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PARTICIPATION IN UNIVERSITY EDUCATION BY GENDER AND GEOGRAPHICAL LOCATION*

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Rates of participation in university education were calculated for each county in the Republic of Ireland for the academic year 1977/78. Rate was defined as the number of 17 to 30 year olds with permanent residence in each county attending university (described in the Higher Education Authority's *Accounts and student statistics, 1977/78)* as a proportion of the population of 17 to 30 year olds living in each county (described in the 1971 Census figures). Participation rates were calculated separately for males and females. Overall participation rate was found to be higher for males than for females. Considerable differences in participation rates were found between counties. Seven variables were selected to predict county participation rates in regression analyses. Three of the variables – distance from a university town, proportion of students aged 12 to 17 attending secondary, community, and comprehensive schools in each county, and proportion engaged in agricultural employment – predicted 78% of the variance in male participation. The proportion engaged in commercial employment in addition to these three variables predicted 80% of variance in female participation.

The principle of equality of educational opportunity has frequently been enunciated as government policy, not only in this country (10, 18), but in other countries in the western world as well (17). Furthermore, it has the support of the vast majority of the Irish public (15). The principle is based on the premise that social roles should be allocated on the basis of 'achievement' rather than 'ascription' (13). That is, roles should be left open to choice, individual effort, and competition, rather than being assigned on the basis of characteristics over which the individual has no control (4).

In its least stringent form, the principle of equality of opportunity means that all children of equivalent measured ability should have equal access to non-compulsory education, irrespective of gender, race, place of residence, social class, or other irrelevant criteria (19). Access is difficult

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to define and measure Besides, many commentators do not accept that it is an adequate criterion of equality and have gone on to define equality in terms of the more stringent, and apparently more readily measured, concepts of participation and achievement (cf 3, p 19)

A number of studies carried out in Ireland have examined the participation rates of some of the groups with which the policy of equality of opportunity has been concerned In the *Investment in education* report, an examination of participation in second level education by place of residence revealed considerable disparities between counties (6) The same report, as well as others (2, 9, 14, 16), examined participation in higher education by social class and found an over representation of high social groups coupled with an under representation of low social groups This situation does not appear to have changed very much over the past fifteen years in at least one university (14) Evidence from Census data indicates that over the first seventy years or so of this century, the participation of males in university education has exceeded that of females (5) A similar discrepancy in participation between the genders has been reported for other countries (e g , 20) Disparities in participation in higher education have been reported for geographical location as well as for gender within the Dublin region (2)

The present study is concerned with university education Its focus is on gender and place of residence, not social class Participation is taken as the index of equality of opportunity The basic questions addressed are are there differences between the genders in participation in university education, and are there differences between counties in the participation of residents in university education? To answer these questions, data published by the Higher Education Authority (12) on the number of students (male and female separately) from each county in Ireland attending university were related to population statistics for each county as reported in the National Census (7)

A further question that may be asked is, if differences exist, how might one account for them? Little guidance is available to one in exploring the possible causes of differential participation by geographical location There are a number of factors, however, which it would seem reasonable to suppose might contribute to the situation One is distance from a university, it seems obvious that university education is more accessible in counties in which universities are located though whether distance is relevant once one gets beyond commuting range is less clear Educational provision at second level would also seem relevant, particularly the availability of secondary 'grammar' education, since the likelihood of following courses

leading to university entrance requirements is greater in secondary than in vocational schools. Finally, employment patterns in a county might influence the decision of residents to pursue a university education. For example, one might expect less interest in university education in a predominantly agricultural area than in an area in which the level of commercial and professional development created more opportunities for university graduates. Whether or not these factors would operate differentially for males and females is not clear. Some of these factors are explored in the study reported in this paper. Indices of a range of characteristics of counties – geographical location in relation to a university town, educational provision at second level, and economic characteristics – were selected and related to the participation rates in university of the residents of each county. Separate analyses were carried out for males and females.

METHOD

The data on which analyses were based were all obtained from published sources.

(i) The number of full-time students attending Irish universities (University College Dublin, University College Cork, University College Galway, Trinity College Dublin, and Maynooth College) by county of permanent residence in 1977/78 is reported in the *Accounts and student statistics* of the Higher Education Authority (12, Table 30). Statistics on students attending the National Institute of Higher Education in Limerick and the National College of Art and Design, though presented in the HEA report, are not included in our analyses, since these two institutions provide a type of education which differs from that provided in traditional universities; besides, the numbers attending them are small (5.3% of students).

(ii) The number of males and females between the ages of 17 and 30 (which is the age range of students described in the HEA report) living in each county of Ireland is reported in the 1971 Census (7, Table 11).

From these two sources, it was possible to calculate the proportion of the 17 to 30 year old age cohort with permanent residence in each county who were attending university. This was done separately for males and females. The proportions which were calculated provide the basic data for the study.

In attempting to account for differential participation rates, the role of seven variables was examined.

(i) Distance from a university town was established for each county. The precise measure used was distance in miles from each county town to the nearest university town. The distance used was that provided in the Auto-

mobile Association's 'Tours and throughroutes in Ireland' In the small number of cases where the relevant information was not provided in this source, distance was estimated from a map In the case of Cork, Dublin, and Galway, rather than using zero, a distance of five miles was assigned For analyses, since the ratio of largest to smallest values was substantial, a logarithmic transformation of distance was carried out

(ii) The number of students attending secondary, community, and comprehensive schools in the year 1976/77 as a proportion of the number of 12 to 17 year olds in the county in 1971 was calculated for each county The proportion was calculated on the basis of figures in the Department of Education's *Statistical Report* for 1976/77 (11, Tables on pp 60 and 67) and figures in the 1971 Census (7, Table 11) for 12 to 17 year olds

(iii) The number of students attending second level schools other than secondary, community, and comprehensive ones in the year 1976/77 as a proportion of the number of 12 to 17 year olds in the county in 1971 was calculated for each county The figures on school attendance were obtained by subtracting the figures for attendance at secondary, comprehensive, and community schools in the Department of Education's *Statistical Report* for 1976/1977 (11, Table on p 60) from the figures in the same report (11, Table on p 34) for total enrolment by county in second-level courses Most of the students not attending secondary, comprehensive, or community schools would have been attending vocational schools Figures for the total population of 12 to 17 year olds were obtained from the 1971 Census report (7, Table 11)

Four indices of employment patterns in counties were used These indices were developed by Baker and Ross (1) on the basis of an industrial classification provided in the Industry volumes of the 1966 and 1971 Censes The four sectors in the classification were as follows

(iv) Agriculture (including forestry, fishing, and turf),

(v) Commercial autonomous, made up of manufacturing industry, mining, sea and air transport, and hotels,

(vi) Social autonomous, comprising the social professions, public authority, building and construction, and public administration and defense,

(vii) Locally induced, comprising trading and all activities not included in other sectors

The proportions of the workforce in each county engaged in each of these sectors in 1971, as calculated by Baker and Ross are used in analyses

RESULTS

Proportion attending university.

The numbers of males and females, by county of permanent residence, attending university in 1977/78 are presented in Table 1 as proportions of the total numbers of males and females, between the ages of 17 and 30 years, living in each county in 1971.

Before examining these data, a number of disadvantages associated with them should be acknowledged. Firstly, the proportions are based on statistics which were obtained at different times. Moreover, we know there was a growth in population in the country generally between 1971 and 1979 of the order of 13.1% (8, p. 3). Thus, to the extent that the increase affected the 17 to 30 year old cohort, the proportions in Table 1 will over-estimate the proportions of people in the country in 1977/78 who are attending university. Further, population change varied from county to county, ranging from – 1.8 to 26.7% (8, Table 3). To the extent that change in the population of 17 to 30 year olds was different in different counties, the proportions presented in Table 1 will provide a rank order of participation which would differ from a rank order based on contemporary population statistics.

A further point to be noted in considering the data in Table 1 is that since the age range of students dealt with in the HEA report (12) was 17 to 30 year olds, a similar age group in county populations was used in the calculation of proportions. While the HEA report does not provide a breakdown by age for each county, it does provide a breakdown for the total student population by age. From this (12, Table 29) we can see that the vast majority of university students are less than 24 years of age. If the proportion of the population between 24 and 30 varies very much from county to county (as a result of different migration patterns, for example), then the data in Table 1 may not provide a very accurate index for some counties of the probability of attendance at a university of residents in the age range most concerned. It was possible to check if the use of an age range other than 17 to 30 year olds as the basis for calculating participation rates affected the ordering of counties in participation. Participation rates were calculated using three population bases in addition to the age range 17 to 30 used in the main analyses; these were for 17 to 20 year olds, 17 to 21 year olds, and 17 to 22 year olds. Correlations between these measures were found to be high, ranging from .87 to .98 for males and from .94 to .97 for females.

Finally it might seem that a better base for the calculation of the percentages of males and females attending university would have been the numbers of males and females in each county aged 10 to 23 in the 1971 Census, i e , those persons who would be in the age range 17 to 30 in 1978 This approach was tested for a few counties but appeared to give results which varied markedly in the relationship they bore to the growth in population in counties between 1971 and 1979 reported in the 1979 Census (8, Table 3)

TABLE 1

PROPORTION OF AGE COHORT (17 30 YEAR OLDS) ATTENDING UNIVERSITY BY COUNTY OF RESIDENCE

COUNTY	PROPORTION		COUNTY	PROPORTION	
	MALE	FEMALE		MALE	FEMALE
Carlow	033	034	Longford	032	044
Cavan	024	034	Louth	028	018
Clare	036	035	Mayo	039	044
Cork	053	039	Meath	027	025
Donegal	023	022	Monaghan	022	025
Dublin	049	031	Offaly	031	029
Galway	066	060	Roscommon	032	049
Kerry	040	035	Sligo	037	032
Kildare	031	025	Tipperary	036	032
Kilkenny	026	031	Waterford	030	026
Laois	029	027	Westmeath	037	032
Leitrim	027	034	Wexford	026	026
Limerick	033	025	Wicklow	039	029

* For example the change in population for Meath from 1971 to 1979 was − 1 8 per cent In 1971 the number of males aged 10 to 23 was 3 303 while the number aged 17 to 30 was 2,272 If the former figure was taken as an estimate of the number of males aged 17 to 30 in 1978, an increase of 45% would be indicated

With these observations in mind, we may look at the trends in the data contained in Table 1. The first thing to note is that there is considerable variation between counties in the proportions attending university. The proportion of males from Galway that attends university (the group with the highest participation rate at 6.6%) is three and a half times greater than the proportion of females from Louth that attends (the group with the lowest participation rate at 1.8%). Other relatively high rates of participation are achieved by Galway females (6.0%), Cork males (5.3%), and Dublin males (4.9%). Relatively low levels of participation are found for Donegal females and Monaghan males (2.2%), Donegal males (2.3%), and Cavan males (2.4%). The positions of Kildare females, Limerick females, Meath females, and Monaghan females, at a 2.5% participation rate, are only marginally better.

The overall participation rate is higher for males (4.1%) than for females (3.3%). However there are considerable differences within some counties in the participation rates of the genders, indicating that whatever factors operate either to facilitate or hinder university attendance do not always operate in the same way for males and females. Counties with relatively large differences between male and female participation rates are Dublin (in favour of males), Roscommon (in favour of females), Cork (in favour of males), Longford (in favour of females), Cavan (in favour of females), Wicklow (in favour of males).

Factors associated with participation rates.

Separate multiple regression analyses were carried out for males and females in which the participation rate of each county was the dependent variable and seven variables were used as predictors: distance from the county town to the nearest university town; the proportion of students in each county attending a secondary, community, or comprehensive school; the proportion of students in each county attending second-level schools other than secondary, community, or comprehensive schools; the proportion of the population in each county employed in agriculture; the proportion of the population in each county in commercial employment; the proportion of the population in each county in social employment; and the proportion of the population in each county in locally induced employment.

A correlation matrix for these variables is provided in Table 2. The correlation between participation rates for males and females is .66. This figure confirms our earlier observation that there are differences within counties between genders in participation rates. When we examine the factors associated with participation, we see that distance from a university

TABLE 2

INTERCORRELATIONS BETWEEN VARIABLES*
(n = 26)

		1	2	3	4	5	6	7	8
1	Proportion males in university								
2	Proportion females in university	66							
3	Distance (log) from university	−82	−42						
4	Proportion in secondary/ community/comprehensive school	39	01	−25					
5	Proportion in other second level school	−25	−19	21	−26				
6	Proportion in agricultural employment	−17	52	39	−50	10			
7	Proportion in commercial employment	−01	−60	−22	37	−12	−90		
8	Proportion in social employment	41	−00	−51	59	−33	−53	23	
9	Proportion in locally induced employment	24	−43	−41	44	05	−92	70	51

* Decimals omitted
r = 39 significant at 05 level

town is more important in the case of males (r = –.82) than in the case of females (r = –.42). In addition to distance, only one other variable is significantly related to male participation – the proportion of the population in secondary, community, and comprehensive schools (r = .39). Three of the employment variables are more strongly related than is distance to female participation – proportion in commercial employment (r = –.60), proportion in agricultural employment (r = .52), and proportion in locally induced employment (r = –.43).

The correlation matrix allows us only to examine the relationship between pairs of variables. However, an inspection of the matrix clearly indicates that many of the predictor variables are inter-correlated. This is most evident in the case of the employment measures. To analyse the collective and separate contributions of the predictor variables to variation in university participation, step-wise multiple regression analyses were carried out. Summaries of the analyses are contained in Table 3 (males) and Table 4 (females)*. In the male analyses, three variables contribute significantly to

TABLE 3

PERCENTAGE OF VARIANCE IN PROPORTION OF MALES ATTENDING UNIVERSITY ASSOCIATED WITH INDEPENDENT VARIABLES
(df = 1, 19)

Independent Variable	R^2	F	Significance (p) of change in R^2
Distance (log) from university	.666	66.57	<.001
Proportion in secondary/ community/comprehensive school	.704	3.79	NS
Proportion in agricultural employment	.780	7.63	<.05
Proportion in locally induced employment	.793	1.26	NS
Proportion in social employment	.800	.79	NS
Proportion in other second-level school	.809	.89	NS

* Since the percentages for the four indices of employment add to 100%, one of these indices will not appear in the regression analyses.

the explanation of 78% of variance in participation These are distance from university, proportion in secondary, community, and comprehensive school, and proportion in agricultural employment The addition of further variables does not add significantly to improvement in prediction The strongest predictor by far is distance from a university which explains 67% of variance

In the case of females, 80% of variance is explained by four variables – proportion in commercial employment, distance from a university, proportion in agricultural employment, and proportion in secondary, community, and comprehensive school No single variable predicts female participation as strongly as distance predicts male participation Among the predictors for female participation, proportion in commercial employ ment (explaining 36% of variance) and distance from a university (explaining a further 31% of variance) are the most potent

TABLE 4

PERCENTAGE OF VARIANCE IN PROPORTION OF FEMALES ATTENDING UNIVERSITY ASSOCIATED WITH INDEPENDENT VARIABLES ($df = 1$ 19)

Independent Variable	R^2	F	Significance (p) of change in R^2
Proportion in commercial employment	364	39 11	< 001
Distance (log) from university	675	33 49	< 001
Proportion in agricultural employment	734	6 38	< 05
Proportion in secondary/ community/comprehensive school	803	7 32	< 05
Proportion in social employment	811	86	NS
Proportion in other second level school	823	1 37	NS

DISCUSSION

The analyses of statistics on participation in university education in Ireland presented in this paper indicate that disparities exist which are related to gender and geographical location. The over-all participation rate is over 20% higher for males than for females.

Disparities between counties are considerably greater than the over-all disparity between males and females. The most extreme difference is to be found between Galway and Louth. The proportion of males from Galway attending university is three and a half times the proportion of females from Louth. Females from Galway and males from Dublin also do considerably better than do males from Monaghan, Donegal, and Cavan, or females from Monaghan, Limerick, and Meath.

Within some counties there are marked differences in participation rates between males and females. For example, there is a large difference, in favour of males, in Dublin and in Cork. On the other hand, female participation is greater than male participation in some counties, considerably so in Roscommon. Thus, we may conclude that the factors which affect participation are not precisely the same for both genders.

The results of the regression analyses support this view. For both genders, distance from a university town is a significant factor, but it operates to a greater extent in the case of males than of females. For males, 85% of the explained variance in university participation can be attributed to distance, but only 45% of such variance can be attributed to distance in the case of females.

Since counties with universities – Cork, Dublin, and Galway, though not Kildare* – show high participation rates, especially in the case of males, we may ask if this may be taken as an indication that distance as a factor influencing university attendance is best thought of in terms of whether the university is or is not within commuting distance for a student. We cannot answer this question unequivocally since we do not have precise information on the commuting practices of students. However, we can be

* Kildare, although it has a recognized college of the National University of Ireland, is not similar in its university participation rates to other counties in which a university is located. This could be due to a variety of factors: the recent development of the university, its size, its proximity to Dublin, its location in a non-urban area, or lack of adequate transport services to it from other parts of the county. Whatever the reason, it does not produce the same proportion of students as other counties with universities. In the following discussion, we will not consider it a 'commuting' county.

sure that many students in Cork, Dublin, and Galway do in fact commute from their own homes Some indication of the relevance of living within commuting distance may be obtained by examining the correlation between distance and participation rate for counties when Cork, Dublin, and Galway are excluded from the data The resulting correlations are insignificant for both males ($r = -36$ compared to $r = -82$ for the total set) and females ($r = -06$ compared to $r = -42$ for the total set) Another way to examine the effect of commuting range is to dichotomize counties into those which permit commuting (Cork, Dublin, and Galway) and those outside commuting range (the remaining 23) and calculate a biserial correlation between these categories and participation rates When this is done, the resulting correlation for males is found to be -83 and that for females, -44 It will be noted that these values are almost identical with the product moment correlations for the same variables Thus, we may conclude that the critical distinction regarding distance for prospective university students is, in most cases, whether or not they reside within commuting distance of a university

That distance is not the only factor affecting participation could, of course, be inferred from an inspection of the data on county participation rates which are presented in Table 1 In the table, we can see that some counties quite close to a university centre (e g , Louth and Meath) have low participation rates The regression analyses indicate that, in addition to distance, employment patterns in the county and secondary-school participation are also related to participation in university education For females, the extent of commercial employment in counties is negatively related to participation, while the extent of agricultural employment is positively related to participation for females and negatively related for males For both males and females, second-level educational participation is related to participation in university education

Why these factors should differ in their importance for male and female participation is not clear In particular, that distance should be less important for females than for males may seem strange In the case of females, other factors related to local employment patterns play a larger role This may reflect the fact that in some counties (for example, in Louth) there has traditionally been a demand for young female labour (commercial autonomous employment), in such cases, the attraction of semi-skilled and skilled employment at an early age may inhibit participation in formal education beyond the age of fourteen or fifteen years (cf 22) Why agricultural employment in a county should be associated more with female than male participation is less clear One of the difficulties in interpreting the agricultural index is that it does not take account of

differences in farm quality or size or in the wealth of farmers in different counties. Better-off farmers may be more likely than less well-off ones to try to send their children to university. Further, they may give preference to their daughters over their sons in this regard. Having said that, we are not unaware that many small farmers, particularly on the western seaboard, make strenuous efforts to provide third-level education for their children. The relatively high participation rates in Galway, Mayo, and Kerry probably reflect this phenomenon.

It should be borne in mind that our data refer to participation only in university education. They tell us nothing about participation in other third-level institutions. It was not possible to include data of the kind used in our analyses for other institutions, since such data are not available in published form. We might expect that their inclusion would have resulted in a somewhat different representation by gender and geographical location than the one we have presented in this paper. Actually data are presented on gender in the Higher Education Authority report (12). There we see that female representation is in fact worse in other third-level institutions than it is in universities. While the proportion of males to females in universities is 5.7:4.3, the proportion in other third-level institutions is 6.3:3.7.

We do not have data on the geographical origin of students attending other third-level institutions. However, we might assume that participation levels in third-level education generally would be better than our figures for participation in university education indicate for counties in which other third-level institutions are located. While this may be so and while obviously it would be of interest to have data of the kind we have examined for all third-level institutions, the point that arises from our analyses remains – that in at least one important sector of third-level education there are disparities associated with gender and geographical location. This is evidence that equality of opportunity, interpreted as equality of participation, has not been realized in this sector of the Irish educational system. Further, on the basis of our evidence relating to distance, it seems likely that equality of access does not exist either.

In any attempts which might be made to improve the present situation our analyses indicate that consideration should be given to three factors: employment patterns, participation in second-level education, and distance from a university town. Obviously little can be done in the short-term about employment patterns which have developed over long periods of time. Regional differences in second-level education are also long-standing but should be more amenable to change. The *Investment in education* (6)

report noted these differences in the early 1960s but was at a loss to find an explanation for them Despite increases in levels of participation in second level education throughout the country over the past fifteen years, there are still considerable differences between counties in the type of provision that is available Our estimates of the proportion of pupils in the age range 12 to 17 that attend secondary, comprehensive, or community schools indicate that they may range between 36 to 75 percent across counties Since the type of education available in such schools is related to participation in university education, its wider availability in counties with low levels of participation might lead to an improvement in university participation in those counties

Before considering steps that might be taken to overcome problems associated with distance, we should acknowledge that this variable is probably confounded with other variables in the context of university participation for which we do not have measures in this study For example, the proportions of higher social status and of more highly educated people are greater in the urban areas in which universities are situated than they are in other parts of the country (15) From what we know about participation in university education of students from different socio economic backgrounds, we would expect higher participation rates among urban dwellers than among rural dwellers However, in our present discussion we will confine our attention to problems that seem to be immediately related to distance, since that is the focus of our investigation

On the assumption that problems associated with distance are largely economic, a number of procedures to deal with them may be considered An obvious area in which to seek a solution is that of student grants Following their introduction in 1968, an increase in participation rates of students from 'working class' backgrounds was noted in one university (14) However, at a later date, following a decline in the real value of grants and in their availability, this participation rate fell (14) From these observations, it would seem that securing an adequate grant is an important factor in determining for some students whether or not they go to university If this is so for less well-off students in general, presumably it applies with even greater force in the case of such students who live beyond commuting distance to a university We would thus expect that a practical recognition of the fact that prospective students who have to leave home to attend university might need more consideration in easing their financial burden than they have hitherto been given in the grants system would lead to greater levels of participation among such students

An alternative to a grants scheme is a loans scheme One such scheme

has been proposed primarily to reduce the state's financial involvement in non-compulsory education (21). It may be that a loans scheme, either as an alternative to the grants scheme or in conjunction with it, could serve to ease the financial problems of some students.

Another method of assisting students would be to provide facilities for university education outside existing university institutions and to distribute these facilities throughout the country. The facilities could be provided in existing institutions or might require the establishment of new ones. In either case, they would presumably be limited in the range of courses which they would offer. For example, first-year university courses might be offered in regional technical colleges or in selected secondary schools. The cost of providing these additional facilities and their quality would have to be weighed against the cost of maintaining students away from home in existing universities. The desirability of using other third-level institutions to prepare students for university would also have to be considered. Another obvious addition to existing facilities would be a television service. Any of these partial services, while not entirely satisfactory, might go some way towards reducing costs for students.

Since the factors we examined in our analyses are not the only correlates of participation in university education, we cannot expect that any of the procedures we have considered would, if adopted, lead to a disappearance of the inequities which our analyses reveal. Each of them has disadvantages associated with it. Besides, they only address problems associated with distance. The role of employment variables and the possible role of psychological and sociological variables, particularly those associated with differences in the participation rates of the genders, were not considered and are beyond the scope of this paper. However, as long as the principle of equality of opportunity remains an important goal of the Irish educational system and as long as it is believed that social roles should be allocated on the basis of achievement rather than of ascription, it will be necessary to examine the procedures we have outlined, as well as other possible methods, in an effort to reduce the inequities which so obviously continue to operate in the system.

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