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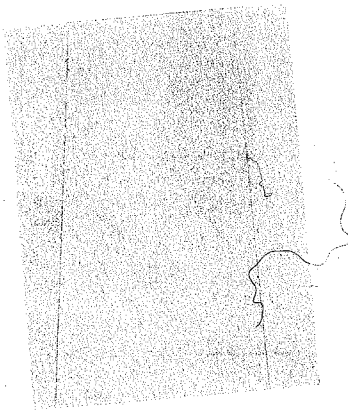
THE ECONOMIC AND SOCIAL RESEARCH INSTITUTE

WHO BENEFITS FROM PUBLIC
EXPENDITURE ON EDUCATION?

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1. Introduction

State-funded expenditure on education amounted over £1,300m in 1987. Given the levels of pay within the educational professions, who benefited from this expenditure? This paper attempts to answer this question by allocating the costs of different types of education to households whose members actually benefited from it.[1] Empirical work on the distributional implications of Irish educational expenditures has, up to now, been based on the Household Budget Surveys conducted by the Central Statistics Office. (Central Statistics Office, 1980 and 1983). The most comprehensive study is that of Rottman and Reidy (1988) for the National Economic and Social Council, which was undertaken in the context of that body's concern that social expenditure programmes should be made more effective and equitable. The estimates in the present paper are based on the ESRI's large scale national household survey in 1987, which included detailed information on the educational participation of all members. Thus, the analysis undertaken here provides more up-to-date information on these issues, and, because of the design of the dataset, allows some improvements in the method of analysis.[2]

The (forthcoming) Green Paper on Education seeks to stimulate debate as part of the process of review and restructuring of the education system. The present paper aims to contribute to that debate. The results of the analysis are relevant, for example, to the balance of state funding between different levels and types of education, and, within each level, the balance between state funding and private contributions. They are also relevant to issues concerning changes in the minimum age at which children are allowed to enter national schools, the ages of compulsory education and the extension of the second-level cycle from 5 to 6 years. The present paper, however, concentrates on the technical issues: it is hoped to pursue the interpretation and policy implications of the results in further work.

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1 The broader question of the extent to which increases in educational expenditure give rise to higher pay rates, or to higher quality or quantity of service provision, is outside the scope of this paper.

2 The CSO's analysis of redistribution using the 1987 Household Budget Survey will also contain up-to-date and improved material.

The next section of the paper deals briefly with the main conceptual and methodological issues which arise in this analysis. The results are set out and interpreted in Section 3. The final section draws together the main findings.

2. Conceptual and Methodological Issues

Theoretical objections to the use of *costs* of providing a public service as a measure of the *benefit* gained by consumers of the service are well known. (See, for example, O'Higgins, 1980). But in the absence of independent measures of the output from public services such as education, the use of input costs to value benefits has been seen as "intuitively repugnant, but practically inevitable" (Maynard, 1976, p.309). An alternative perspective is that attribution of costs helps to identify where public resources are going. If benefits are proportional, though not necessarily identical, to costs, then this attribution can also help to identify who benefits; but even without any interpretation in terms of benefit, the attribution of publicly funded resources to different groups is of interest.

The first question which arises in attributing expenditure on education to households is what expenditure is to be covered. *Comprehensive Public Expenditure Programmes 1988* documents expenditures totalling over £1,300m. The present analysis attributes nine-tenths of that expenditure to households. (Table 1). The main items excluded are building and capital expenditures and school transport. There are a number of arguments concerning the appropriate treatment of capital expenditures (see, for example, O'Higgins, 1980). The one which weighed most heavily in the present context, however, was that capital expenditures at different levels of education tend to fluctuate from year to year. As a result, capital expenditure in a given year cannot be taken as a reliable guide to the benefits which participants derive from the accumulated capital stock in that level of education. Expenditure on school transport is also excluded. The data in the ESRI survey will allow this expenditure to be allocated to households, but it has not been possible to do so at this stage. A number of smaller items of

expenditure are also excluded: the salaries of teachers and other staff in special schools, for example. But overall £9 out of every £10 spend on education is attributed by the analysis to households benefiting from the service in question.

The objectives of third-level education expenditure include support for research. But the extent of this support is not fully identified within the programme. Staff within universities are expected, in general, to undertake research. Thus, some element of pay expenditure could be attributed to research. But in the present analysis, all such expenditure is counted as part of the cost of provision of third-level education and attributed as a resource flow to third-level students. The possible impact of different treatments of this issue could be explored by undertaking analyses which varied the proportion of pay expenditure allocated to research (say, from 0 to 20 per cent).

Table 1:   *Expenditure on Education: Coverage of the Analysis*

Educational Institution	Total £m	Allocated £m	Allocated/Total %
National schools	486	436	90
Second Level	530	474	89
Third Level	303	273	90
Total	1319	1183	90

Source: *Comprehensive Public Expenditure Programmes 1988.*

In the present analysis, the main concern is with the distribution of educational expenditure across different income groups. The standard form for this type of analysis has been to divide the population of households into five or ten equal sized groups ("quintiles" or "deciles" respectively) on the basis of their income. The 20 per cent of households with the highest incomes are referred to as the top quintile, and the 20 per cent with lowest incomes as the bottom decile.

A number of issues arise in deciding on which income criterion households should be ranked, before they are divided into quintiles (see Rottman and Reidy, 1988). In this paper, the income concept used is the same as that employed by Rottman and Reidy in all respects

but one. Thus, disposable cash incomes are adjusted for household size and composition, using the same equivalence scale as was employed by Rottman and Reidy.[3] The difference is that the incomes in the analysis of the 1987 survey are estimates of annual income, rather than simply current income. Thus, a household with unemployed members might have low current income, but if the unemployment spells were short, or the incomes when in employment were high, the annual income of the household might place it in a higher position in the income distribution; while some households not currently experiencing unemployment, but affected by it in the recent past, would occupy lower positions in the annual income distribution than in the current income distribution.

A major difficulty in using the 1973 and 1980 Household Budget Surveys for analysis of the distributional implications of education expenditures is that these surveys do not allow a link to be established between many third level students and their parental households. Children under 15 who are at boarding school are treated as members of the parental household, but older students are only included if they were at home during the full 14-day period for which household expenditures were recorded. Consistent with this treatment, students sharing a flat would be recorded as an independent household. Thus, analysis of the distribution of educational expenditures on this basis "is not linking the educational subsidy with the highest cost to the socio-economic groups that are its beneficiaries. The subsidies will often instead be attributed to low income households - low income because their members are students who are either not in employment or in low-wage part-time employment" (Rottman and Reidy, 1988, pp. 92-3).

It could be argued that third-level education constitutes a benefit mainly to the individuals concerned, rather than their parental households. But this would not imply that the allocation of expenditures on the basis of residence would be correct. It would suggest, instead, that the analysis should seek to relate the expenditure to the lifetime earnings of the individuals.

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3 This scale is defined by 1 for a single person household; 0.25 for a child aged 0 to 4; 0.38 for a child aged 5 to 13; and 0.53 for a child aged 14 to 20; and 0.74 for other adults (aged over 20).

Actual current earnings of the household of residence would not provide an adequate proxy for this approach. Income of the parental household would provide a much better proxy. There would remain a bias, in that benefits from higher education attributed to low income households would tend to raise the earnings of the individuals concerned; thus, in general, analysis on the basis of expected lifetime earnings would tend to show greater concentration of benefit than analysis on the basis of parental household income. But analysis on the basis of income in the household of residence would be a still more imperfect measure.

The ESRI's 1987 Survey of Income Distribution, Poverty and Usage of State Services included students living away from home during term as a special category of household member. This enables a link to be established between third-level education benefits and the incomes of parental households. Thus, the difficulties outlined above can be circumvented. Income from grants and scholarships was also recorded in a way which allows them to be analysed separately.

The standard method for allocation of education expenditures to households involves two stages. First, state expenditure at different levels of education and in different types of institution is averaged over the number of pupils or students in the relevant institutions, to get, for example, mean expenditure per pupil in primary education. Then, using the information on educational participation of all household members in a sample, these "costs per pupil" are used to estimate the expenditure attributable to each household, and thereafter for different income groups.

This procedure may not, however, allocate all of the relevant educational expenditures. Rottman and Reidy (1988) suggest, for example, that participants in third level education are underrepresented in the 1980 Household Budget Survey, because of a growing tendency to live away from the parental home, and a low response rate from student households. If this is the case, not all of the expenditure on third level education would be allocated by the standard procedure. If, on the other hand, younger children are over-represented in the sample (as is the case in the ESRI's 1987 survey) then the standard procedure would allocate more primary education expenditure than was actually incurred.

The empirical importance of this issue can be seen in Table 2, which shows the actual numbers of participants in various types of education in 1987 and the corresponding estimates from the ESRI Survey.

Table 2:   *Educational Participation and Expenditure by Type of Education*

Educational Institution	Official statistics ('000s)	ESRI estimate ('000s)	Actual expenditure £m
National schools	567	620	436
Secondary schools	216	212	559
Vocational schools	83	53	172
Community/comprehensive schools	39	41	50
Universities	40	26	148
Other third level	28	31	83
Grants & scholarships-numbers	16	30	-
Grants & scholarships-£m		31	42

Source: Official statistics and actual expenditure derived from *Comprehensive Public Expenditure Programmes 1988.*

The survey estimates of numbers in secondary schools, community and comprehensive colleges, and non-university third-level institutions are close to the official estimates. The use of the standard method of allocating expenditures to households would, therefore, lead to the attribution of a sum very close to actual expenditure in these areas. But the use of the standard method would lead to a substantial overestimate of expenditure on primary education, and substantially underestimate expenditure in vocational schools and universities. It would also underestimate the amounts spent on grants and scholarships, despite the overestimate of numbers in receipt of such support.

One response to such problems is to correct for differential non-response by attributing a higher weight to responding households in underrepresented categories, and a lower weight to responding households in overrepresented categories. A sample which had been reweighted in this way would yield "grossed-up" estimates which corresponded exactly to the numbers of participants in different educational institutions.

An alternative, simpler procedure can also achieve this end. It assumes that non-response has distorted only the numbers of participants in different institutions, rather than their profile in terms of income characteristics. On this basis, as demonstrated in the appendix, it is possible to estimate quintile shares in a way which will ensure full and exact allocation of educational expenditures. The procedure can be thought of as based on the same "cost per pupil" method, but with a correction factor which is defined by the ratio of the actual population in the relevant category to the sample estimate of that population.[4] The results do not differ from the standard method for the distribution of expenditure on a particular type of education (say, vocational schools); but they do represent an improvement on the standard method when calculating shares of expenditure for aggregations over different types of education (such as second level education, or total educational expenditures).

The final methodological issue to be discussed is how the analysis is to take account of differing numbers of *potential* participants in various levels of education within the different income groups. The basic analysis reports how much expenditure can be attributed to each income group (quintile). For example, 25 per cent of expenditure on primary schools may go to the bottom quintile, and 15 per cent to the top quintile. But part of this difference may arise simply because there are more primary age schoolchildren in the bottom quintile. In order to take account of such differences, the analysis also produces results which are "standardized" for the numbers in the relevant population. The relevant populations are defined as those aged 4 to 12 for first level education, aged 12 to 18 for second-level education, and aged 18 to 22 for third-level education. The question answered by the standardized results is "what would be the distribution of expenditure if there were equal numbers of children in each income group, but participation rates in each type of education, and the costs of each type of education, differed in the way that they do now?"

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4 For the category "grants and scholarships", where the survey data include direct information on the amounts of expenditure, the correction factor is based instead on the ratio of actual total expenditure on these items to the estimate of expenditure based on the sample. In this way the reported amounts of grants are "scaled up" to represent the total of actual expenditure.

3. Results and Interpretation

As noted earlier, there are substantial differences in the methods and concepts used here from those used in earlier work in this area. As a result, the figures for 1973, 1980 and 1987 *cannot* be interpreted as representing trends in the distributional pattern of educational expenditure. Despite the differences in concepts, however, it is important to compare the results for 1987 with those of previous research in the field, in order to see to what extent our perception of distributional patterns may be altered by the shift in focus, together with any underlying changes educational participation and expenditure patterns. Thus, many of the tables which follow show results for 1973 and 1980, drawn from Rottman and Reidy's analysis of the Household Budget Surveys; and, separated by a bar to emphasise the existence of non-comparabilities, the results for 1987 based on analysis of the ESRI Survey of Income Distribution, Poverty and Usage of State Services.

Table 3: *Distribution of Total Education Expenditure by Equivalent Disposable Income Quintiles: 1973, 1980 and 1987*

Income Quintile	1973	1980	1987
Bottom	17.9	21.6	16.5
2nd	26.2	23.1	19.3
3rd	24.2	23.7	25.4
4th	18.9	19.2	22.0
Top	12.7	12.1	16.7

Source: 1973 and 1980: Rottman and Reidy (1988), Tables 4.5 and 4.6

We begin by taking an overall view of the distribution of educational expenditures over income groups. Table 2 shows that the share going to the top group was about 12 to 13 per cent in 1973 and 1980, with a further 19 per cent going to the income group next to the top. The 1987 figures, with their different concepts and methods, suggest much higher proportions

going to the top groups: the share of the top group is higher by about 4 percentage points, and that of the next group is higher by about 3 percentage points. The share of the bottom two income groups, on the other and, is about 9 percentage points lower in the 1987 analysis.

These are substantial differences in distributional patterns. A number of factors may help to explain how they arise:

(1) Changes in the numbers within the relevant age groups across income groups

(2) Changes in educational participation patterns across income groups

(3) Changes in the pattern of expenditure over types of educational institution

(4) Differences in the methods of analysis used for the earlier and later data.

In order to analyse the roles played by each of these factors, substantial re-analysis of the 1973 and 1980 data would be needed. The remainder of this section concentrates, instead, on setting out the overall differences between earlier results and those of the 1987 analysis for different levels of education. But Table 4 below shows an important element of the differences in the methods of analysis: a finer distinction between the age groups of potential participants in 1987.

Table 4: *Distribution of Primary Age Children by Equivalent Disposable Income Quintiles*

Income Quintile	1973	1980	1987
	ages 5-14	*ages 5-14*	*ages 4-12*
		Primary Age Children	
Bottom	19.2	23.6	19.3
2nd	28.4	24.9	23.8
3rd	24.3	23.6	24.6
4th	16.9	17.7	19.6
Top	11.2	10.1	12.2

Source: 1973 and 1980: Rottman and Reidy (1988), Tables 4.5 and 4.6

Table 4 shows the proportions of children in the age groups 5-14 and 14-21 for the years 1973 and 1980. For 1987 it is possible to define age groups which correspond more closely to those in which the majority of participants at different levels of education are found. As far as primary school is concerned, the age range 4 to 12 covers the vast bulk of actual and potential participants. The distribution of primary age children shows a higher proportion in the top income group in 1987 than in earlier years, while the proportion in the lowest two income groups declined. At first sight, this finding may be somewhat surprising. It is known that rising unemployment during the 1980s increased the number of low income families in the lower reaches of the equivalent income distribution. But the 1987 analysis is based on the distribution of estimated *annual* incomes. Families headed by persons currently unemployed tend to move upwards in the income distribution when annual incomes are taken into account, since for many of them the spells of unemployment may have been relatively short.

Table 5: *Distribution of Primary Education Expenditure by Equivalent Disposable Income Quintiles: Standardized and Unstandardized Results*

Income Quintile	1973	1980	1987
		Unstandardized results	
Bottom	20.0	24.5	20.1
2nd	29.6	26.1	23.9
3rd	23.9	23.6	25.2
4th	16.6	17.2	18.7
Top	10.0	8.6	12.1
		Standardized results	
Bottom	21.1	21.1	20.9
2nd	21.1	21.4	20.2
3rd	19.9	20.4	20.6
4th	19.9	19.8	19.2
Top	18.1	17.3	19.2

Source: 1973 and 1980: Rottman and Reidy (1988), Tables 4.5 and 4.6

As a result of the increased numbers of primary age school children in the higher income groups, we find in Table 5 that the proportion of expenditure on primary education going to the top income groups is higher in the 1987 analysis than in earlier years. But the same table show that when these proportions are standardized for the numbers in the relevant age groups, the differences between the 1987 results and those of earlier analyses are quite limited. In effect, since the vast majority of primary age children go to national schools, expenditure is distributed almost exactly in proportion to the number of children. While the numbers going to private schools are concentrated in the top two income groups, they are so small (less than 2 per cent of the relevant age group) that they do not have a major impact on this picture.

Table 6: *Distribution of Potential Second- and Third-Level Education Participants by Equivalent Disposable Income Quintiles*

Income Quintile	1973	1980	1987	1987
	ages 14-21	ages 14-21	ages 12-18	ages 18-22
	Second/Third Level Age Groups			
Bottom	13.8	15.3	18.7	8.6
2nd	22.0	18.3	19.8	15.8
3rd	25.0	23.8	25.0	22.1
4th	22.4	24.7	23.2	27.9
Top	16.4	17.9	13.3	25.6

Source: 1973 and 1980: Rottman and Reidy (1988), Tables 4.5 and 4.6

Table 6 shows the distribution of potential second- and third-level education participants across income groups. For the years 1973 and 1980 the potential pool is treated as being those aged 14 to 21, for both second- and third-level education. For 1987 it has been possible using the ESRI figures to derive more precise estimates of the potential pool of participants. The age range 12 to 18 covers the vast bulk of actual and potential participants in second-level education; while the range 18 to 22 includes the preponderance of actual participants in third-level education in 1987. This more detailed 1987 analysis suggests that the broader specification of the pool of participants overstates the potential pool for third-level participation in the lower income groups, and understates the relative size of the potential pool for the higher income groups. Aggregation in 1987 along the lines of the 1973/1980 analysis would certainly lead to such distortions, because in the lower income groups, children in the 12-22 age group tended to be disproportionately in the lower end of the age range (12-18). Correspondingly, in the higher income groups, children in the age range 12-22 tended to be disproportionately in the 18-22 age group.

Other things being equal, one might then expect to find that standardized results (which take into account the size of the pool of potential participants in each level of education) would show a reduction in the proportion of third level expenditure accounted for by the top income groups; and an increase in the proportion of second level expenditure which is attributable to high income groups. The latter phenomenon is clear from Table 7. After standardizing for the size of the potential pool, the 1987 analysis finds the share of second level expenditure going to the top two income groups is about 3 to 5 percentage points higher than in the earlier analyses. The share of the bottom two income groups is about 5 to 7 percentage points lower than in the earlier analyses. This makes the distribution of expenditure on second-level education close to a proportional one, rather than the progressive pattern suggested by earlier results.

Table 7:   *Standardized Distribution of Second Level Education Expenditure by Equivalent Disposable Income Quintiles*

Income Quintile	1973	1980	1987
Bottom	25.0	27.5	22.2
2nd	23.0	22.5	20.4
3rd	19.3	20.1	22.0
4th	16.3	16.5	18.6
Top	16.5	13.5	16.8

Source: 1973 and 1980: Rottman and Reidy (1988), Tables 4.5 and 4.6

Turning to third-level education (Table 8), we find much more complex differences between the results of the 1987 analysis and earlier work. The most striking difference between the pre-1987 and 1987 analyses is the sharp rise in the combined share of university expenditure going to the top two quintiles: it rises from about 55 per cent in 1973 and 1980 to 64 per cent in 1987. Correspondingly, the share of the bottom two quintiles falls from around

27 per cent to 16 per cent.[5] The analysis of expenditure on other third level institutions, by contrast, suggests a more evenly distributed benefit than the 1980 analysis. For example, the share of the top two quintiles is 41 per cent in 1987, as against over 50 per cent in 1980.

Table 8: *Standardized Distribution of Third Level by Equivalent Disposable Income Quintiles*

University Education

Income Quintile	1973	1980	1987
Bottom	14.9	9.4	4.7
2nd	11.8	18.9	11.3
3rd	19.9	15.7	19.5
4th	29.1	12.9	26.2
Top	24.3	43.1	38.1

Other Third Level Education Expenditure

Income Quintile	1973	1980	1987
Bottom	21.5	12.4	18.0
2nd	15.8	18.5	17.6
3rd	18.3	18.5	2 .3
4th	20.6	25.5	19.8
Top	23.8	25.1	21.3

Source: 1973 and 1980: Rottman and Reidy (1988), Tables 4.5 and 4.6

A separate analysis of the distribution of grants and scholarships is possible using the ESRI 1987 Survey. In principle, a classification into quintiles on the basis of income excluding grants and scholarships would be preferable. This analysis can also be undertaken using the

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5 The shares of the individual quintiles are rather more volatile. The proportion of standardized expenditure on university education going to the top income group is somewhat reduced. It seems likely that this is due to the differences in age groups used to standardize this element of expenditure.

ESRI survey, but is unlikely to alter the broad picture set out in Table 9. Grants and scholarship expenditure is found to be concentrated on the middle of the income distribution, after standardization for numbers within the relevant age group. This raises questions about the effectiveness of income-tested support for third-level students, and more general questions about the low rates of participation in the lowest income groups. The analysis of total expenditure on third-level education then shows that, after taking account differences in the numbers of potential students in the different quintiles, the share of the top income group is almost three times that of the bottom group.

Table 9: *Standardized Distribution of Third Level Education Expenditure by Equivalent Disposable Income Quintiles, 1987*

Income Quintile	Univ	Other 3rd	Grants/ scholarships	Total
Bottom	4.7	18.0	12.9	10.4
2nd	11.3	17.6	20.9	14.9
3rd	19.5	23.3	32.0	22.9
4th	26.2	19.8	17.3	22.7
Top	38.1	21.3	16.8	29.2

Source: ESRI Survey, 1987.

4. Conclusions

The results of the analysis of the distributive effects of total expenditure on education undertaken here show that it is substantially less progressive than earlier analyses suggested. A number of different factors contribute to this outcome; one is that higher numbers of children in the relevant age groups are found within the upper income groups in 1987.

Turning to third-level education, the ESRI's 1987 survey allowed a link to be established between students and their parental households, even if the students lived away from home during term-time. Thus, it has been possible to analyse the distribution of third-level education expenditures in a more comprehensive fashion than has hitherto been possible. The results confirm earlier concerns that state financing of third-level education on the current basis tend to reinforce existing income inequalities. The distribution of expenditure on university education is particularly skewed: almost two-fifths of expenditure goes to the top fifth of the income distribution, compared with less than one-twentieth going to the bottom fifth of the income distribution.

Tussing (1978) emphasised the need to distinguish between the "public good" element of education, and the "private good" element which individual pupils captured for themselves.[6] The private benefits captured by individuals include improved employment opportunities and increased wages. At the same time he recognised that education had a legitimate redistributive function. On this basis he argued that public funding of education should be reserved for the "public good" elements of education (mainly on efficiency grounds, though also with a view to distributional equity), and for the less advantaged (mainly on grounds of distributional equity and equality of opportunity). The picture of the distributive effects of current educational expenditures shown by the present analysis suggests that there are strong arguments on equity grounds, as well as for efficiency reasons, for a reorientation of educational expenditure towards disadvantaged groups, and for a greater element of private financing of third-level education.

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6 In particular, he noted that the fact that individuals acquire skills needed by society through the education system does not make education a public good: the individuals are paid for the use of their skills.

Appendix: Alternative Methods for Estimating Quintile Shares

In order to compare the different methods of estimating quintile shares, some notational conventions are needed. In the calculations in the paper a total of 7 different types of educational expenditure are considered: national schools, secondary schools, vocational schools, community/comprehensive schools, universities, other third level institutions and third-level grants and scholarships. These different types of educational expenditure are represented by the index j. The index i is used to refer to quintile groups.

N_{ij} is the *sample* estimate of the total number of persons who are in quintile i and participating in education of type j.

C_j is the "cost per pupil" of education of type j. This is derived by dividing total expenditure on this type of education V_j by the actual number of participants in the population, P_j.

The "standard method" for estimating the share of expenditure on education (of type j) accounted for by a particular quintile (i) is based on the following procedure:

Method A:
$$S_{ij} = \frac{N_{ij}C_j}{\sum_i N_{ij}C_j}$$

The denominator of this expression may be an under- or over-estimate of total expenditure on this form of education, depending on whether the sample estimate of participants $(N_j = \sum_i N_{ij})$ is an under- or over-estimate of the actual population total, P_j.

One method of ensuring that the actual expenditure is exactly and fully allocated is to pre-multiply the relevant sample estimates by the ratio of the population total of participants to the sample estimate of that population total. This would yield an identical estimate of the quintile share for a particular type of education:

Method B:
$$S_{ij} = \frac{\frac{P_j}{N_j}N_{ij}C_j}{\frac{P_j}{N_j}\sum_i N_{ij}C_j}$$

This may be rewritten as

Method C:

$$S_{ij} = \frac{\frac{P_j C_j}{N_j} N_{ij}}{\frac{P_j C_j}{N_j} \sum_i N_{ij}}$$

The term $\frac{P_j C_j}{N_j}$ can, however, be calculated using only information on total expenditure on the type of education ($P_j C_j$) and the sample estimate of the number of participants in that type of education. Method C can be thought of as simply dividing total expenditure on education of type j over all sample participants; the implicit assumption is that those participants "missing" from the sample are distributed over income deciles as those who are observed in the sample.

Each of these methods clearly gives the same answer as regards the distribution of expenditure on education of a particular type over quintile groups. But when looking at shares of total educational expenditure, or of educational expenditures at second or third level, where different costs per pupil are attached to different institutions or programmes, it is essential to ensure that all educational expenditures are exactly and fully attributed to households. Otherwise, differences in the coverage of the different educational programmes may distort the results.

A simple example may help to illustrate this point. In order to bring out the nature of the difference between the methods, it is assumed that the sample estimate of numbers in third level education is extremely low, and that the cost differential between first and third level education is particularly high. The precise figures used (which are *not* designed to reflect the actual situation) are a cost per pupil are £500 in primary schools and £5,000 in third-level institutions; and an actual number of third level of participants of 50,000 as against a sample estimate of 20,000. It is assumed that the sample estimate of 500,000 primary level students matches the actual total. The table below shows that in such circumstances, the standard method of estimating quintile shares for first and third-level education combined could produce misleading results, overstating the share of the bottom income groups and understating that of the top income groups.

$N_{i1STLEV}$	$N_{i3RDLEV}$	Method A	Method B or C
		Quintile shares	
100	0	14.3	10.0
100	2	17.1	15.0
100	3	18.6	17.5
100	5	21.4	22.5
100	10	28.6	35.0

Bibliography

Central Statistics Office (1980) *Redistributive Effects of State Taxes and Benefits on Household Incomes in 1973*, Dublin: Stationery Office.

Central Statistics Office (1983) *Redistributive Effects of State Taxes and Benefits on Household Incomes in 1980*, Dublin: Stationery Office.

Clancy, P. (1988) *Who Goes To College?* Dublin: HEA.

Coolahan, J. (1991) "A View of the Irish Education System: Current Issues and Problems", Chapter 9 of Background Report for OECD (1991).

Durkan, J. (1991) "Perspectives on Fiscal Policy: Education", paper presented to Dublin Economics Workshop Policy Conference, Kenmare, October 18-20.

Murphy (1984) "The Impact of State Taxes and Benefits on Irish Household Incomes, 1973-80" *Journal of the Statistical and Social Inquiry Society of Ireland,* Vol. XXV, Part I, 1983/84.

Nolan, B. (1990) "Inequity in the Financing and Delivery of Health Care in Ireland", ESRI Project on Income Distribution, Poverty and Usage of State Services Working Paper No. 16.

O'Higgins, M. (1980) "The Distributive Effects of Public Expenditure and Taxation: An Agnostic View of the CSO Analyses", in C. Sandford, C. Pond and R. Walker (eds.) *Taxation and Social Policy*, London: Heinemann.

OECD (1991) *Review of National Policies for Education: Ireland*, Paris: OECD.

Rottman and Reidy (1988) *Redistribution Through State Social Expenditure in the Republic of Ireland: 1973-80*, Dublin: National Economic and Social Council, Report No. 85.

Sheehan, J. (1991) "Education and the Economy", Chapter 8 of Background Report for OECD (1991).

Tussing, A. D. (1978) *Irish Educational Expenditures - Past, Present and Future,* Dublin: ESRI General Research Series Paper No. 92.