income y_t and other characteristics, e.g. the number of family members fs_t , and that this evaluation is a monotonically increasing function of y_t , we can write for $y_{\delta,t}$

$$(2.2) \quad y_{\delta,t} = f(y_t, fs_t, \delta).$$

The function f is monotonically increasing in y_t . A national poverty line y_{δ}^* is now defined as the solution of the following equation:

$$(2.3) \quad y_{\delta}^* = f(y_{\delta}^*, fs, \delta).$$

The expression (2.3) defines a poverty line associated with the welfare level δ differentiated with respect to family size. This definition can be extended by including other individual characteristics as well.

The individual t 's actual income y_t can now be compared with y_{δ}^* ,

$$(2.4) \quad \begin{aligned} \text{if } y_t \leq y_{\delta}^* & \quad \text{individual } t \text{ is poor,} \\ \text{if } y_t > y_{\delta}^* & \quad \text{individual } t \text{ is not poor.} \end{aligned}$$

In the next section we will introduce a cardinal utility function from which a functional specification of equation (2.2) can be derived.

3. THE INDIVIDUAL WELFARE FUNCTION OF INCOME

The cardinal welfare function used is the individual Welfare Function of Income (WFI), introduced by Van Praag (1968) and elaborated upon in Van Praag and Kapteyn (1973) and Kapteyn (1977). In Van Praag (1968) it was postulated that individuals are able to evaluate income levels on a finite interval scale, which after a suitable transformation can be chosen to be a $[0, 1]$ scale. In other words, an individual's welfare evaluation of an income y is described by a cardinal welfare function $U(y) \{U : [0, \infty) \rightarrow [0, 1]\}$, where y stands for after tax income. According to the theory outlined in Van Praag (1968), the function $U(y)$ can approximately be described by the lognormal distribution function $\Lambda(y, \mu, \sigma)$, with parameters μ and σ . We recall that $\Lambda(y, \mu, \sigma) = N(\ln y, \mu, \sigma)$, where N is the normal distribution function.

The parameters μ and σ generally differ over individuals. A simple method of measuring μ and σ for each individual was designed in Van Praag (1971). It is based on direct questioning. An individual is asked to associate income levels

with verbal qualifications like “good,” “sufficient” etc. The question asked is the Income Evaluation Question (IEQ):

“Please try to indicate what you consider to be an appropriate amount for each of the following cases? Under my (our) conditions I would call a net income per week/month/year of:

- about \$ very bad
- about \$ bad
- about \$ insufficient
- about \$ sufficient
- about \$ good
- about \$ very good”

On the assumption that individuals try to maximize the information given by their answers, the six income levels stated can be shown to correspond to the means of equal quantiles on the [0, 1] scale. (See van Praag (1968), Kapteyn (1977), Buyze (1982)). The answers given by each respondent to the IEQ provide us with a number of points on his WFI, and estimation of the individual parameters μ and σ is now straightforward (see van Praag and Kapteyn (1973)).

The parameters μ and σ can be interpreted as follows: the quantity $\exp(\mu)$, called the *natural unit*, is the income level evaluated by 0.5. The larger an individual’s μ , the larger the income needed for an evaluation of 0.5. This is illustrated in Figure 1. The parameter σ , the welfare sensitivity parameter, determines the slope of the WFI around $\exp(\mu)$. The larger an individual’s σ , the broader the range of incomes around $\exp(\mu)$ he will evaluate substantially different from zero or one. This is illustrated in Figure 2.

The parameter μ can be explained to a large extent by:

$$(3.2) \quad \mu_t = \beta_0 + \beta_1 \ln fs_t + \beta_2 \ln y_b$$

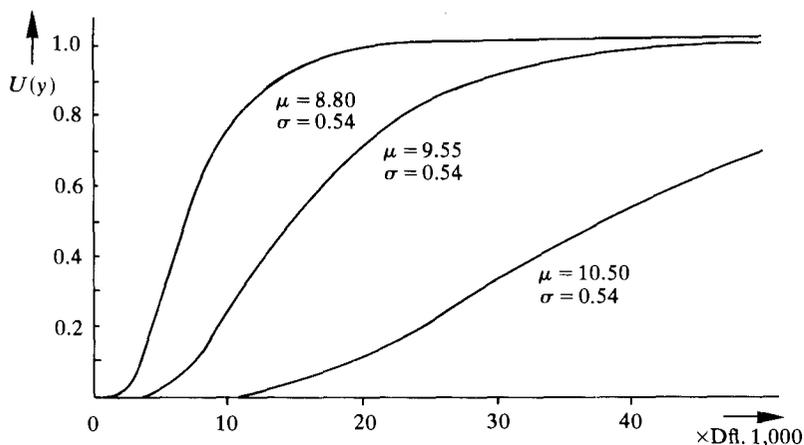


Figure 1. The welfare function of income for different values of μ

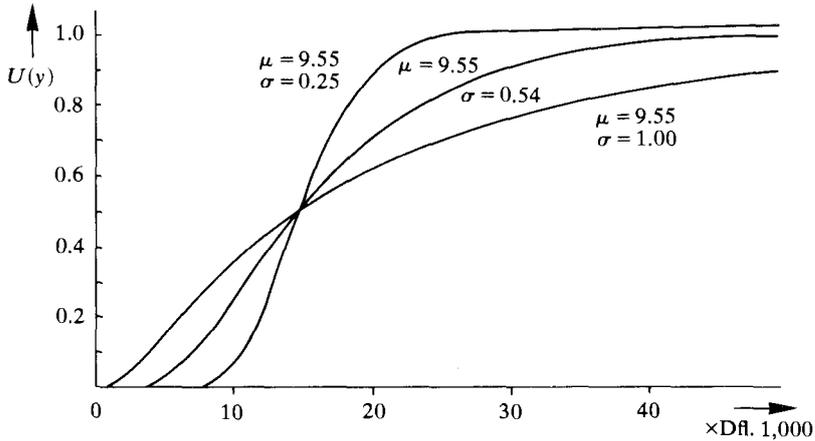


Figure 2. The welfare function of income for different values of σ

where $f_{s,t}$ is individual t 's family size and y_t after tax household income. Adding an i.i.d. error term ε , with $\varepsilon \sim N(0, \sigma^2)$, the parameters $\beta_0, \beta_1, \beta_2$ can be estimated by OLS. Empirical results have shown that the explanatory variables in this equation account for about 60 percent of the variance in μ_t (see, e.g., Van Praag and Kapteyn (1973)). The parameter β_2 is called the *preference drift*, reflecting the elasticity of $\exp(\mu)$ with respect to income. The parameter β_1 is the *family size elasticity* of $\exp(\mu)$. As it has been found that the parameter σ could not be explained by $\ln f_{s,t}$ and $\ln y_t$, σ will be assumed exogenous in this analysis.

The WFI provides us with the following specification of (2.1):

$$(3.3) \quad \Lambda(y_{\delta,t}; \mu_t, \sigma_t) = N\left(\frac{\ln y_{\delta,t} - \mu_t}{\sigma_t}, 0, 1\right) = \delta,$$

which yields:

$$(3.4) \quad \ln y_{\delta,t} = \mu_t + u_{\delta} \sigma_t,$$

where u_{δ} is the δ -quantile of the standard normal distribution. Substituting equation (3.2) in equation (3.4) we get:

$$(3.5) \quad \ln y_{\delta,t} = \beta_0 + \beta_1 \ln f_{s,t} + \beta_2 \ln y_t + u_{\delta} \sigma_t.$$

Fixing σ_t at the population average $\bar{\sigma}$, the national poverty line y_{δ}^* is now found by solving

$$(3.6) \quad \ln y_{\delta}^* = \beta_0 + \beta_1 \ln f_{s,t} + \beta_2 \ln y_{\delta}^* + u_{\delta} \bar{\sigma}.$$

The method is illustrated in Figure 3 for a household of given family size. On the right of y_{δ}^* we have $y_t > y_{\delta,t}$, i.e. the people on the right of y_{δ}^* are non-poor, while the people on the left of y_{δ}^* , where $y_t < y_{\delta,t}$ are poor.

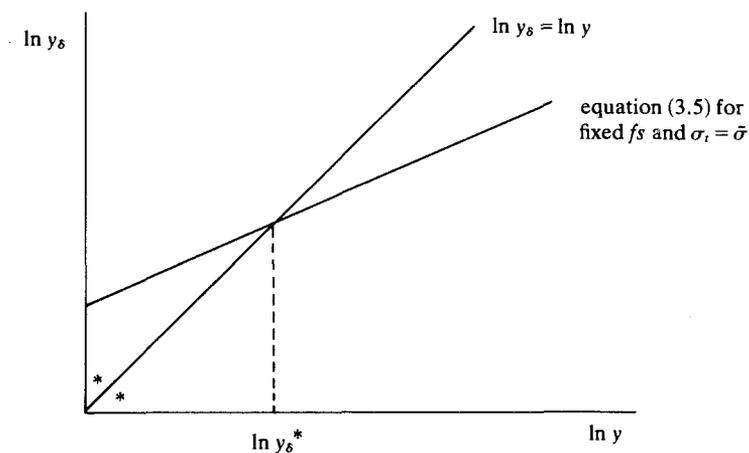


Figure 3. The relationship between $\ln y_\delta$ and $\ln y$ for a given family size

4. DIFFERENTIATION OF THE POVERTY LINE

In section 3 we described a relationship between $y_{\delta,t}$, income y_t and family size $f_{s,t}$. It might be hypothesized that other individual characteristics, e.g. age, education, also effect $y_{\delta,t}$. Denoting these characteristics by a vector \mathbf{x} we write for equation (2.2)

$$(4.1) \quad y_{\delta,t} = f(y_t, f_{s,t}, \mathbf{x}_t, \delta).$$

From equation (3.4) it follows that this amounts to the specification of a relation between μ and these characteristics \mathbf{x} , as σ is assumed to be exogenous. Assuming that the vector \mathbf{x} consists of K elements, each of which can assume L_k different values ($k = 1, \dots, K$) we specify the following relation for μ_t

$$(4.2) \quad \mu_t = \beta'_0 + \beta'_1 \ln f_{s,t} + \beta'_2 \ln y_t + \sum_{k=1}^K \sum_{l=1}^{L_k-1} (\beta_{lk} D_{lk,t}),$$

where $D_{lk,t} = 1$ if characteristic k takes on value l for unit of observation t
 $= 0$ otherwise.

Specification (4.2) implies that only the intercept β_0 in equation (3.2) differs for individuals with different characteristics \mathbf{x} .

Fixing again σ_t at the population average $\bar{\sigma}$, the *type-specific poverty lines* can then be assessed as

$$(4.3) \quad y_\delta^*(\mathbf{x}, f_s, \delta) = \exp \left\{ \frac{1}{1 - \beta'_2} \left(\beta'_0 + \beta'_1 \ln f_s + \sum_{k=1}^K \sum_{l=1}^{L_k-1} (\beta_{lk} D_{lk}) + \bar{\sigma} u_\delta \right) \right\}.$$

Introduction of type-specific poverty lines introduces a number of problems. First, even though income levels may be evaluated differently by individuals with different characteristics \mathbf{x} , it may not be acceptable from a political point of view to confirm these differences in a statutory poverty line. Secondly, by focusing on income evaluation only we are liable to exclude other relevant factors, e.g. leisure. The model might be extended to include these aspects as well, but this extension is beyond the scope of the present paper.

Suppose one is not interested in poverty lines differentiated according to the elements of \mathbf{x} , but only in family-size differentiated poverty lines. A procedure is then needed to derive some average of all type-specific poverty lines. As the effect of \mathbf{x} on the poverty line is assumed to be reflected by differences in the intercept of equation (4.2) only, we need an average of all type-specific intercepts. We calculate the average poverty line by weighting all type-differentiated intercepts with the relative frequency of each type in the total population. It can easily be shown that this amounts to:

$$(4.4) \quad y_{\delta}^*(fs, \delta) = \exp \left\{ \frac{1}{1 - \beta'_2} \left(\beta'_0 + \beta'_1 \ln fs + \sum_{k=1}^K \sum_{l=1}^{L_k-1} \beta_{lk} f_{lk} + \bar{\sigma} u_{\delta} \right) \right\}$$

where f_{lk} is the marginal relative frequency of value l for characteristic k in the total population. The national poverty line thus obtained, differentiated according to family size only, is the geometric weighted mean of all type specific poverty lines.

If one wants to differentiate the poverty line according to some of the characteristics contained in \mathbf{x} , but not according to all, the same procedure can be applied by substituting the relative frequencies for the dummy variables for which an average is wanted.

5. DATA AND RESULTS

The data used in this analysis have been obtained from a survey in eight countries of the European Community.² By order of the European Community this survey was designed, prepared and analysed at the Center for Research in Public Economics of Leyden University. The objective of this research project was to gather information on income, living conditions and the perception of poverty. The survey was carried out by national poll agencies.

In each country a sample size of about 3,000 households was reached. In the present study a subsample of 13,360 households could be used. For the calculations a reweighting scheme is used, as the resulting subsamples are no longer representative for the population.³

²These countries are Belgium, Denmark, France, W. Germany, Great Britain, Ireland, Italy and The Netherlands. The survey was in the form of a mail-back questionnaire in all countries except Ireland and Italy, where an oral survey was conducted. The response rates varied from 50 percent in The Netherlands to 93 percent in Italy.

³For a description of the procedure used see, e.g., Klein (1974). Weights have been calculated by comparing the subsample data with national statistics, provided by the national poll agencies.

In order to assess poverty lines for different types of households we classified each household according to the following household characteristics:

- degree of urbanization
- age of main breadwinner
- employment of main breadwinner
- education of main breadwinner
- sex of main breadwinner
- number of income earners in the household.

For the classification of these characteristics see Table 5.1; for the education level we have used five classes, ranging from elementary education (first level) up to university degree (fifth level). The reference household for which the dummy variables are set equal to zero is a household with one income earner, living in a place with less than 20,000 inhabitants. The main breadwinner is a non-working man, younger than 30 years with only elementary education.

In Table 5.1. the OLS estimates of equation (4.2) are presented, together with the sample size and mean value of σ for each country. The coefficients which are significantly different from zero at the 0.05 level are marked with an asterisk. The values of \bar{R}^2 are quite satisfactory for individual cross-sectional data. Note that not only the dummy coefficients, but also the parameters β_1 and β_2 vary between countries. For the preference parameter β_2 the lowest value is found in Great Britain (0.364), the highest in Denmark (0.631). This coefficient can be interpreted in the following way: an increase in income of α percent causes an increase in μ of 0.63α percent in Denmark, but only of 0.36α percent in Great Britain (*ceteris paribus*). In other words the same proportional increase in income is perceived in Denmark as yielding a smaller increase in welfare than in Great Britain. The family-size elasticity β_1 reflects the fact that the needs of a family, represented by the welfare parameter μ , increase with family size. The smallest value is found in France (0.059). This means that in France an increase of family size, provided there is no change in income, causes only a small loss of welfare as compared to the other countries. The largest family-size elasticity is found in Ireland (0.163). The differences in these elasticities might result from different national regulations with respect to family allowances, schooling fees, etc. However, a discussion of these different regulations is beyond the scope of this paper.

Let us now look at the effects of the different household characteristics. It follows from equation (4.2) that a positive value of the dummy coefficient for a certain characteristic results, *ceteris paribus*, in a higher poverty line for that characteristic.

In all countries except W. Germany, living in a large city (over 100,000 inhabitants) results in a higher poverty line. This may be caused by higher costs of living in such an area. In three countries, Denmark, Great Britain and Italy, the coefficients for this group do not significantly differ from zero. The coefficient for living in a city of 20,000 up to 100,000 inhabitants was not significantly different from zero in most countries.

Within the classification of employment no definite pattern is observed. Most coefficients do not significantly differ from zero. However, in most countries

TABLE 5.1.
ESTIMATED COEFFICIENTS OF EQUATION (4.2)

	Belgium	Denmark	France	W. Germany	Great Britain	Ireland	Italy	Netherlands
<i>Country</i>								
intercept (β_0)	4.275*	3.931*	4.048*	3.815*	4.926*	4.128*	6.466*	4.398*
$\ln fs$ (β_1)	0.097*	0.075*	0.059*	0.112*	0.115*	0.169*	0.156*	0.100*
$\ln y$ (β_2)	0.433*	0.631*	0.505*	0.583*	0.364*	0.455*	0.381*	0.537*
<i>Urbanization degree</i>								
20,000–100,000 inhabitants	0.020	-0.004	-0.011	0.079*	-0.004	0.102*	-0.041*	0.007
>100,000 inhabitants	0.049*	0.009	0.058*	0.060*	0.024	0.090*	0.028	0.052*
<i>Age of main breadwinner</i>								
30–40 years	0.037	0.018	0.051*	0.003	0.082*	0.001	-0.004	0.050*
40–50 years	0.051	0.030	0.048*	0.018	0.098*	-0.028	0.004	0.062*
50–60 years	0.089*	0.004	0.046*	0.019	0.105*	-0.012	-0.004	0.079*
60–65 years	-0.057	0.004	-0.014	-0.091*	0.038	0.005	-0.042	0.033
>65 years	-0.049	-0.113*	-0.097*	-0.096*	-0.112	-0.053	-0.034	-0.033
<i>Employment of main breadwinner†</i>								
Manual workers	0.003	0.028	0.004	-0.055*	-0.006	-0.006	-0.048	-0.053*
Employees	0.041	0.055*	-0.028	-0.031	0.040	0.018	0.047	-0.047*
Self-employed	0.042	0.027	0.005	-0.023	0.015	0.013	0.011	-0.101*
Farmers		-0.060*	-0.079*	-0.012		-0.028	0.146*	-0.120*
Civil servants	0.012	0.072*	0.004	-0.039	0.068		0.069*	-0.031
<i>Education of main breadwinner</i>								
2nd level	0.073*	0.028	0.045*	0.037	0.067*	-0.002	0.062*	0.027*
3rd level	0.064*	0.021	0.077*	0.081*	0.064*	0.079*	0.042	0.057*
4th level	0.046	0.004	0.065*	0.011	0.179*	0.090*	0.057*	0.066*
5th level	0.150*	0.061*	0.091*	0.114*	0.213*	0.057	0.050	0.152*
<i>Number of breadwinners</i>								
Two breadwinners	0.026	0.067*	-0.001	0.041*	0.023	0.028	-0.023	-0.023
<i>Sex main breadwinner</i>								
Female	-0.040	-0.027	-0.002	0.013	-0.027	-0.075*	-0.031	-0.034*
\bar{R}^2	0.695	0.829	0.676	0.693	0.575	0.636	0.510	0.664
N	1,272	1,972	2,052	1,574	1,183	1,733	1,911	1,933
$\bar{\sigma}$	0.41	0.33	0.44	0.40	0.45	0.41	0.55	0.35

*Significant at the 0.05 level.

†In Belgium and Great Britain it was not possible to separate the group of farmers from the group of self-employed people. In Ireland no distinction could be made between employees of private companies and civil servants; they are both classified in the group of employees.

the lowest value is found for the group of farmers which might be explained by the fact that farmers usually enjoy some income in kind.

As to the level of education, in most countries the value of the dummy coefficients generally rises with the education level. But in considering these figures one has to bear in mind that the educational levels cannot always be classified in an ordinal way. In all countries the highest value is found for the highest level of education (university degree). This may partly result from higher income expectations for people with higher education, due to past investment in human capital (see, e.g., Becker (1964)). A second explanation for the fact that higher education results in a higher poverty line may be found in the *social reference group* of individuals: people with a higher education will usually have individuals with higher incomes in their social reference group. This will also shift their poverty line upwards.

For the number of income earners a significant coefficient is found in only two countries (Denmark and W. Germany). There are two factors which might influence the level of the poverty line with respect to this characteristic. First when both partners in a household are working this can result in higher costs of living, for instance for child-care arrangements or time saving household equipment. On the other hand when both partners are working they will have a high family income as compared to families in one's social surroundings where only one person is working. This may result in a high evaluation of their own income and consequently a relatively low poverty line. This negative effect will be smaller when families with two income earners are more frequently found. The positive coefficient in both Germany and Denmark suggests that in these countries the cost aspect tends to dominate the reference effect.

As to the sex of the main breadwinner, in most countries the coefficient is not significantly different from zero, except in Ireland and The Netherlands where the poverty line of a female breadwinner is lower than the poverty line of a male breadwinner.

Table 5.1. enables us to determine the effect of each characteristic separately on the poverty line. We can also assess the combination of characteristics that will result in the highest and in the lowest poverty lines for each country, by combining all variables that within each group of characteristics have the highest and lowest values of the dummy coefficients. Note that not all combinations of characteristics will be present in our survey.

There appears to be one type generally having the highest poverty line, namely a male civil servant or employee between 40 and 60 years of age, with a university degree, living in a large city. Exceptions are found in France, where the highest poverty line is observed for a self-employed breadwinner, and in Germany and The Netherlands, where the highest poverty line is found for a household where the head of the family is a non-working person. In Germany and Ireland the family with the highest poverty line lives in a middle-sized town. In Ireland the age of the main breadwinner with the highest poverty line is between 60 and 65 years.

The lowest poverty line is observed in most countries for families living in a small town, with one breadwinner who is over 65 years of age and has completed

the lowest educational level, and is either not working, a manual worker or a farmer.

We now turn to the levels of the estimated poverty lines. The choice of the welfare level that might be considered as the appropriate level for a poverty line is a subjective one. As an illustration the geometric weighted mean of the type-specific poverty lines corresponding to the welfare levels 0.4 and 0.5 are calculated. The former level can be situated in the wording of the Income Evaluation Question between the qualifications "bad" and "insufficient"; the latter between "insufficient" and "sufficient."

TABLE 5.2.
POVERTY LINES CORRESPONDING TO THE WELFARE LEVELS 0.4 AND 0.5 IN U.S. \$ PER YEAR

	δ	Family size						y_{med}
		1	2	3	4	5	6	
Belgium	0.4	6,349	7,155	7,659	8,012	8,364	8,616	14,603
	0.5	7,609	8,566	9,171	9,674	10,027	10,380	
Denmark	0.4	5,895	6,802	7,407	7,861	9,271	9,473	10,628
	0.5	7,407	8,566	9,271	9,826	11,640	11,892	
France	0.4	7,659	8,314	8,717	9,019	9,271	9,473	11,619
	0.5	9,574	10,430	10,934	11,337	11,640	11,892	
W. Germany	0.4	4,233	5,089	5,694	6,147	6,550	6,853	13,022
	0.5	5,442	6,550	7,306	7,861	8,364	8,768	
Great Britain	0.4	5,240	5,946	6,399	6,752	7,004	7,256	10,219
	0.5	6,298	7,105	7,659	8,062	8,415	8,667	
Ireland	0.4	3,981	4,938	5,593	6,198	6,550	6,954	8,100
	0.5	4,837	5,996	6,802	7,457	7,961	8,415	
Italy	0.4	4,686	5,593	6,198	6,651	7,004	7,357	11,806
	0.5	5,845	7,004	7,760	8,314	8,818	9,221	
Netherlands	0.4	5,946	6,903	7,558	8,012	8,415	8,768	13,232
	0.5	7,206	8,364	9,171	9,725	10,229	10,632	

^aAs the exchange rate is a rather inaccurate reflection of purchasing power we used purchasing power parities as calculated by the Dutch Central Bureau of Statistics. The exchange rates for October 1, 1979, are (1 U.S. dollar = ... "national currency"): Belgium: 28.84 BFr, Denmark: 5.24 Dkr, France: 4.21 FF, W. Germany: 1.79 DM, Great Britain: £0.48, Ireland: £0.48, Italy: 824 lire, The Netherlands: fl 1.99. The purchasing power parities give the equivalent amount of 1 U.S. dollar for each country: Belgium = 1.05, Denmark = 1.30, France = 1.00, W. Germany = 1.03, Great Britain = 0.94, Ireland = 0.89, Italy = 0.74, The Netherlands = 1.00.

In Table 5.2. the poverty lines are tabulated for family sizes ranging from one to six. In the last column the median income in the sample for each country is given. Let us consider the poverty line of a four-person family at the 0.5 level. We see the highest poverty line in France and the lowest in Ireland, the French line being about 50 percent higher than the Irish line. Besides France, The Netherlands, Belgium, and Denmark have poverty lines above average, while Great Britain, Italy, Ireland and Germany are below average.

In Table 5.3 we have given the lowest and highest type-specific poverty line for a four-person family at the 0.5 level, compared with the average poverty line.

TABLE 5.3
HIGHEST AND LOWEST TYPE-SPECIFIC POVERTY LINES^a

	Highest Poverty Line (<i>fs</i> = 4)	Lowest Poverty Line (<i>fs</i> = 4)	National Poverty Line (<i>fs</i> = 4)
Belgium	14,764	6,651	9,674
Denmark	15,771	5,089	9,826
France	15,217	7,054	11,337
W. Germany	11,740	5,140	7,861
Great Britain	12,950	5,442	8,062
Ireland	10,682	5,543	7,457
Italy	10,279	5,694	8,314
Netherlands	14,965	6,752	9,725

^aU.S. \$ per year.

Both the highest and the lowest type-specific poverty lines are found in Denmark, where the difference between the highest and the lowest poverty line is more than 10,000 dollars. Note that the differences over countries in the lowest type-specific poverty lines are much smaller than the differences in the average lines. The dispersion of the highest poverty line is much higher than the dispersion of the lowest poverty line.

Having calculated poverty lines, we can assess the percentage of people with an income below this poverty line. We call this percentage the poverty ratio. Poverty ratios have been calculated in two ways: the first way is to compare the household income with the average poverty line corresponding to the family size of the household; the second way is to compare the household income with the poverty line specific for the socio-economic type to which the household belongs. Poverty ratios according to the former method are given for the 0.4 and 0.5 welfare level in columns 1 and 2 of Table 5.4. In column 3 the type-specific poverty ratios for the 0.5 level are presented.

TABLE 5.4
ESTIMATED POVERTY RATIOS

δ	Poverty ratios according to average poverty line		Poverty ratios according to type-specific poverty line
	0.4	0.5	0.5
Belgium	12.33%	18.21%	12.48%
Denmark	23.13%	34.55%	29.82%
France	27.10%	43.44%	42.61%
W. Germany	3.13%	7.52%	6.79%
Great Britain	13.85%	22.04%	19.48%
Ireland	26.13%	38.42%	39.17%
Italy	9.47%	17.48%	16.72%
Netherlands	5.89%	15.73%	13.42%

Let us first look at the poverty ratios according to the average poverty line. At both welfare levels France has the highest poverty ratio, amounting up to

43 percent at the 0.5 level. Ireland is second at both levels, while the lowest poverty ratios are found in W. Germany, followed by The Netherlands. Looking at these figures one has to bear in mind that the poverty lines differ considerably. France for instance has a poverty line at the 0.5 level that is more than 50 percent higher than West Germany. The resulting poverty ratios hence do not merely reflect income differences but differences in aspiration levels between countries as well. When we take the level of the poverty line into account Ireland appears to have the largest percentage of "absolute" poverty. It might be concluded that poverty in most countries is considerable, especially with respect to the 0.5 level. In three countries more than a third of the population appears to have an income which they evaluate at less than 0.5. There is only one country, W. Germany, where a moderate poverty ratio is found. In the last column of Table 5.4. type-specific poverty ratios are given. With the exception of Ireland these type-specific poverty ratios are in all countries lower than the average poverty ratios.

Finally we consider the following case. Let us assume that a Frenchman with his poverty line, of 9019 dollars (0.4-level), was dropped into England and that he would assess the extent of poverty in England, given the French norm. He would find that 30.38 percent of the British population would be poor if the French welfare standards were applied. In the same way it follows that the poverty ratio according to German standards in Great Britain would be only 10.58 percent, while the British themselves assess severe poverty (0.4 level) to be present in 13.85 percent of the households.

TABLE 5.5
POVERTY RATIO IN COUNTRY A ACCORDING TO THE POVERTY LINE ($\delta=0.4$) OF COUNTRY B

	Poverty line of:							Nether-lands
	Belgium	Denmark	France	W. Germany	Great Britain	Ireland	Italy	
Poverty ratio in:								
Belgium	12.33	10.53	17.58	2.57	4.94	1.73	3.06	11.48
Denmark	25.06	23.13	32.84	11.19	17.18	10.05	14.07	23.18
France	19.98	18.37	27.10	8.01	13.53	7.69	11.37	18.93
W. Germany	10.54	9.54	16.98	3.13	6.57	2.70	3.83	9.96
Great Britain	22.40	19.78	30.38	10.58	13.85	10.85	12.48	21.42
Ireland	44.59	42.69	55.96	26.08	32.63	26.13	30.76	44.68
Italy	17.10	15.21	24.70	7.31	11.16	6.76	9.47	16.59
Netherlands	6.84	5.03	13.74	0.56	1.63	0.56	1.03	5.89

The whole 8×8 table is presented in Table 5.5. From Table 5.5. we see that it is virtually impossible to fix one European poverty line which is satisfactory for all European countries. A level of material welfare considered as poverty in country A would correspond to a fairly luxurious level in country B. For the time being it seems advisable not to define a uniform poverty line, since it would certainly yield considerable welfare differences in the European countries.

6. CONCLUSION

In this paper a poverty-line concept has been elaborated and applied based on welfare derived from income. The effect of different socio-economic characteristics on the level of this poverty line is estimated. The method is applied to individual survey data from eight member countries of the European Community. Large differences in poverty lines are found, both between countries and between different socio-economic groups within countries. As differences in poverty lines may arise as a result of different costs of living or different aspiration levels, the poverty lines found reflect relative poverty as perceived by individuals.

According to this poverty line definition, France has both the highest poverty line and the highest poverty ratio. Ireland, on the other hand, having the lowest poverty line, and lowest median income, ranks second as to its poverty ratio. Low poverty ratios are found in Germany, where the poverty line as a percentage of median income is lowest.

The differences between socio-economic groups have a systematic pattern over countries. Within each country the highest poverty lines are observed for households living in a large city where the main breadwinner is a male civil servant with a university degree. The lowest poverty lines are found for families living in small cities, where the breadwinner has finished the lowest educational level and is either a retired person, a farmer, or a manual worker, older than 65 years. Some of these characteristics reflect the cost aspect of the poverty lines, others the aspiration aspect.

The poverty line definition used can be extended to include past experiences and expectations for the future, as well as the trade-off between income and leisure.

Finally, we note that it is also possible to derive a poverty line from answers to one single question like "What do you, in your circumstances, consider to be an absolute minimum income for your family?" (see Goedhart *et al.* (1977), Van Praag *et al.* (1980b)). The welfare evaluations of the poverty lines based on this question differ considerably over countries (Van Praag (1976), Van Praag *et al.* (1980b)). This is due to the fact that in such a question one is asked to mention only one point of the income-welfare scale, which may be interpreted differently in different countries. We have therefore preferred the welfare concept based on the WFI.

We conclude that the poverty concept used in this paper can be used for the measurement of poverty and differences in poverty perception, both over countries and over socio-economic groups within each country.

REFERENCES

- Becker, G. S., *Human Capital*, New York: National Bureau of Economic Research, 1964.
- Buyze, J., Estimation of Welfare Levels of a Cardinal Utility Function, *European Economic Review*, vol. 17, pp. 325-332, 1982.
- Goedhart, T., Halberstadt, V., Kapteyn, A., and Van Praag, B. M. S., The Poverty Line: Concept and Measurement, *The Journal of Human Resources*, vol. 12, pp. 503-520, 1977.
- Kapteyn, A., *A Theory of Preference Formation*, Ph.D. Thesis, Leyden University, 1977.
- Kilpatrick, R. W., The Income Elasticity of the Poverty Line, *The Review of Economics and Statistics*, vol. 55, 1973.

- Klein, A., *Textbook of Econometrics*, Prentice-Hall, New Jersey, 1974.
- OECD, Public Expenditures on Income Maintenance Programmes, *Studies in Resource Allocation*, No. 3, Paris, July 1976.
- Orshansky, M., Counting the Poor: Another look at the Poverty Profile, *Social Security Bulletin*, vol. 28, 1965.
- , The Shape of Poverty in 1966, *Social Security Bulletin*, vol. 31, 1968.
- Rainwater, L., *What Money Buys. Inequality and the Social Meanings of Income*, Basic Books, New York, 1974.
- Rowntree, B. F. *A Study of Town Life*, London, MacMillan, 1901.
- Townsend, P., in D. Wedderburn (ed.), *Poverty, Inequality and Class Structure*, Cambridge University Press, pp. 17–20, 1974.
- , *Poverty in The United Kingdom. A Survey of Household Resources and Standards of Living*, Penguin Books, 1979.
- Van Praag, B. M. S., *Individual Welfare Functions and Consumer Behaviour*, Amsterdam, North-Holland Publishing Company, 1968.
- , The Welfare Function of Income in Belgium: An Empirical Investigation, *European Economic Review*, vol. 2, pp. 337–369, 1971.
- Van Praag, B. M. S. and Kapteyn, A., Further Evidence on the Individual Welfare Function of Income: An Empirical Investigation in The Netherlands, *European Economic Review*, vol. 4, pp. 33–62, 1973.
- Van Praag, B. M. S., Goedhart, T., and Kapteyn, A., The Poverty Line. A Pilot Survey in Europe, *The Review of Economics and Statistics*, vol. 62, pp. 461–465, 1980a.
- Van Praag, B. M. S., Hagenaaars, A. J. M., and Van Weeren, J., *Poverty in Europe*, Leyden University, Center for Research in Public Economics, 1980b.