

RESEARCH BRIEFING

Education and Earnings in Northern Ireland

Dr Colm Harmon (University College Dublin & CEPR, London)
Professor Ian Walker (University of Warwick & IFS, London)

March 27, 2000

Key Points

- One of the principal aims of this analysis is the estimation of the return to a year of education, on average, in terms of the additional earnings made by individuals. Our estimates of this average financial “return” to education suggest that it is higher in Northern Ireland (NI) than in Great Britain (GB). This conventional statistical analysis of the GB data suggests a return (in the form of higher wages) of 6% for men and 10% for women per year of education, while the NI data suggests higher figures of around 8% for men and 12% for women per year. These are statistically significant differences.

An analysis of returns to different levels of education indicates that the return to GCSE is much larger in NI than GB. The returns to moving from GCSE to ‘A’ level are approximately the same in both NI and GB. For women the marginal return to moving from ‘A’ level to degree is large but approximately the same as GB. In contrast the marginal return to moving from ‘A’ level to degree for men is lower in NI. It should be noted that this analysis is based on a stock sample and the pattern for the current flows could be significantly different.

- These estimates do not take into account the cost of providing education and should be interpreted as *private* returns (i.e. to the individual). However there is considerable evidence in the previous literature to suggest that the private returns are likely to be lower bounds on the return to society as a whole - because increasing the education of some increases the productivity of everyone, not just those receiving more education. These estimates therefore indicate a large ‘social’ return to education, especially in NI.
- The implication of these higher returns is that, on average, NI born individuals find education more expensive or difficult to acquire holding everything else constant. Thus, these estimates support the case for encouraging and facilitating higher levels of education participation in NI on straightforward financial criteria. This would be a sound investment for NI.
- More sophisticated estimation methods that allow for the possibility that education and financial returns are determined simultaneously, suggest even higher rates of return - and still suggest that the returns are higher in NI than GB.
- Within NI, we found no significant difference in the return to education between Catholic and Protestant. Analysis with larger datasets would be required before it could be concluded that there is any significant difference by religion, but we did find significantly higher returns for women than men.
- The data suggests that there has been no decrease in the returns to education over time. Thus, there does not seem to be any ground for believing that the large recent increase in the supply of graduates has depressed the returns to education. Indeed the evidence suggests that the increase in the demand for highly skilled and educated labour has only just kept pace with the large increase in supply so keeping the return approximately constant over time.

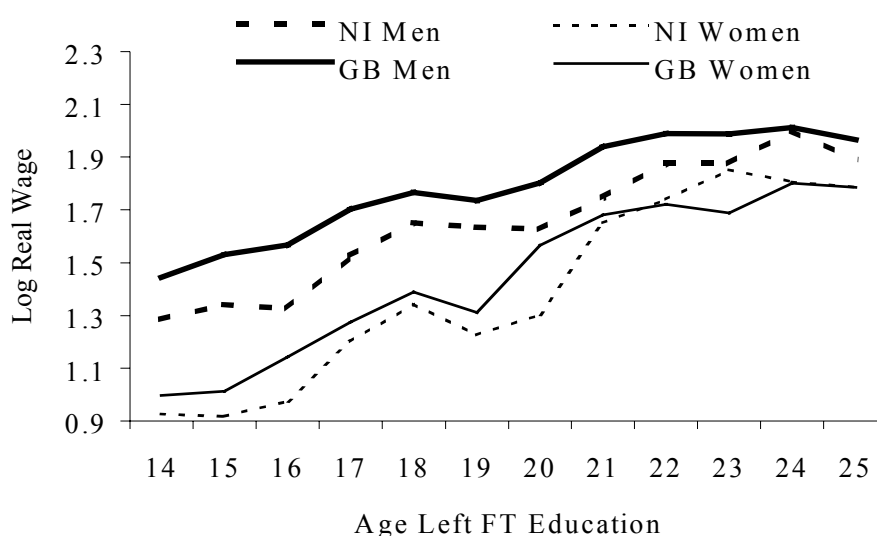
- An investigation into the extent to which education provides a signal of existing productivity as opposed to enhancing productivity suggests that the impact on productivity is the dominant factor. The signaling value is rather small, probably accounting for around 1 percentage point of the overall rate of return to education.
- A dataset that was drawn from NI Higher Education (HE) and Further Education (FE) entrants allowed us to examine two groups in detail– one which entered further or higher education in 1979 and another which entered in 1985. This data is particularly illuminating on the GB/NI differential. The raw data suggests very large regional differentials between GB and NI in annual earnings for both those who received their HE in GB and those that remained in NI for their HE. There is a large wage penalty for living in NI as opposed to GB, and the penalty seems larger at lower levels of wages.
- Our statistical analysis revealed that: a better class of degree leads to higher earnings in NI (but not significantly so in GB); women get paid less than men (around 9% on average); but there is a large wage premium (26%) associated with living and working in GB rather than NI. Religion has no discernible direct effect on the earnings of this sample of graduates. When we control for initial “ability” using the A level score, we find that wages are higher for NI graduates than GB graduates - by a significant 31% for women and an insignificant 5% for men. The implication is that (at least for women) NI HE institutions generate more *value added* than GB institutions in that from a base of students with lower A-level scores than in GB the average earnings of graduates show a remarkable similarity and the differences we do observe are due mainly to the regional differentials. Based on separate analyses for GB residents who were GB born and GB residents who were born in NI suggests that internal migration from NI to GB does respond to the relative sizes of unemployment rates and HE availability. We also find that individuals who are more likely to leave NI (for unobservable reasons) are more likely to have high wages relative to those born in GB. For example, “ambitious” people may be more likely to migrate and ambition may be rewarded in the labour market. However for those currently living in GB we find no significant differences in the rates of return to education between those born in NI and those born in GB once we control for their unobservable differences.

Study Findings

Stylised Facts

- Based on the Family Expenditure Survey (FES) for Great Britain (GB) and Northern Ireland (NI) the overall difference in earnings between men and women is 29.8% in NI and 42.7% in GB. Thus the gender differential is larger in GB than NI (or, equivalently, the regional difference is smaller for women than men). However when we examine earnings of men and women by education level (Figure 1) the gender differential is larger at lower levels of education. This suggests that the returns to education are higher for women than men.

Figure 1
Education and Wages by Gender for GB and NI Pooled FES/NIFES 1985/6-1994/5



- The education distributions are quite different between NI and GB for both men and women. The proportion of individuals whose age of leaving education is 21 or above is given in Table 1. The GB/NI differential is large and positive for men and small and positive for women. Table 2 gives the average lengths of education by gender and region. The average lengths are very similar and the differences between Tables 1 and 2 suggest that NI has a higher proportion stopping education at 17/18 than in GB.

Table 1 Percentage with Education Leaving Ages Exceeding 20 - FES/NIFES 1985/6-1994/5

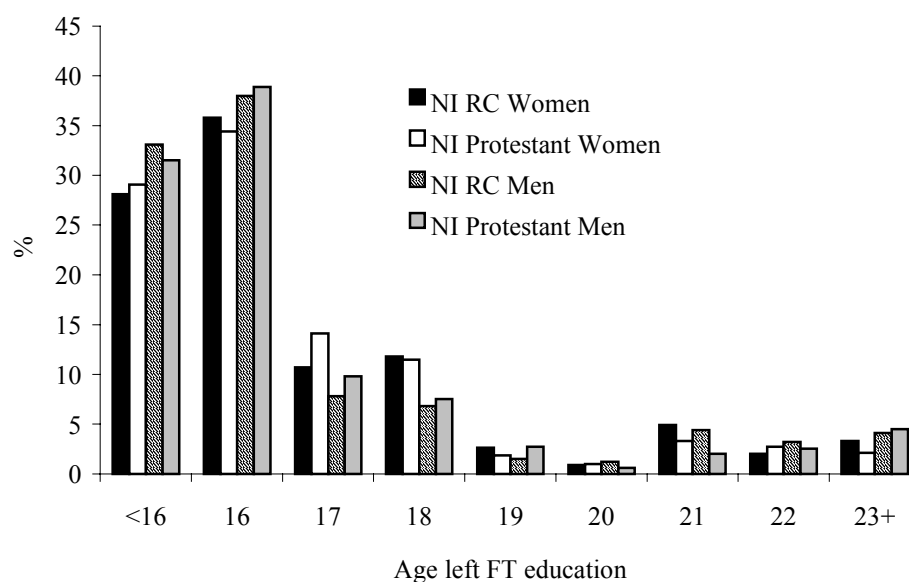
	Men	Women	Gender Differential
GB	12.1	9.7	2.4
NI	9.9	9.0	0.9
Regional differential	2.2	0.7	

Table 2 Average Duration (Years) of Education - FES/NIFES 1985/6-1994/5

	Men	Women	Gender Differential
GB	11.7	11.6	0.1
NI	11.5	11.6	-0.1
Regional differential	0.2	0.0	

- Figure 2 shows that there are differences in the proportion leaving education beyond 20 within NI with Protestants, women in particular, having slightly lower participation rates than Catholics. However, average durations of education by religion and by gender are little different within NI.

Figure 2
Education Years Distribution within NI: Pooled NIFES 1985/6-1994/5



Estimated Returns to Education

- We estimate the private returns to the individual of a year of education based on regression analysis of the FES data for NI and GB. We find that the return to education is 8% when we pool the FES data for both NI and GB. When we estimate separate returns for men and women we find significantly higher returns for women (at 10%) than men (at 6%). When we estimate separate equations for men in GB and men in NI we find that the return to education is somewhat higher in NI (7.5%) than in GB (6.3%). Similarly we find that for women the return to education is higher in NI (11.7%) than in GB (9.9%).
- We also control directly for religion. We find that the returns to education are approximately as before (7.6% and 11.8%). Catholic men earn 11.1% less than Protestant men, and Catholic women earn 4.9% less than Protestant women. Data from an alternative data source, the Continuous Household Survey (CHS) confirm these results.
- One difficulty with the results above is that they treat education as if it were distributed randomly across individuals. In fact, we find that there is a systematic pattern to the distribution of education across individuals. In particular, we find that those individuals who, for unobserved reasons, have high returns have low levels of education. We do this by statistically modelling the length of education that individuals have and use this model to assign a predicted level of education for each individual based on their observed characteristics. We find that those individuals who have less education than we would predict on the basis of their observed characteristics have lower wages than we would have anticipated on the basis of their observed characteristics. The implication is that the return to additional education is high for those with less education than we would expect. For example, those individuals that come from households without a culture that values post-compulsory education seem to have higher returns to education than those that do. The implication is that policies that encourage access to post-compulsory education are likely to have financial returns.

7. The results that do control for the unobservable determinants of education can be viewed as “marginal” returns – that is the returns to extra education for those that ceased education at a low level. These contrast with the earlier results, which are “average” returns – i.e. the returns to all individuals as a whole. These marginal estimates are inevitably less precise but we do find “marginal” returns that are significantly larger than the “average” returns above: for example, with the FES/NIFES data we find estimated returns from an additional year of education for men of 10% in GB and 14% in NI, and for women we find 19% in GB and 24% in NI.

Returns to Specific Qualifications and Degree Types

8. Based on General Household Surveys (GHS) for GB and Continuous Household Survey (CHS) for NI we find that there have been significantly rising returns to a degree **relative to A levels** to Arts/Humanities and Science/Engineering for women, and rising returns to Science and Engineering for men during the 1980's in the UK. Note that these are private returns since they reflect only the opportunity costs of the time spent studying not the tuition costs that are larger for science and engineering. While the NI CHS presents some difficulties with definitions and sample size, the results suggest that there is no shortage of NI capacity in any particular subject area except for Engineering where the return to men is a large and significant 21% higher **relative to an Arts degree**.
9. We estimated the effect of education level, including the higher vocational training that is usually associated with Further Education. The return to a degree relative to A-levels is approximately 40% for women in NI and in GB; for men there is a large difference with the return in NI being just 17% compared to 28% in GB. The penalty for being less well qualified is larger in NI than in GB, which explains why these results are still consistent with the earlier finding that the returns to years of education are, on average, higher in NI than GB. This is shown in Figures 3a and 3b where we present the wage differential for having the stated qualifications relative to the base case of no qualifications. At each point the returns in NI are greater than in GB that supports our earlier work where we simply measured education in years.
10. In Figure 3a the slopes of the lines show the marginal returns for moving from one qualification level to the next (taking GCSE as the starting point of this progression). These are larger in NI than GB at lower levels of education but lower in NI than GB at higher levels. In Figure 3b it does not make sense to view these qualifications as a progression since they are largely mutually exclusive so we present the results for vocational qualifications as a bar chart.

Figure 3a Returns to Non-Vocational Qualifications

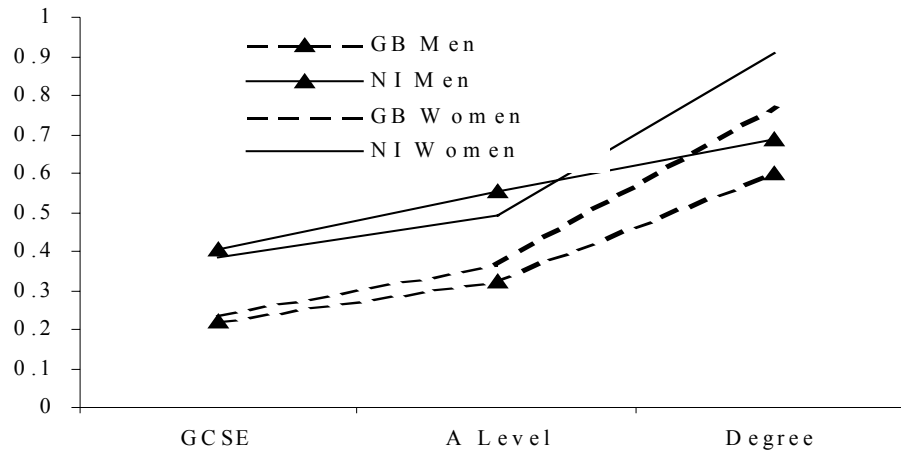
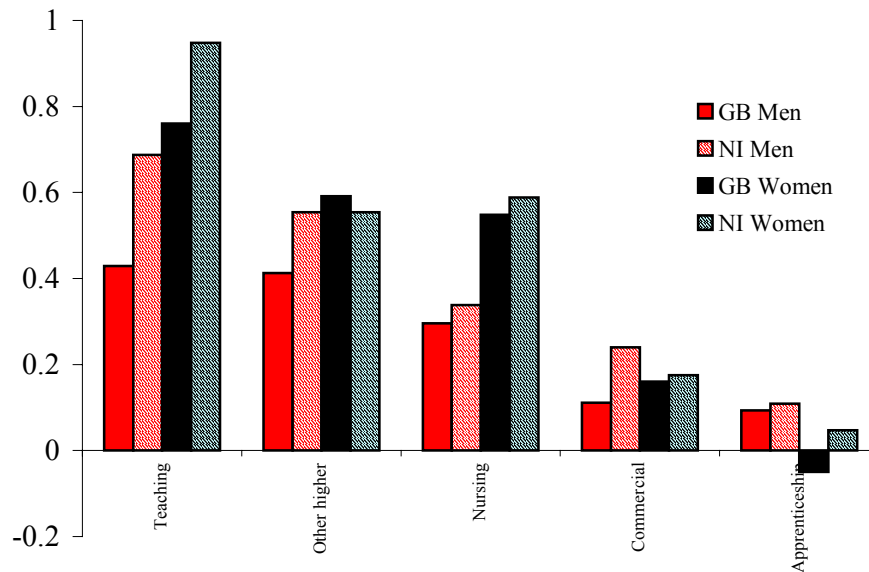


Figure 3b Returns to Vocational Qualifications



11. The returns in NI for having GCSE (relative to no qualifications) are much larger than in GB for both men and women. The returns to moving from GCSE to A Level are approximately the same in NI as GB (since the graphs are close to being parallel in this range). For women the marginal returns to moving from A Level to Degree are large but approximately the same in GB and NI. In contrast the marginal return to moving from A Level to Degree for men is larger in GB than NI. Note that this is a stock sample and the distribution may differ from the current flow proportions.
12. The returns to vocational qualifications do not exhibit significant differences between NI and GB except for teaching qualifications where the returns in NI are higher than in GB relative to no qualification. However, A levels are essentially a pre-requisite to acquiring a teaching qualification and the return to a teaching qualification relative to A levels in NI is then not significantly different from GB.

13. Thus, our evidence strongly suggests that the returns to education are, on average, higher in NI than in GB and that, in particular, we find significantly higher returns to GCSEs relative to no qualifications in NI rather than GB.

Education, Migration and Labour Market Returns

14. An alternative data source available to us is the Higher Education Northern Ireland (HENI) cohort study of 1992 that examines two groups – one who entered further or higher/further education in 1979 and another who entered in 1985. We extract 3435 individuals (1761 men, 1674 women) who have complete information on the relevant variables. The most notable feature of the data is that it is made up entirely of NI born graduates and hence is quite different from NIFES or CHS so that it would be inappropriate to compare the samples directly. The raw HENI data suggests very large regional differentials between GB and NI annual earnings both for those who received their HE in GB and those that remained in NI for their HE (Table 3).

Table 3 Annual Gross Earnings (£) of NI Born Graduates

	HE in NI	HE in GB	GB-NI Differential %
Working in GB	15,852	16,649	5.03
Working in NI	11,036	12,531	13.55
GB-NI differential%	43.63	32.86	

15. Figure 4a examines the distribution of the ‘movers’ (who leave NI for HE in GB) and ‘stayers’ (who remain in NI for HE). The probability of studying in GB rather than NI is slightly higher for women than for men and somewhat higher for Protestant than Catholic. In Figure 4b the probability of returning to NI, conditional on having studied in GB, is larger for women than men and for Catholic than Protestant.

Figure 4a Location of Higher Education by Religion and Gender

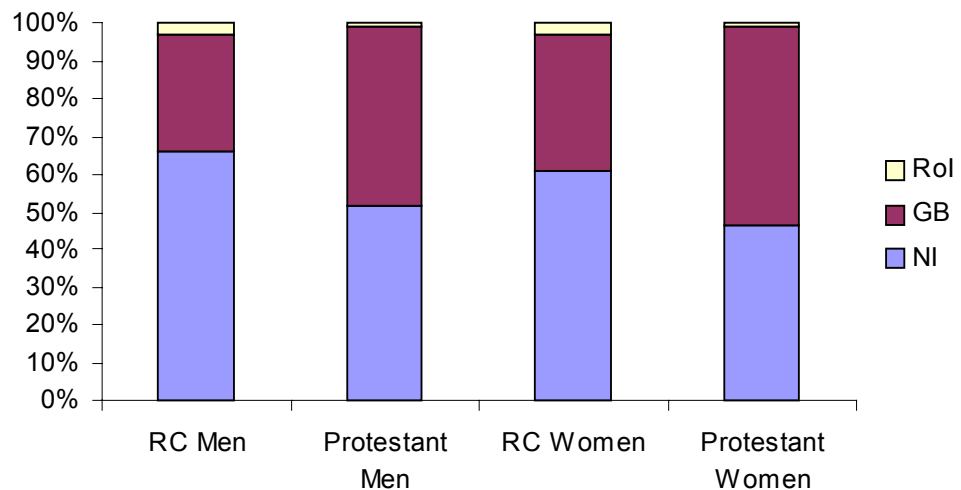
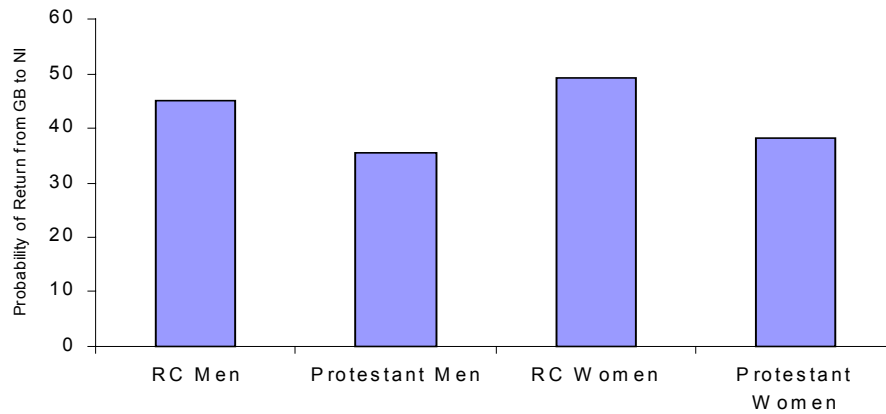


Figure 4b Probability of Returning by Religion and Gender – GB Educated



16. The proportion studying in GB is the same for both cohorts irrespective of religion. The proportions returning to NI after education in GB is identical across cohorts even though the '79 cohort has had an additional 6 years to return - this suggests that individuals return to NI, if they are going to, quite soon after graduation in GB. Non-graduation (drop-out) rates show a much higher rate for men than women and much higher rate for RC relative to Protestant. However, this does not explain the deterioration in the rate for Protestants between 1985 and 1991.
17. The A-level scores of Catholics and Protestants appear to have converged somewhat with Protestant scores declining and Catholic scores rising (Table 4). The A-level scores differ systematically between Protestants and Catholics and between those that graduate in GB and those that graduate in NI which suggests that it is the more able Protestants that leave for GB (Table 5). Table 6 shows how this breaks down by subject studied. Since medicine demands the top grades wherever it is studied the difference only manifests itself in other subjects - the gap is largest for Science subjects.

Table 4 A Level Scores: by Cohort and Religion

	Catholic	Protestant
85 cohort	15.9	18.4
91 cohort	16.7	17.4

Table 5 A Level Scores: by Place of HE and Religion

	Catholic	Protestant
GB graduate	16.8	20.4
NI graduate	16.5	17.3

Table 6 A Level Scores: by Place of HE and Subject

	GB graduate	NI graduate
Medicine	22.9	23.1
Science	20.8	16.6
Engineering	18.5	15.7
Soc Sci/Business	17.7	16.5
Arts/Human	18.8	15.7
All	19.3	16.9

18. The score of 16.9 for NI graduates in the table is little different when broken down by whether individuals now live in GB or not. Of the NI graduates the more able are just as likely to leave as the less able. However, the score of 19.3 for GB graduates breaks down into 17.9 for the ones that return to NI and 20.0 for those that remain to take up work in GB. This difference is particularly large for medical students and social scientists. Thus, it appears that the most able Protestants choose to study in GB and the better qualified of those choose to remain in GB.
19. Protestant graduates have A-level scores that exceed Protestant dropouts by approximately 48%, which is much smaller than for Catholic men (78%) and for women (approximately 70% on average). Protestant men in HE have higher ability than other groups in HE. Moreover Protestant male dropouts are more able than dropouts for other groups. However Catholic men and women are more likely to drop out in general.
20. From a statistical analysis of the HENI data we observe how a better class of degree outcomes lead to higher earnings in NI (but not significantly so in GB); women get paid less than men; there is a large wage premium associated with living in GB; and there is a small effect of A level score. These results suggest that, controlling for the other variables: living in GB as opposed to NI carries a large positive premium (about 26%); men earn more than women (a differential of 11% for those whose HE was in GB, and 8% for those whose HE was in NI); and being Protestant seems to be unimportant for the earnings of graduates.
21. Important differences are noted by location of the HE “treatment”. Controlling for A level score, wages are higher for NI graduates than GB graduates - by a significant 31% for women and an insignificant 5% for men. The implication is that (at least for women) NI HE institutions generate more value added than HE received at GB institutions.
22. We estimate separate equations with the CHS data for two groupings - GB residents who were either GB born or NI born. The results suggest that internal migration from NI does respond to the relative sizes of unemployment rates and HE availability and that this is has the expected sign. Moreover the effect seems to be larger for women than men. We find statistically significant evidence that individuals that are more likely to migrate, for unobservable reasons, are more likely to have high wages relative to those born in GB. For example, ambitious people are more likely to migrate and ambition is positively rewarded in the labour market. However, we find no significant differences in the rates of return to education between migrants and non-migrants controlling for their unobservable differences using a more advanced econometric method.

Methodology

The research was based on the econometric analysis of individual-level datasets to identify the relationship between education and earnings in NI with special attention to the distinctive issues that relate to NI such as the question of excess demand, the possibility of pursuing HE outside NI and the possibility that such individuals do not return. The focus was on the rate of return for the individual. A second aspect to the work was the examination of the impact of education on those individuals who chose to study outside NI for their higher education. These may not be a *randomly selected* subset of all NI students so we needed to explain why some individuals choose to study outside NI and others do not. Throughout our analysis we used GB data from the GHS and the FES, and NI data from the NI-FES, CHS and HENI datasets to model the impact of education on wages.

Project Details

The project was commissioned by DENI from Dr Colm Harmon and Professor Ian Walker at a cost of £49,000.

Full Report

The full report, entitled “Education and Earnings in Northern Ireland” by Colm Harmon (University College Dublin and the Centre for Economic Policy Research, London) and Ian Walker (University of Warwick and the Institute for Fiscal Studies, London) is available from the Department of Higher and Further Education, Training and Employment.