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EARNINGS INEQUALITY IN GREAT BRITAIN 1975–90: THE ROLE OF AGE

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This paper is concerned with the growing earnings dispersion among British men. The study is based on unit record data drawn from the New Earnings Survey. It is found that increases in inequality within age groups account for most of the rise in earnings inequality overall. Occupation too is a significant explanation of growing inequality among workers, but the major part of increased inequality within age groups remains unexplained.

INTRODUCTION

In a review article Levy and Murnane (1992) were able to conclude that recently a number of controversies regarding the dispersion of earnings in the U.S. have been resolved. Among these they mention first the course of earnings dispersion and how for men, "... earnings inequality moved from stability or gradual increases in the 1970s to rapid increases in the 1980s" (*Ibid.*, pp. 1371–2). The investigation of the North American evidence on inequality appears to have been more extensive than has been the case for Great Britain. In a comparative study of inequality trends in Canada, Sweden, West Germany, Australia and the U.S., Green, Coder and Ryscavage (1992, p. 3) were unable to include Britain as they did not have relevant data for two time periods in the 1980s. The purpose of this paper is to bring up to date the research on inequality among men working full time in Britain.

Using 16 years of data from the New Earnings Survey (NES), the development of earnings inequality to 1990 is investigated. For Britain the roles of age and some other explanators highlighted in the U.S. literature are assessed. This paper begins with a brief review of some recent research for the U.S. and Britain. The course of inequality among British men is established and an attempt is made to decompose the changes into parts associated with relative mean earnings, employment shares, and inequality within age groups of workers. Regression

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results are used to analyse the contributions to the growth of earnings dispersion from the included variables. Although age is found to be a useful explanator of inequality, it appears to be just one of several influences.

Findings on Inequality

That inequality has been growing in a number of industrialised countries is now well known. Some of the research addresses two elements of rising overall inequality: that which emerges *between* identifiable groups, and that which develops *within* the specified groups. Commonly the groups are identified by gender, age, and education. What has crystallised is that the "... understanding of increased within-group inequality is far more primitive than our understanding of earnings movements between groups" (Levy and Murnane, 1992, p. 1370). Variables used to investigate within-group dispersion in the literature include occupation, sector, region and indicators of changing labour market institutions. In this section of the paper recent research, on these and some other factors as well as age, is reviewed and the principal findings are noted. Much of the U.S. literature addresses the contention that changes in the structure of employment have produced a "polarization" of earnings, (Burtless 1990). Underlying factors thought to be important include structural change, technical change, age and cohort-size effects; increased educational participation, and de-unionisation and workplace flexibility.

Age may matter to inequality in two ways. First it is a crude proxy for experience, but it also operates through demographic shifts. The most obvious of these is the post-war baby boom. On the latter Blackburn (1990, p. 454) commented on the oddity that changing inequality between age groups in the 1980s was unlikely to be due to the effect of that large cohort. Any effect should have been obvious in the previous decade. In relation to their human capital model Dooley and Gottschalk (1984) argued that the effect of the baby boom should emerge as variations in inequality between groups and should decline with experience. Using data for 1968 to 1979 they found a temporary increase in earnings dispersion, but of more importance were the "... substantial increases in earnings inequality within labour force cohorts even after the levels of education, experience, and unemployment were controlled for" (*Ibid.*, p. 86). Both Karoly (1992) and Blackburn (1990) conclude that age, industry, and education contribute significantly to growing inequality, but age does not stand out as the dominating explanation. According to Burtless (1990, p. 115) most of the recent greater inequality among U.S. males was from within groups defined for age, education, region and experience. He also identified growing gaps between the incomes of older and younger men, and between the incomes of more and less educated men.

Early work on inequality in Great Britain was based on cohort data. Hart (1976) and Creedy and Hart (1979) showed that earnings dispersion increased with age for adult males, especially in prime age. Within age groups, earnings dispersion increased over time. For the 15 years from 1965 to 1980 Mookherjee and Shorrocks (1982) found a steady increase in income inequality in the U.K. Contributions to inequality from within age groups changed little, but that between groups was growing and accounted for between 16 and 30 percent of the

total (*Ibid.*, p. 892). Ermisch (1988) showed that the impact on earnings of varying cohort sizes depends on the size of preceding and following generations.

Shifts in the skill mix of the workforce are a possible source of changes in interoccupational earnings. These may be a source of changing inequality. Levy and Murnane (1992, p. 1366) observed that "... earnings differentials among relatively detailed occupations have increased over the last 20 years, with the differentials growing twice as fast during the 1980s as in the previous decade." Several researchers have studied earnings and occupations, sometimes also including industry variables. On this, Howell and Wolff argued (1991, p. 499) for the U.S. that "... changes in occupation mix alone would have led to a *decline* in earnings inequality in the 1960s and 1970s. ... if the source of growing earnings inequality is to be found within industries, it is due to changing relative wages among occupations rather than changes in the occupation (skill) mix of industry employment." For Groshen (1991, p. 876), occupational wage differentials and establishment differentials are the principal explanators of U.S. wage variation. Phelps Brown (1988, pp. 400–3) highlighted some theoretical issues and empirical results on the interactions between age and occupation which may produce earnings inequality. He reported for Britain that for different occupations there is more variation in the earnings of older than younger groups of workers.

When changes in distribution are observed over many years, a likely source is structural change. An obvious structural shift has been the recent "deindustrialisation"—the shift away from manufacturing towards services. For the U.S. over the period 1963 to 1987, Harrison and Bluestone (1990, pp. 361–2) observed that because of deindustrialisation, "... the entire wage spectrum shifts towards a lower average, higher variance distribution." This was similarly described by Bluestone (1990, p. 305). The contributions to inequality from age, industry, education and other characteristics were estimated by Blackburn (1990, Tables 3 and 4). On his estimates the effect of industry accounted for thirteen percent of the overall change in the variance of the log of earnings between 1967 and 1985.

In some economies there are substantial differences in earnings between different regional locations. These differences may grow or shrink through time and there may be accompanying migrations of workers across regions. Such shifts could contribute to variations in inequality. Little work has emerged on this issue but Blackburn (1990, p. 449) found that when regional dummies were included in an "other characteristics" variable, a decline in inter-regional earnings differences acted to lower inequality. Regional dummies, along with gender, occupation and an incentive indicator, were included in Groshen's attempt to control for human capital. She noted the persistence of establishment wage differentials (1991, p. 881). For the U.K. Moghadam (1990) found that region, as well as education, industry, and occupation influences, explained differential wage growth.

A prominent institutional change in the 1980s was the decline in trade union density. It if had been uniform across high and low paid workers, or across gender, skill, or occupation, then it need have had little impact on inequality. However, unions have typically narrowed the dispersion of earnings and have succeeded in improving relative earnings for those at the bottom of the pay structure—women, blacks, the unskilled, and the disabled (Elliott, 1991, p. 440). For the U.S., Flaherty and Caniglia (1992) found that unions equalise earnings among men.

Deunionisation has been included in a number of inequality studies. It was important to the decline in relative earnings of unskilled U.S. males (Blackburn, Bloom and Freeman, 1990), but Davis and Haltiwanger (1991, p. 138) found the deunionisation effect to be minor in U.S. manufacturing. Firm size interacted with deunionisation so that ". . . an increase in industry-wide union density disproportionately increases the wages of small plants and thus narrows the size-wage differential" (*Ibid.*, p. 169). This interaction effect was also trivial.

In the following section the focus is on age and the decomposition of earnings inequality into "between" and "within" parts. Subsequently, regression analysis is used to analyse earnings variation while controlling for age, as well as for some of the other groups of variables discussed so far.

Age and Inequality

The research reviewed in the previous section has been rather less concerned with the level of inequality, but rather more with redistribution, or increasingly unequal earnings. Here an investigation is made of changing inequality among British men of different ages over the period 1975 to 1990. The New Earnings Survey (NES) provides a panel of about 50,000 male full-time workers for whom observations on gross weekly earnings, age, region, industry and occupation, and several institutional variables are available. The sample is restricted to those men for whom data are available in all survey years. Using these data it is possible to assess the importance of inequality between different age bands of men relative to the contribution to overall inequality among individuals within the age bands.

Inequality is measured with the mean logarithmic deviation index,

$$I_0(t) = \frac{1}{n(t)} \sum_i \log \frac{\mu(t)}{y_i(t)}, \tag{1}$$

where at time t $n(t)$ is the number of employed males, $\mu(t)$ is mean earnings, and $y_i(t)$ is earnings for the i-th individual.[1] The index of inequality I_0 is plotted in Figure 1.[2]

During the sixteen-year period there was a general tendency to rising overall earnings inequality. It fell only in 1977 and grew most between 1985 and 1987. Being additively decomposable, the index I_0 allows the identification of contributions to inequality from earnings dispersion within groups of workers, and that coming from the changing relative mean earnings of the groups. Where workers belong to one of G groups, the "within" component is

$$W(t) = \frac{1}{n(t)} \sum_{g=1}^{G} n_g(t) I_g(t), \tag{2}$$

[1]This index has the following features: it is non-negative, equalling zero only when all earnings are equal; between-group inequality is independent of inequality within subgroups; it satisfies the Pigou-Dalton principle of transfers, and the index is mean independent. Further, if r groups, each containing n individuals and having an identical earnings distribution y are aggregated into a single population of $r \times n$ individuals, then aggregate inequality is the same as in each of the constituent groups (Shorrocks, 1980 and Mookherjee and Shorrocks, 1982).

[2]As annual values for I_0 are small for our New Earnings Survey sample, they are multiplied by 1,000 and denoted I_0^*.

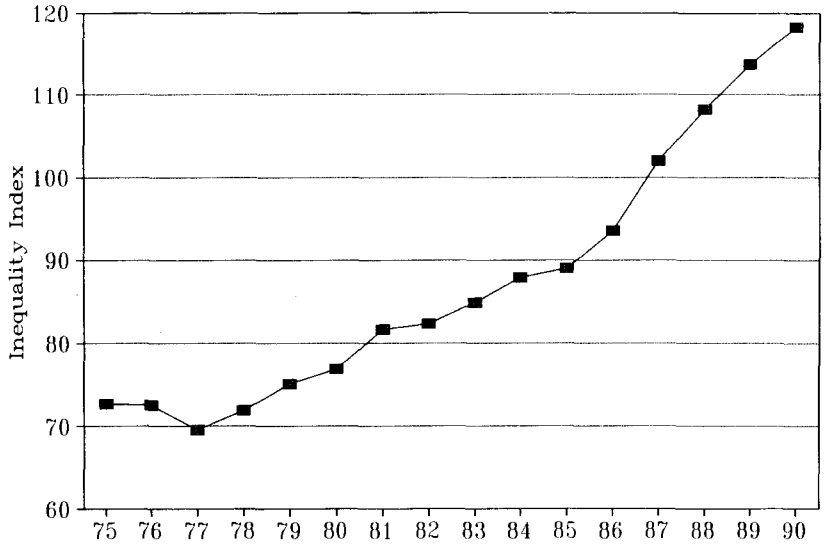

Figure 1. Inequality Among Men Working Full Time 1975–90

where at time t $I_g(t)$ is the value of the inequality index I_0 for group g, and $n_g(t)$ is the number of individuals in group g. The "between" component arising from groups' mean earnings is

$$B(t) = \frac{1}{n(t)} \sum_{g=1}^{G} n_g(t) \log \frac{\mu(t)}{\mu_g(t)}, \tag{3}$$

where $\mu_g(t)$ denotes the mean earnings of men in group g. Here the groups are defined by age. The between component is the "... inequality due solely to the difference in mean incomes by age. ... the pure *age effect*" (Mookherjee and Shorrocks, 1982, p. 889). The rise in inequality is decomposed into contributions associated with nine age bands. These are five-year bands from 17 to 21 up to 57 to 61, with two open-ended ranges "less than 17" and "greater than 61". For the NES data the decomposition of inequality is set out in Table 1 below.

The first column contains the data underlying Figure 1. The inequality within age groups, $W(t)$, always contributes at least 80 percent to $I_0^*(t)$ in each year. However, the contribution from the between component was smaller in the mid-1980s than in the later years. The paths of $W(t)$ and $B(t)$ are displayed in Figure 2.

There were three phases in the contributions to inequality from the between, or age, effect. First was the growth in the age effect up to 1981. For younger and older age groups the tendency for mean earnings to fall, relative to the overall mean, accounted for most of the variation in the contribution of each group to the age effect. Second, the age effect declined from 1981 to 1985. In this phase, up to 1982, the decline in the age effect was associated with the halving of the share of 17 to 21 year olds in the sample. Participation factors related to education,

TABLE 1

DECOMPOSITION OF THE INEQUALITY INDEX 1975–90

Years	$I_0^*(t)$	$W(t)$	Percent of Total	$B(t)$	Percent of Total
1975	72.6	59.1	81.4	13.5	18.6
1976	72.5	58.2	80.3	14.3	19.7
1977	69.5	55.9	80.4	13.6	19.6
1978	71.9	57.8	80.4	14.1	19.6
1979	75.1	60.9	81.1	14.2	18.9
1980	76.9	62.0	80.6	14.9	19.4
1981	81.6	66.1	81.0	15.5	19.0
1982	82.3	67.6	82.1	14.7	17.9
1983	84.9	70.5	83.0	14.4	17.0
1984	87.9	73.9	84.1	14.0	15.9
1985	89.0	75.6	84.9	13.4	15.1
1986	93.6	79.0	84.4	14.6	15.6
1987	102.0	86.0	84.3	15.9	15.6
1988	108.3	90.7	83.7	17.6	16.3
1989	113.7	94.2	82.8	19.5	17.2
1990	118.3	95.2	80.5	23.1	19.5

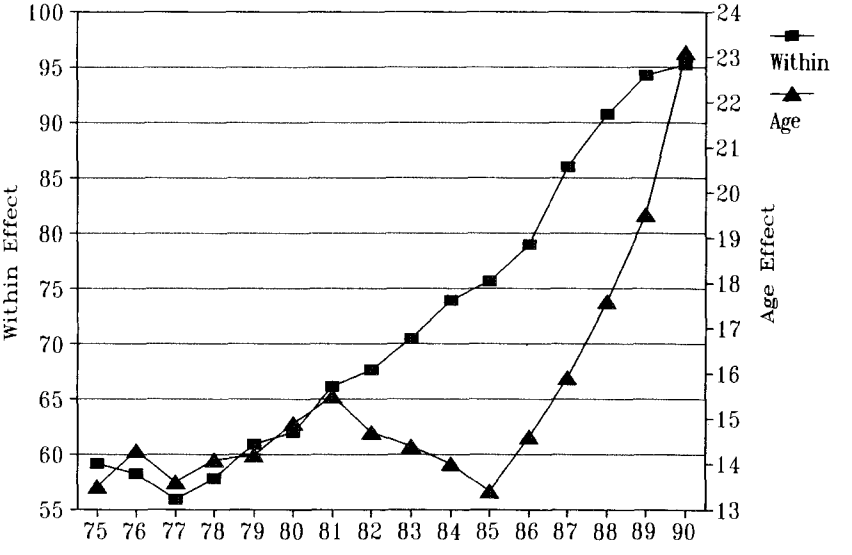

Figure 2. Contributions to the Inequality of Earnings

employment training schemes, and the rise in youth unemployment underlie this.[3] After 1982 the dominant effect was a decline in the contribution from those aged 22 to 26. This was partially offset by increases in the age effects for each of the age groups in the band 27 to 41. This corresponded to a decline in their relative

[3]Note that the New Earnings Survey does not cover workers whose earnings fall below the National Insurance contribution level. Thus, sampling bias is more likely for groups, such as those under 21, and older workers with declining earnings.

mean earnings. Finally, after 1985, the age effect for the 22 to 26 year old group grew. Their relative mean earnings fell while their employment share rose. Up to the mid-1980s the changing relative earnings of younger and older workers were the dominant element of the age effect. At the end of the decade, the main age effect was from workers in their early twenties. The distinct positive trend in the within component was due to the rapid growth in within-group inequality among prime-aged men.

Variations in the within component of I_0 are the result of interactions between the time paths of the population weights $s_g = n_g/n$, and the within-group inequality contributions I_g. Variations in the age effect arise from the interaction between the time paths of s_g and the logarithm of relative group mean earnings, μ_g/μ. To separate the influences of group shares, means, and within components, I_g, the following decomposition of I_0 between periods t and $t+\Delta t$ is used:

$$\Delta I_0 = \sum_g s_g(t)\Delta I_g + \sum_g \left\{ I_g(t) - \log \mu_g(t) + \frac{\mu_g(t)}{\mu(t)} \right\} \Delta s_g + \sum_g s_g(t) \left\{ \frac{\mu_g(t)}{\mu(t)} - 1 \right\} \frac{\Delta \mu_g}{\mu_g(t)} + 0(2), \tag{4}$$

where 0(2) denotes terms of order 2 in the changes in the group shares, means and within components, ΔS_g, $\Delta \mu_g$ and ΔI_g. The derivation of the decomposition is given in Rimmer (1994). In (4) the first three terms correspond to the linear terms in Taylor's expansion for the difference ΔI_0. Higher order terms which account for "interaction" or "compositional" effects among changes in shares, means and within components have been accumulated into the term 0(2).

Equation (4) has a number of advantages over other approaches to the process of decomposition. First the separate effects on I_0 of changes in group shares, means and within components are given in (4) as closed-form expressions. It follows that each of the separate effects can be computed, and that the total of all interaction effects is simply the difference between the actual change in inequality and the sum of the separate effects. Unlike other commonly used approaches to decomposing an index there is no possibility of confounding interaction effects with the separate effects (Rimmer 1994). Since the linear terms in a Taylor's expansion are obtained from the partial derivatives of I_0 the separate effects in (4) are uniquely determined once the changes in shares, means, and within components are specified (see Apostol, 1957, Chapter 6). Moreover the separate effects are approximations to the changes in I_0 caused by "marginal" changes in one of the shares, means, or within components. For example, if for group g mean earnings increase by amount $\Delta \mu_g$, while all other factors remain unaltered, then from (4) the change in inequality, ΔI_0, is approximately

$$s_g(t) \left\{ \frac{\mu_g(t)}{\mu(t)} - 1 \right\} \frac{\Delta \mu_g}{\mu_g(t)},$$

and the "marginal" effect on I_0 at time t is

$$\frac{\partial I_0}{\partial \mu_g} = \frac{s_g(t)}{\mu_g(t)} \left\{ \frac{\mu_g(t)}{\mu(t)} - 1 \right\}.$$

In the context of comparing the current work with other research on inequality in Britain, the decomposition (4) has the further advantage that it is consistent with the approach taken by Mookherjee and Shorrocks (1982, pp. 896–7).

Again using the NES data the contributions of each of the separate effects in (4) to the overall change in inequality have been calculated for each year. These are summarised in Table 2, where the year-on-year changes have been aggregated over two sub-periods and for the whole period between 1975 and 1990. In the table the "share effect, Δs_g" [corresponding to term 2 in (4)] is the change due to variations in age-group sample shares. The second $\Delta\mu_g$ [term 3 in (4)] is the change in inequality due to variations in age-group mean earnings. Finally, ΔI_g [term 1 in (4)] corresponds to within-group variations in inequality.

TABLE 2

CHANGES IN I_0^*: FULL-TIME WORKING MALES 1975–90

Term[1]	Age Group	1975–83	1983–90	1975–90
Share effect Δs_g	<21	−19.7	6.5	−13.2
	22–51	113.4	−12.5	100.9
	>51	−96.8	9.8	−87.0
Total		−3.1	3.8	0.7
Mean effect $\Delta\mu_g$	<21	−37.3	−13.3	−50.6
	22–51	48.6	24.3	72.9
	>51	−7.8	−4.5	−12.3
Total		3.4	6.6	10.0
Within effect ΔI_g	<21	0.1	1.3	1.5
	22–51	8.7	18.1	26.9
	>51	3.4	3.6	7.0
Total		12.2	23.0	35.3
Approximate total effect		*12.6*	*33.4*	*46.0*
Actual Change[2]		12.3	33.4	45.7

[1]Refers to the term of order one in equation (6).

[2]The entries in this row were calculated using the data in column 1 of Table 1, as the differences in I_0^* between 1975 and 1983, 1983 and 1990, and 1975 and 1990.

Consider first the variations in I_0^* due to changes in sample shares. In each sub-period, these are greatest for men aged 22 to 51. Indeed the increase of 113.4 over the sub-period, 1975–83, is the largest change reported in the table. However, changes in the share effect for both younger and older males operate in the opposite direction to that for the middle group in each sub-period. Another countervailing influence operates: shifts in age structure act to reduce inequality over the first nine years by 3.1 units, but this is outweighed by similar effects which increase the value of the index by 3.8 in the second period. The result is a relatively modest overall change in I_0^* of 0.7 over the 16 years. Even though there are some large effects reported in this part of the table, the changing age-structure of the sample contributes little to the growth in inequality.

In the second panel of Table 2 it is evident that changes in mean earnings between prime-age males and other men are again countervailing. The net effect for each sub-period is to cause total inequality to grow, by 3.4 in the first period and 6.6 in the second. The overall contribution from this component reflects the rise in the relative mean earnings of men in the middle group, especially in relation to younger workers. The decomposition (4) reveals the pre-eminence of increasing

inequality within age groups for the men. In particular it highlights the growth in inequality among prime-age workers. In the lower panel of Table 2 it is clearly within the age band 22 to 51 years that the within group inequality in each period is greatest. For the period from 1965 to 1980 Mookherjee and Shorrocks (1982) found a steady increase in inequality. They were able to attribute most of it to variations in the relative mean *income* of different age groups. Here, the results in Table 2 indicate that the effect of relative mean earnings on overall inequality (the mean effect) is swamped by the within effect. These results are not directly comparable with those in Mookherjee and Shorrocks. The periods of study are not wholly overlapping, and whereas Mookherjee and Shorrocks used income data, here earnings are used. Inequality of incomes and earnings need not necessarily move in tandem and thus too much should not be made of the apparent contrast in the sources of the growth in inequality.

The decomposition provided here is limited in that it cannot expose influences other than age on inequality. The between component could include influences of factors which are correlated with age. Since factors other than age are not controlled for, age-specific earnings differences may be biased estimates of age itself on earnings, and hence on inequality. In the regression analysis which follows we model some factors, including age, which may explain inequality.

Evidence from Cross-section Regressions

Thus far the course of inequality among British men has been analysed using the additively decomposable index I_0, concentrating on age. Here the approach is in two linked parts. First regression analysis is used to reveal additional influences which could explain the course of inequality. Then the variance of the log of earnings is used to assess the changing importance of the contributions of regression variables to the explained part of earnings dispersion. Using unit records from the NES, a sequence of regressions was estimated for the years 1983 to 1990.[4] The form of each regression in any year was

$$\log y_i = \alpha + \sum_{j=1}^{J} \beta_j' X_{j,i} + u_i, \tag{5}$$

where α is the intercept, β_j denotes a vector of slope coefficients, $X_{j,i}$ is a vector of explanatory variables belonging to group j and u_i is a normally distributed disturbance. The J blocks of explanatory variables comprise occupation, region, institutional dummies, tenure, sector, industry and age. With the regressions it is possible to consider the impact of age on earnings while controlling for some other independent influences. Pooled regressions were estimated to test first for the hypothesis of constant slopes and constant intercepts through time, and second for the hypothesis of constant slopes but varying intercepts. Both hypotheses were decisively rejected. Cross-section results for 1983 and 1990 are set out in Appendix 1.[5] Sample size ensured that most coefficients were significant at the one percent level.[6]

[4]A consistent industrial classification was only available after 1983.

[5]A full set of results is available from the authors.

[6]Except for industry, each group of dummies generally had large t-values in the regressions. Tests for the joint significance of the industry dummies supported their inclusion.

The NES does not include observations on education and experience and thus precludes the direct, conventional, modelling of human capital in the regressions. However occupation and age may be interpreted as embodying some elements of human capital. Facing a similar constraint Groshen (1991, p. 874) included region, gender, occupation and an incentive measure in a composite variable in order to control for human capital. Relative to the excluded occupation of general managers, workers in personal service and farming and related jobs suffered the largest pay penalty in both years. To the extent that occupation is an indicator of human capital, the regressions suggest that skilled workers such as those in the first few occupations, do better in terms of their earnings, relative to other men. So far as region is concerned, those in the southeast were least penalised relative to the control group, and the Welsh were relatively most penalised in both years. The share of employment of workers covered by collective agreements between unions and employers fell from 48.6 percent in 1985 to 35 percent in 1990. In the latter year such workers were slightly worse off than others. The very small proportion of workers affected by the decisions of Wages Councils had, as expected, relatively lower earnings in both years. Agriculture is the excluded industry. In 1990 workers in distribution were relatively disadvantaged, whereas there was a premium for those in energy, mining, and banking. When other influences are allowed for, there appears to be a bonus for all men in the prime age years from 27 to 51. While all of these age groups do well relative to the very young excluded group, those aged 37 to 46 did best in 1983. Age clearly contributed to increased earnings dispersion by 1990.[7]

Results from the regressions can be used to see how much of the difference in the variance of log earnings between 1983 and 1990 is attributable to the included groups of dummy variables. To do this the variance in the dependent variable is decomposed according to

$$\sigma^2_{\log y} = \sum_{j=1}^{J} \beta_j' \Omega_{jj} \beta_j + 2 \sum_{j=1}^{J} \sum_{k=j+1}^{J} \beta_k' \Omega_{kj} \beta_j + \sigma^2_\varepsilon, \tag{6}$$

where Ω_{jj} is the variance–covariance matrix of the group of variables X_j, and $\Omega_{kj}(k \neq j)$ is the matrix of covariances between X_k and X_j. Following Blackburn (1990) the decomposition (6) may be used to examine the extent to which changes in inequality between 1983 and 1990 are attributable to contributions arising from the blocks of independent variables.

The components of the variance corresponding to the first two terms in (6) for 1983 and 1990 are set out in the two upper panels of Table 3. The third panel shows the percentage of the change in the variance of log earnings accounted for by each block of variables. About two-thirds of the overall increase in earnings inequality is explained by variables included in the regressions. (The sum of the elements of the third panel is 64.25 percent.)

The contributions from two variables stand out. Occupation explains 17 percent of the total increase in the variance of the dependent variable. About 21

[7]It may be that changes over time in educational participation have affected the relative earnings of the very young men in the excluded group. Some part of the age effect may be influenced by this choice of the reference group.

TABLE 3

CONTRIBUTIONS TO THE VARIANCE OF LOG EARNINGS (× 1000) IN 1983 AND 1990

1983[1]

	Occupation	Region	Agreement	Wages Board	Tenure	Sector	Industry	Age group
Occupation	27.48	2.39	−0.10	0.75	−0.10	−0.93	−0.78	7.16
Region		4.40	−0.02	0.05	−0.03	0.03	0.03	−0.11
Agreement			0.00	0.02	0.00	−0.02	0.08	0.00
Wages Board				0.42	0.00	0.00	0.65	0.47
Tenure					0.10	0.00	0.03	0.47
Sector						0.33	0.88	−0.08
Industry							5.07	1.36
Age group								20.43

1990[1]

	Occupation	Region	Agreement	Wages Board	Tenure	Sector	Industry	Age group
Occupation	38.56	4.63	0.46	1.05	−0.16	0.16	2.19	13.12
Region		7.21	0.16	0.02	−0.16	0.00	0.25	−0.37
Agreement			0.20	−0.09	−0.05	0.46	−0.34	−0.41
Wages Board				0.46	0.00	−0.09	0.87	0.55
Tenure					0.32	−0.02	0.02	1.64
Sector						0.48	−0.66	−0.75
Industry							5.95	2.60
Age group								33.77

Percentage of overall difference in the variance of log earnings, 1983-90

	Occupation	Region	Agreement	Wages Board	Tenure	Sector	Industry	Age group
Occupation	17.13	3.47	0.86	0.46	−0.10	1.69	4.60	9.21
Region		4.35	0.27	−0.04	−0.20	−0.05	0.34	−0.39
Agreement			0.30	−0.17	−0.07	0.73	−0.66	−0.63
Wages Board				0.05	0.00	−0.14	0.33	0.11
Tenure					0.34	−0.04	−0.02	1.81
Sector						0.24	−2.39	−1.04
Industry							1.37	1.92
Age group								20.61

[1]The variance of log earnings (× 1000) was 163.5 in 1983 and 228.2 in 1990.

percent is accounted for by age. Another sizeable contribution comes from the covariance between occupation and age. This is consistent with the increase of 22 percent in the between component, $B(t)$, in Table 1. It grew from 14.4 in 1983 to 23.1 in 1990. In other words, not controlling for the other factors in the decomposition based on (1) appears not to have biased the age effect estimates noticeably.[8] This suggests that the distribution of age bands across occupations is not even, and acts to increase overall inequality. If it is accepted that occupation reflects educational differences, then the results here parallel those of Blackburn (1990) on the importance of the covariance between age and education as an explanation of the rise in inequality in the U.S. Interactions between occupation and region and occupation and industry make smaller contributions to the overall difference. Blackburn (1990, p. 448) reported a steady decline in the importance of "other characteristics"—including region. Here region itself contributes a little over four percent to the explanation.

CONCLUDING REMARKS

In this paper three analytical techniques have been used to explore rising earnings inequality among British men working full-time. The index used showed that for these men inequality grew relentlessly after 1977. The decomposition of

[8]This was pointed out to us by an anonymous referee.

the index into effects due to inequality between age groups of men and within these groups showed that the growth was mainly due to the latter effect, largely in the prime-age band. This is in line with the earlier research finding of Creedy and Hart (1979) who found this for British men in the decade up to 1973. Although cyclical influences on inequality have not been modelled directly, the graphs do not support such an explanation of within-group inequality. The between-group index has turning points which are not well aligned with the economy's cycles.

The regressions provide some insights to possible explanations for earnings differences. There is little evidence of a substantial shift in the skill mix of the workforce—at least as indicated by occupation. Aside from the increased share of professional and administrative workers, and the fall in the share of the transport and storage group, little else happened. The coefficients for the first seven occupations in the list were larger in 1990, whereas the others were a little smaller. This may indicate changing relative wages among all occupations, independent of some other influences. It is also (roughly) consistent with improved returns for more highly skilled workers, relative to others.

The regressions did not provide much support for the hypothesis that deunionisation has been a major force for growing inequality. However, on deindustrialisation, employment shares suggest that the importance of manufacturing in Britain changed little between 1983 and 1990. The major shifts in the industrial mix appear to have been a redistribution of employment among finance and other services, and transport and distribution. In each of these sectors the coefficients show a tendency to an increased earnings premium.

Some factors emphasised in the literature on inequality are associated with demography. The rise in between-group inequality by 1990 occurred because the relative earnings of younger and older workers deteriorated, compared with prime-age workers. While not fully investigated here, preliminary cohort analysis of NES data show that the cohort born in the 1960s earned about 12 percent less while in their twenties, than the cohort born a decade earlier. Overall, the research suggests that most of the increase in male earnings inequality which took place in Great Britain during the 1980s occurred within age bands of workers.

The decomposition of the variance of the log of earnings showed that of the variables included in the regressions, age, occupation, and to a lesser extent region, made the most obvious contributions to the explained part of changes in earnings inequality. Interactions between occupation and age, industry, and region, mattered too. Although age stands out as being important, it must be acknowledged that it is only one of many influences on the development of increased earnings dispersion. From the index of inequality in Table 1 and the decomposition in Table 3 just about 80 percent of the change is due to factors other than age. This is similar to the findings of Karoly (1992) and Blackburn (1990) that age is not dominant in explaining the growth in U.S. earnings inequality. The part explained by age for Great Britain appears to be due to changes in relative mean earnings of age bands of workers. Until these changes are themselves explained, the causes of the major part of rising inequality remain unknown. This study of the role of age in earnings dispersion updates the research on inequality among British men, but as Levy and Murnane remarked of the overall literature, understanding of within-group inequality remains "primitive."

APPENDIX 1

ORDINARY LEAST SQUARES REGRESSIONS FOR LOG EARNINGS, 1983 AND 1990

Variable[1,2]	1983 Mean	1983 Coefficient *T-value*	1990 Mean	1990 Coefficient *T-value*
Occupation				
Professional and administrative	0.086	−0.24	0.102	−0.17
		−17.68		*−15.80*
Social professionals	0.041	−0.34	0.037	−0.29
		−23.45		*−21.73*
Artistic and sports	0.010	−0.34	0.010	−0.34
		−18.21		*−18.48*
Professional scientists	0.098	−0.36	0.102	−0.34
		−27.44		*−32.05*
Managerial, excluding general	0.070	−0.32	0.079	−0.31
		−24.02		*−28.34*
Clerical	0.103	−0.66	0.097	−0.64
		−49.61		*−58.37*
Sales	0.035	−0.54	0.034	−0.51
		−37.15		*−39.89*
Security and protective	0.033	−0.31	0.035	−0.37
		−20.72		*−27.58*
Personal services	0.033	−0.77	0.025	−0.80
		−52.26		*−57.52*
Farming and related	0.023	−0.78	0.020	−0.81
		−43.11		*−43.05*
Materials processing	0.033	−0.59	0.032	−0.61
		−39.74		*−46.01*
Making and repairing	0.049	−0.61	0.049	−0.62
		−42.90		*−51.05*
Metal and electrical	0.187	−0.56	0.183	−0.57
		−43.21		*−54.82*
Semi-skilled	0.039	−0.63	0.039	−0.64
		−44.14		*−51.69*
Construction and mining	0.038	−0.63	0.031	−0.64
		−43.51		*−47.94*
Transport and storage	0.099	−0.64	0.085	−0.68
		−48.16		*−61.99*
Miscellaneous	0.013	−0.69	0.011	−0.71
		−40.27		*−40.10*
Region				
South East, excluding London	0.170	−0.13	0.180	−0.13
		−27.05		*−23.69*
East Anglia	0.035	−0.17	0.037	−0.20
		−21.26		*−21.69*
South West	0.076	−0.18	0.083	−0.21
		−30.54		*−31.06*
West Midlands	0.095	−0.19	0.097	−0.24
		−34.46		*−37.11*
East Midlands	0.068	−0.19	0.073	−0.23
		−30.99		*−31.57*
Yorkshire and Humberside	0.086	−0.18	0.086	−0.24
		−31.57		*−35.51*
North West	0.112	−0.17	0.106	−0.22
		−31.50		*−34.31*
North	0.054	−0.17	0.049	−0.23
		−25.24		*−28.31*
Wales	0.044	−0.20	0.042	−0.26
		−26.77		*−29.53*
Scotland	0.091	−0.15	0.086	−0.22
		−26.53		*−31.79*

APPENDIX 1—continued

Variable[1,2]	1983 Mean	1983 Coefficient *T-value*	1990 Mean	1990 Coefficient *T-value*
Institutions				
Collective agreement	0.486	0.01	0.350	−0.04
		1.54		*−7.47*
Wages Boards and Councils	0.041	−0.10	0.035	−0.12
		−12.26		*−11.18*
Tenure				
Held job less than 12 months	0.125	−0.03	0.157	−0.05
		−7.27		*−10.76*
Sector				
Public corporations	0.169	0.03	0.081	−0.06
		5.19		*−7.36*
Central government	0.081	−0.02	0.069	−0.06
		−2.28		*−5.86*
Local government	0.126	−0.03	0.112	−0.04
		−4.51		*−3.92*
Industry				
Energy and water supply	0.055	0.17	0.055	0.25
		9.61		*11.48*
Other mineral & ore extraction	0.063	0.04	0.063	0.12
		2.48		*5.95*
Metal, vehicles and engineering	0.184	−0.03	0.185	0.05
		−1.77		*2.70*
Other manufacturing	0.133	−0.02	0.132	0.04
		−1.31		*1.92*
Construction	0.048	−0.07	0.047	0.01
		−3.87		*0.36*
Distribution, catering, repairs	0.108	−0.16	0.113	−0.10
		−9.84		*−4.85*
Transport and communication	0.111	0.03	0.105	0.08
		1.50		*3.73*
Banking, finance, insurance	0.086	0.03	0.113	0.14
		1.53		*7.10*
Other services	0.196	−0.02	0.173	0.05
		−1.14		*2.47*
Age group				
17 to 21	0.073	0.55	0.074	0.46
		24.80		*22.88*
22 to 26	0.117	0.81	0.073	0.882
		36.68		*43.40*
27 to 31	0.129	0.94	0.113	1.00
		42.74		*49.82*
32 to 36	0.144	1.02	0.128	1.06
		46.17		*52.67*
37 to 41	0.122	1.04	0.137	1.10
		47.18		*54.70*
42 to 46	0.109	1.04	0.145	1.10
		46.72		*54.82*
47 to 51	0.102	1.00	0.114	1.08
		44.93		*53.63*
52 to 56	0.092	0.96	0.100	1.03
		42.97		*50.87*
57 to 61	0.076	0.90	0.079	0.96
		40.10		*47.00*

APPENDIX 1—continued

Variable[1,2]	1983 Mean	1983 Coefficient *T-value*	1990 Mean	1990 Coefficient *T-value*
62 and over	0.031	0.85	0.030	0.86
		36.65		*39.63*
Constant		4.77		5.26
		136.93		*109.81*
Mean of log earnings	5.03		5.61	
$\bar{R}^2$	0.43		0.49	
N	51218		47315	
$F(52, N\text{-}51)$	746.03		879.03	

[1]The omitted variables from the blocks of dummy variables were:
Occupation—Managers
Region—Greater London
Collective agreement—No major collective agreement
Wages Board Council—No Wages Board Council
Tenure—Held job for more than 12 months
Sector—Private sector
Industry—Agriculture, forestry and fishing
Age group—16 and under

[2]Detailed definitions of the dummy variables for occupation and industry are available in the New Earnings Survey Bulletins.

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