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RACIAL DISCRIMINATION AND OCCUPATIONAL ATTAINMENT IN BRITAIN*

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The last few years has seen rising concern about the relative economic position of racial minority groups in Britain. Despite this growing concern empirical analysis has been scarce, particularly in the area of earnings and employment and particularly at a national level.[1] This continual lack of empirical evidence itself acts as a barrier to the elimination of racial discrimination in the labour market. If effective anti-discrimination policy is to be formulated, it is necessary to know the 'form' that racial discrimination takes.

This lack of evidence contrasts markedly with the position in the United States where a considerable literature on the occupational and earnings position of various minority groups has accumulated.[2] The comparative neglect of this area by British economists may have been partly due *in the past* to a feeling that racial discrimination was less of a problem in the British labour market, but has mainly been due to a lack of adequate data. The recent National Training Survey provides a timely opportunity to examine racial differentials and their interaction with various factors, particularly education, labour market experience and training.

This paper is an attempt to provide empirical evidence on differentials in occupational positions between black immigrants and white UK-born individuals equal in other occupation-determining characteristics. Only discrimination *within* the labour market is examined and it should be noted that this may be less than total discrimination, since some of an individual's characteristics may themselves be the result of discrimination *before* the market. In comparing these two groups it should also be noted that any differentials ascribed to discrimination will be the result of a combination of discrimination on the grounds of colour and discrimination on the grounds of country of birth. The extremely small proportion of the labour force who are black and UK-born is reflected in the data set used, which contains an insufficient number of such individuals to separate out these two factors. The use of a sample of white immigrants for this purpose requires untenable assumptions and is not undertaken.

The National Training Survey was conducted on behalf of the Manpower

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[1] The main national level evidence is provided by the PEP survey, the results of which are presented in Smith (1976). The Community Relations Commission evidence to the Royal Commission on the Distribution of Income and Wealth (1978), for example, relies heavily on this source.

[2] See, for example, Ashenfelter (1970, 1972), Freeman (1973, 1974), Hall and Kasten (1973), Strauss and Horvath (1976) and Weiss (1970).

Services Commission in late 1975 (see Manpower Services Commission (1978) for details) and involved detailed interviews with about 54,000 individuals. Its main advantages for the present investigation are twofold. Firstly, the provision of information on occupation histories allows investigation both of individual occupational movements and of changes in the average differential over time. Secondly, the size of the survey means that a sufficiently large sample of black immigrants can be generated for the analysis (about five times the size of that available from the General Household Survey for example).

In addition to estimating the average differential in occupational attainment it is also important to know how this differential varies across individuals with different characteristics and in particular how the differential varies over the life cycle. These questions are investigated in Section II using a simple model for estimating differentials that is laid out in Section I. Given the differences in occupational level attained by the two groups a key question to examine is how these compare with those in earnings. What is the relative importance in the earnings differential of differences in occupational attainment and differences in earnings given the occupational level attained, i.e. within occupations? Are differences in earnings the result of black immigrants being paid less for doing similar jobs or the result of their not gaining access to the better paid jobs? This question is investigated in Section III.

The 1970's saw dramatic changes in labour market conditions in Britain and it seems pertinent to ask how these affected the relative economic position of black immigrants. The picture outlined in Sections II and III is a snap-shot of a point in time (1975). In Section IV fixed age samples for each year from 1970 to 1975 are analysed to investigate whether or not that picture changed over the period. In contrast to this examination of aggregate changes, individual mobility is considered in Section V. The longitudinal nature of the occupation data is utilised to investigate the key determinants of individual occupational progress over a five-year period and to examine whether or not black immigrants differ from UK-born white workers in this respect.

I. A MODEL FOR ESTIMATING DIFFERENTIALS

This section presents a methodology suitable for the estimation of racial differentials, based on that used by Oaxaca (1973) and others since. The degree of *direct* discrimination experienced by individual i may be defined as

$$\Delta_i = \frac{Y_i - Y_i^W}{Y_i^W},$$

where Y_i is the occupational position attained by individual i measured in some suitable way and Y_i^W is the occupational position that individual i would have attained were he white, but otherwise had identical characteristics. Since for blacks Y_i^W is not directly observable, a model of the occupational attainment process must be used. Assume that the position attained is generated for the two groups in the following way

$$\text{Ln } Y_i^B = \mathbf{x}_i' \boldsymbol{\beta}^B + u_{1i},$$

$$\text{Ln } Y_i^W = \mathbf{x}_i' \boldsymbol{\beta}^W + u_{2i},$$

where $\mathbf{x}_i$ is a vector of characteristics, $\boldsymbol{\beta}^B$ and $\boldsymbol{\beta}^W$ are vectors of unknown parameters and u_{1i}, u_{2i} are random errors. Thus the overall occupational attainment process may be written as

$$\begin{aligned}\operatorname{Ln} Y_i &= \mathbf{x}_i' \boldsymbol{\beta}^B D_i + \mathbf{x}_i' \boldsymbol{\beta}^W (1 - D_i) + u_i \\ &= \mathbf{x}_i' \boldsymbol{\beta}^W + \mathbf{x}_i' (\boldsymbol{\beta}^B - \boldsymbol{\beta}^W) D_i + u_i,\end{aligned}$$

where D_i is a binary variable indicating whether the individual is black and $u_i = D_i u_{1i} + (1 - D_i) u_{2i}$. From the definition of Δ_i

$$\operatorname{Ln} Y_i = \operatorname{Ln} Y_i^W + \lambda_i D_i,$$

where $\lambda_i = \operatorname{Ln}(1 + \Delta_i)$. Thus having estimated occupational attainment equations for the two groups, the differential for the ith individual can be estimated from

$$\hat{\lambda}_i = \mathbf{x}_i' (\hat{\boldsymbol{\beta}}^B - \hat{\boldsymbol{\beta}}^W) = \mathbf{x}_i' \Delta \hat{\boldsymbol{\beta}},$$

and the mean differential in the black sample from

$$\hat{\bar{\lambda}} = \bar{\mathbf{x}}^{B'} (\hat{\boldsymbol{\beta}}^B - \hat{\boldsymbol{\beta}}^W) = \bar{\mathbf{x}}^{B'} \Delta \hat{\boldsymbol{\beta}},$$

where $\bar{\mathbf{x}}^B$ is the vector of means in the black sample. Alternatively from the differential

$$\lambda_i = \operatorname{Ln} Y_i - \operatorname{Ln} Y_i^W,$$

where Y_i^W must be estimated since it is not observable for blacks. Thus

$$\hat{\bar{\lambda}} = \overline{\operatorname{Ln} Y} - \widehat{\overline{\operatorname{Ln} Y^W}} = \overline{\operatorname{Ln} Y} - \bar{\mathbf{x}}^{B'} \hat{\boldsymbol{\beta}}^W = \bar{\mathbf{x}}^{B'} \Delta \hat{\boldsymbol{\beta}},$$

as above. Of course there is an index number problem with this: $\hat{\bar{\lambda}}$ could be evaluated at $\bar{\mathbf{x}}^W$ instead of at $\bar{\mathbf{x}}^B$. However, to measure the extent of discrimination against blacks it seems intuitively more reasonable to consider the average over the black sample. In addition since blacks are such a small proportion of the population in Britain it is reasonable to use the coefficients from the white equation to estimate the occupational attainment of the black sample in the absense of discrimination. Having estimated λ_i for an individual with a certain set of characteristics, the estimate of Δ_i is given by

$$\hat{\Delta}_i = \exp(\hat{\lambda}_i) - 1.$$

The same model can be used to estimate differentials in earnings and, modified slightly, to analyse occupational progress.

II. DIFFERENCES IN OCCUPATIONAL ATTAINMENT

Measurement of differences in occupational position requires the construction of a numerical measure, since occupational position is not naturally cardinal or even ordinal. Two main approaches are possible. The first is to measure an occupation's position by the average hourly earnings received by those in that occupation. The second is to use a 'status' scale such as that constructed by Goldthorpe and Hope (1974) from an interview sample. The first approach has several advantages and is the way that occupational position is measured in this paper. Unlike with the alternative approach, it is abundantly clear what is being measured. Since this measurement is in money units, it also allows easy interpretation of the results. In addition, it provides for an easy comparison with current earnings differentials thus permitting an examination of the relative importance of within-occupation earnings differences and differences in occupational position. The main disadvantage of the approach is that it takes no account of the non-pecuniary aspects of jobs which are an important component of their desirability.

Whilst the alternative approach may take some account of the non-pecuniary attributes of an occupation, it suffers from the inherent difficulties in the interpretation of the concept of 'status.' In addition, there is some degree of arbitrariness in the cardinalisation involved in the construction of the Goldthorpe–Hope scale from the interviewee rankings.

Despite these differences, Phelps Brown (1977) and others have pointed out that there is broad agreement between the grading of occupations by status and by average earnings. Although this does not necessarily imply that estimated differentials in occupational attainment as measured by average earnings will be similar to those measured on the status scale, results based on a projection of the Goldthorpe–Hope scale presented in an earlier version of this paper do in fact indicate considerable similarity.

Turning to the details of the construction of the measure, the National Training Survey uses the KOS (Key Occupations for Statistical Purposes) classification currently used by the Department of Employment which identifies 396 occupations. Average hourly earnings by OUG (Occupation Unit Group) were calculated from the 1975 General Household Survey tapes and mapped into the KOS groups.[1] Other sources, such as the New Earnings Survey, classified directly by KOS provided insufficient coverage of occupations.[2]

The samples used are of white male workers born in the United Kingdom and black male workers born outside the United Kingdom.[3] Both samples include those not currently in employment who have worked at some time before. These people are allocated the value for their most recent occupation. This is an attempt to avoid the problem of sample bias that may result from omitting this group.[4]

The specification of the determinants of the occupational level attained by an individual is based on the conventional Human Capital model. Training (both formal and informal), as the means by which skills are acquired, is clearly a key determinant of occupational position. A number of modifications are made to the

[1] The mapping was performed by David Metcalf and the resultant variable is the same as that used in Metcalf and Nickell (1982) and Nickell (1982).

[2] Even after addition of unpublished information, provided by the Department of Employment, the New Earnings Survey only affords average hourly earnings data on about half the KOS occupations.

[3] The term black is used throughout this paper to refer to the members of the sample assessed by the survey interviewer to be 'non-white'. Roughly 30 % were born in the West Indies, 40 % in the Indian subcontinent and 30 % elsewhere.

[4] There may instead be a measurement error problem if those currently not working have potential occupational levels systematically lower (or higher) than their most recent actual occupational levels. However, this is thought likely to be a less serious problem than the sample bias problem.

standard earnings-function specification of Mincer (1974) and others. First, binary variables are used to represent age on completion of full-time education (before starting work) since there is generally evidence of non-linearity in the returns.

Age on completion of full-time education is used as the measure of the amount of education obtained in preference to a scale or set of dummy variables for the educational qualifications obtained because of a serious problem associated with the treatment of foreign qualifications, which is particularly pertinent in the present context. All foreign qualifications, at whatever level, are coded under one heading in the National Training Survey. It is therefore not possible to allocate individuals with such qualifications to the category of the equivalent U.K. qualification as would be necessary to estimate the differential defined in the previous section.

The possible solutions to this problem are most unsatisfactory. A separate dummy variable could be included to represent possession of a foreign qualification. However, since the level of qualifications that this would represent is unknown, it would not be possible to assess what the return would be in the absence of discrimination, and hence not possible to measure the desired differential.

Alternatively the possession of foreign qualifications could be ignored altogether. However, this will tend to result in an understatement of the human capital of those with foreign qualifications, which will be particularly serious here since 72% of those with foreign qualifications have no U.K. qualifications. As a result there will be a tendency to underestimate the required differentials, since 22% of black immigrants have foreign qualification whereas only 0·1% of the white U.K.-born sample do.

A further complication would arise if dummy variables or a scale for *highest* qualification were used in deciding where to rank foreign qualifications. Since 75% of black immigrants with these foreign qualifications have no U.K. qualifications this is important to the estimation of the differential and would further exacerbate the problem. Given these various considerations the use of education completion age is prefered to the use of educational qualifications for the present purposes. The variables S16 to S21+ represent completion of full-time education at these ages.

The appropriate measure of labour market experience also requires careful consideration. Two alternative specifications are used. In the first a quadratic in years of total labour market experience is used, whilst in the second a distinction is made, for immigrants, between experience before arrival in the United Kingdom and experience since arrival in the United Kingdom. Employers and craft unions may not regard skills and general experience obtained abroad as being comparable with the equivalent obtained in the United Kingdom. This may be partly due to the skills being less applicable or the experience being less relevant to the job undertaken in the United Kingdom. It may also be partly due to discrimination on the part of employers and/or trade unions. Hence whilst the use of total experience, X, may overstate the extent of discrimination, the partitioning of experience into that before arrival, A, and that after arrival,

Table 1

Estimates of Occupational Attainment Equations

(Dependent variable = Ln (1975 occupational position).)

Variable	White		Black		Black	
*S*16	0·1736	(0·0053)	−0·0146	(0·0325)	−0·0166	(0·0324)
*S*17	0·2770	(0·0084)	0·0912	(0·0380)	0·0858	(0·0380)
*S*18	0·3501	(0·0108)	0·1111	(0·0423)	0·1008	(0·0424)
*S*19	0·3285	(0·0180)	0·1114	(0·0541)	0·1033	(0·0542)
*S*20	0·3703	(0·0231)	0·2196	(0·0532)	0·2126	(0·0531)
*S*21+	0·5539	(0·0102)	0·3124	(0·0441)	0·2996	(0·0439)
MAR	0·0557	(0·0075)	0·0028	(0·0352)	0·0137	(0·0355)
WDS	0·0290	(0·0123)	−0·0568	(0·0725)	−0·0361	(0·0719)
SWKR	−0·0230	(0·0080)	−0·0188	(0·0373)	−0·0311	(0·0359)
PSE	−0·0222	(0.0281)	−0·0885	(0·0253)	−0·0937	(0·0256)
FTT	0·0749	(0·0042)	0·0103	(0·0260)	0·0084	(0·0259)
EVT	0·0812	(0·0059)	0·1062	(0·0402)	0·1085	(0·0400)
X	0·0123	(0·0006)	−0·0027	(0·0044)	—	—
X^2	−0·00022	(0·00001)	0·00006	(0·00009)	—	—
A	—	—	—	—	0·00021	(0·00011)
A^2	—	—	—	—	−0·0056	(0·0034)
X−*A*	—	—	—	—	−0·0072	(0·0061)
$(X-A)^2$	—	—	—	—	0·00023	(0.00021)
Constant	4·3130		4·5479		4·5823	
SEE	0·2728		0·2608		0·2595	
R^2	0·234		0·200		0·211	
F	476·1		9·5		8·9	
Sample size	21,850		548		548	
Estimated average differential			−11·6% (0·0151)		−9·6% (0·0152)	

Notes:
(i) For definitions of variables see text.
(ii) Standard errors in parentheses.
(iii) Average differential evaluated at black sample means (see text).
(iv) Standard error given below the estimated average differential is that for $\lambda = \text{Ln}(1+\Delta)$.

(*X*−*A*), may understate the extent of discrimination. Results are presented for both specifications in what follows and might be regarded as providing respectively overestimates and underestimates of the degree of direct discrimination.

Whilst the effects of informal on-the-job training are assumed to be captured in this way, it may be expected that there will be additional returns to any spells of formal training. Two extra variables are included in an attempt to capture these effects. *FTT* indicates those who have undertaken a spell of full-time training in the last 10 years and *EVT* indicates those who have undertaken a spell of evening vocational training in the last 10 years.[1]

Further binary variables are included to indicate those who are married (*MAR*), those who are widowed, divorced or separated (*WDS*) and those who

[1] Thus only the 'incidence effects' of training are measured. No allowance is made for 'duration effects' since the general evidence is that for post-1965 vocational training, spells of longer duration do not provide higher returns than shorter ones. See Nickell (1982) and Greenhalgh and Stewart (1982) on this point.

are 'secondary' workers (*SWKR*). 'Secondary' workers are defined to be those who are neither heads of households nor the chief wage earner in a household. Finally, a binary variable is included to indicate those with poor spoken English (PSE), since this may well reduce their chances of access to a number of jobs. Thus, when the extent of discrimination is considered below, it is to be understood as being differences in attainment between men alike in these various characteristics.

The results for the occupational attainment equations are presented in Table 1. The average differential is estimated to be −11·6 % when total experience is used and −9·6 % when experience is partitioned into that before and that after arrival, argued above to be over- and under-estimates respectively. Both are highly significant and represent a sizeable differential in occupational position between men equal in other observed occupation-determining characteristics.[1]

The coefficient estimates in the separate equations are of interest in themselves. The returns to education are higher at all levels for white workers than for comparable black workers. These returns rise to an estimated 74 % for whites with a full-time education completion age of 21 or above, which is roughly double the comparable figure for black workers.[2] For the black sample there is no significant return to leaving at 16 relative to leaving at 15 or below, whereas for the white sample all education coefficients are significant. It would appear that there may be significant barriers to entry facing black workers in regard to those jobs for which higher education is the entry route for whites.

The marital status variables are both significant for whites. Married men reach levels roughly 6 % higher than comparable single men and for the widowed, divorced and separated the effect is roughly half this. These effects may be a combination of demand-side and supply-side effects. Employers may regard being married as a signal of stability or reliability and married men with their additional responsibilities may work harder or seek promotion or other advancement more vigorously. In either case these effects do not appear to be present for black workers. Similarly, being a 'secondary' worker reduces the occupational attainment of white workers by about 2 % other things being equal, again possibly a combination of supply and demand effects. This effect also is not present for black workers.

The quality of spoken English is, as might be expected, an important determinant of occupational attainment for black immigrants. Other factors held constant those with poor spoken English have occupational levels 8–9 % lower than those with good spoken English. The proportion of U.K.-born whites in the sample with poor spoken English is very small and the effect insignificant.

The estimated experience profile for white workers has the customary shape and reaches a maximum after about 28 years in the labour market. In contrast the estimated black profile is flat: the two terms in the total experience framework

[1] It is unlikely that all factors relevant to the determination of an individual's occupational position have been included in these equations, or indeed ever could be. Hence throughout this paper it is important to remember that differentials are calculated holding constant only those factors which can be observed in this data set.

[2] Differentials such as this are calculated as $\exp(\beta_j) - 1$.

are both individually and jointly insignificant. The four terms in the partitioned experience framework are also jointly insignificant. Whereas white workers progress up the occupational ladder during the first part of their working lives, it would appear that the same is not true for black immigrants. In the case of full-time training also the effect of having had a spell in the last 10 years is insignificant for black workers whilst it carries a return of about 8 % for whites. In both cases the indication seems to be, as with the results on education, that barriers reduce entry by black immigrants into those higher-level jobs normally accessible to whites with education/training/experience.

The results for evening vocational training courses show a markedly different picture. For white workers the effect is similar to that for full-time training at about 8 %. For black immigrants however the significant effect of about 11 % is considerably larger than their insignificant returns to full-time training. There are a number of possible reasons for this. Firstly, evening training may be more productivity enhancing than full-time training for black immigrants. One possible reason for this would be heterogeneity of training with black immigrants discriminated against in terms of the type of training that they receive. This would tend to make the estimates of the extent of discrimination given above underestimates. Other possible explanations are that evening training acts as a proxy for motivational factors or that employers treat it as a signal of these or of reliability or other characteristics that they seek.

Whilst the average differential is of considerable interest, additional information can be provided by calculating predicted differentials for the individual workers in the sample of black immigrants (as described in Section I). The differential exhibits considerable dispersion over this sample: the upper and lower quartiles are roughly −3 and −19 %, the median differential at about −12 % is similar to the mean. However, examination of the distribution for this sample suggests that this may not be a particularly representative figure since there appears to be peaks at about −17 % and close to zero. All these differentials are calculated from the equations using total experience. Those calculated using partitioned experience produce numbers smaller in absolute value but tell a similar story.

The main reasons for this pattern have already been suggested: barriers to entry into higher-level jobs resulting in lower educational returns and flatter experience profiles for black immigrants. To illustrate, an individual who completed full-time education at age 15 or below and has other characteristics equal to the averages for the black sample has a predicted differential of +0·7 % while a similar individual who completed full-time education at age 16 or above has an average predicted differential of −17·8 %.[1]

Another source of dispersion in the differential is labour market experience. Those with little labour market experience have lower differentials since their white indigenous counterparts are also largely in lower-level occupations at this stage. The differences widen when white workers move up the occupational ladder with experience while the black immigrants do not. Of those with $x < 19$

[1] The schooling effects are evaluated at the conditional means (given $S \geqslant 16$) for the black immigrant sample.

Table 2

Variation in the Differential

	Differential without partitioned experience (%)	Differential with partitioned experience (%)
Average differential	−11·6	−9·6
Man with basic set of characteristics	−17·4	−15·6
Deviations from basic characteristics:		
School leaving age ⩽ 15	−0·3	+2·0
= 17	−17·2	−15·7
= 18	−21·5	−20·5
= 19	−19·8	−18·5
= 20	−14·3	−12·9
⩾ 21	−21·7	−20·9
Single	−12·9	−12.0
Widowed/divorced/separated	−24·2	−17·6
Secondary worker	−17·1	−16·3
Poor spoken English	−22·7	−21·5
Full-time training in last 10 years	−22·6	−21·1
Evening training in last 10 years	−15·3	−13·3
Years of experience = 0	−0·6	+3·8
= 10	−12·0	−14·1
= 30	−17·9	−12·9
= 40	−13·6	−1·5
Experience prior to arrival (A) = 5	—	−16·1
= 10	—	−13·6
= 15	—	−8·1
(Comparison with white with (20−A) years of experience)		
Experience prior to arrival (A) = 5	—	−17·9
= 10	—	−18·3
= 15	—	−16.9
(Comparison with white with 20 years of experience)		

Notes:

(i) A man with the basic set of characteristics has 20 years of experience (all in the United Kingdom in the case of the partitioned experience equation), left school at 16 and is married. All other variables in the equation take the value zero.

(ii) All differentials calculated from the estimated equations given in Table 1.

(iii) Deviations from the basic set of characteristics are considered singly.

only 5·1 % have $-\Delta > 19$ % while 44·1 % have $-\Delta < 4$ %. In the remainder of the sample ($x \geqslant 10$) 29·4 % have $-\Delta > 19$ % and 26·9 % have $-\Delta < 4$ %.[1]

These findings, expressed in a slightly different way, can also be seen in Table 2 where predicted differentials for various typical individuals are considered. First the predicted differential for a man with the basic set of characteristics is presented and then the effects of various deviations from this basic set are considered. A man with the basic set of characteristics has 20 years of labour market experience (all in the United Kingdom in the case where the partitioned-experience equation is used), completed full-time education at age 16 and is

[1] These calculations are based on the total experience equations. The overall picture is similar when partitioned experience is used.

married. All other variables in the equation are set to zero. Hence he is not a secondary worker, has good spoken English and has not undertaken any formal training in the preceeding 10 years. Such a man has a predicted differential of −17·4 %, roughly equal to the average given education to 16 or above quoted earlier, although of course rather larger than the overall average. The rest of the table is largely self-explanatory. It can be seen again that education and experience are the main causes of variation in the differential as discussed above; however a number of lesser causes are also evident.

III. EARNINGS AND OCCUPATIONAL ATTAINMENT

This section compares the already estimated differentials in occupational attainment with the comparable differentials in current earnings. In particular it examines whether in addition to differences in occupational attainment there are also differences in earnings given the occupational level attained, i.e. within occupations.

Some consideration of the appropriate method of estimating such earnings equations using this data set must be made at this point since the information on earnings is incomplete.[1] Each individual in the survey was asked to place his current earnings in one of a number of consecutive ranges listed on a card.[2] Such a procedure is thought to increase both the response rate and the number of correctly classified incomes.

The latent structure of the equations to be estimated may be assumed to be given by

$$y_i = \mathbf{x}_i' \boldsymbol{\beta} + u_i \quad (i = 1, \ldots, n),$$

where y_i is the unobserved dependent variable (in this case the logarithm of current weekly earnings), $\mathbf{x}_i$ a vector of non-stochastic regressors and $\boldsymbol{\beta}$ a vector of unknown parameters. The u_i are assumed to be independently identically normally distributed random variables with mean zero and variance σ^2. Hence the distribution of the unobserved dependent variable is given by

$$y_i \sim \mathrm{N}(\mathbf{x}_i' \boldsymbol{\beta}, \sigma^2) \quad (i = 1, \ldots, n).$$

The observed information concerning the dependent variable is that it falls into a certain range. Let A_k be the upper boundary of the kth range (of the logarithm of earnings). Then the information on earnings is of the form

$$A_{k-1} < y_i \leqslant A_k.$$

Since the end ranges are open-ended, $A_0 = -\infty$ and $A_K = +\infty$, where K is the number of groups (10 in the case of the *NTS* variable).

The likelihood of the observed sample is given by

$$L = \prod_{k=1}^{K} \prod_{i \in k} \left[F\left(\frac{A_k - \mathbf{x}_i' \boldsymbol{\beta}}{\sigma}\right) - F\left(\frac{A_{k-1} - \mathbf{x}_i' \boldsymbol{\beta}}{\sigma}\right)\right],$$

where F is the cumulative distribution of the standard normal. Maximum

[1] A more detailed investigation of this problem can be found in Stewart (1982).

[2] In addition the data is censored (in the statistical sense) in that both end-ranges are open-ended.

likelihood estimates can be obtained by a least-squares algorithm as outlined below. To obtain consistent estimates of the parameters by a least-squares regression on the x's would require the use of the conditional expectation, $E(y_i|A_{k-1} < y_i \leqslant A_k)$, as dependent variable. Given the latent structure this expectation is given by

$$E(y_i|A_{k-1} < y_i \leqslant A_k) = \mathbf{x}_i'\boldsymbol{\beta} + \sigma\left[\frac{f(Z_{ik-1}) - f(Z_{ik})}{F(Z_{ik}) - F(Z_{ik-1})}\right]$$

where $Z_{ik} = (A_k - \mathbf{x}_i'\boldsymbol{\beta})/\sigma$ and f is the standard normal density function. Hence estimation of $\boldsymbol{\beta}$ and σ (by least squares) requires estimation of the conditional expectations and vice versa. This suggests that iterative estimation between the two might be appropriate. In fact it can be shown that such a procedure (with a suitable correction to the least-squares estimate of σ at each iteration) will converge to the maximum-likelihood estimates (see Stewart (1982) for further details).[1] Maximum-likelihood estimates, obtained in this way, of the equations for current weekly earnings are presented, together with their asymptotic standard errors, in the first three columns of Table 3.[2] The sample is reduced to those in employment at the time of interview and answering the earnings question. The estimates for occupational attainment using this sample are presented in the remaining columns of the table for purposes of comparison.

The average differential in earnings is estimated to be -17.2% when total experience is used and -9.1% when experience is partitioned into that before and that after arrival. These compare with estimated average differentials of -13.0 and -10.9% in occupational attainment. Since the earnings and occupation equations contain the same variables, consideration of regressions for the logarithm of earnings relative to occupational position permits testing of these differences. When partitioned experience is used the estimated average differential in earnings is insignificantly different from that in occupational position. However, when total experience is used, this difference is significant. In this case roughly $\frac{3}{4}$ of the earnings differential is due to differences in the occupational level attained and about $\frac{1}{4}$ to differences in earnings given occupation. If it is appropriate to think of the two specifications bracketing the degree of direct discrimination, then the conclusion is that between 75 and 100% of the differential in earnings is due to differences in occupational attainment. This of course suggests that the major policy problem concerns occupation entry rather than pay within an occupation.

Further interesting results are evident in the individual coefficients. The experience profile in earnings for black immigrants is significant, unlike that in occupational attainment. When the differences between the earnings and occupation equations are examined, it is interesting to note that the experience profile in earnings relative to occupational level for black immigrants is identical to that for whites both in its initial slope and its curvature (both differences are

[1] Initial estimates were obtained by fitting a lognormal distribution to the sample distribution of earnings and then allocating to each individual in an earnings group the estimated marginal conditional expectation.

[2] Asymptotic standard errors are obtained by inversion of the information matrix (see Stewart (1982) for details). The value of 'R^2' is computed as the square of the correlation between the predictions and the final estimates of the conditional expectations (given k).

Table 3

Estimates of Earnings and Occupational Attainment Equations

Dependent variable...	Ln (current weekly earnings)						Ln (current occupational position)					
Sample...	White		Black		Black		White		Black		Black	
$S16$	0·1448	(0·0073)	−0·0541	(0·0438)	−0·0441	(0·0440)	0·1814	(0·0058)	0·0134	(0·0353)	0·0138	(0·0353)
$S17$	0·2804	(0·0115)	0·1342	(0·0513)	0·1520	(0·0518)	0·2789	(0·0093)	0·0846	(0·0415)	0·0818	(0·0417)
$S18$	0·3784	(0·0150)	0·1328	(0·0564)	0·1601	(0·0572)	0·3653	(0·0120)	0·1462	(0·0455)	0·1384	(0·0461)
$S19$	0·3624	(0·0253)	0·0886	(0·0701)	0·0904	(0·0706)	0·3487	(0·0203)	0·1520	(0·0566)	0·1422	(0·0569)
$S20$	0·4672	(0·0333)	0·2260	(0·0757)	0·2433	(0·0763)	0·3634	(0·0263)	0·1786	(0·0612)	0·1771	(0·0615)
$S21+$	0·6470	(0·0145)	0·3675	(0·0612)	0·3685	(0·0617)	0·5630	(0·0114)	0·2975	(0·0495)	0·2877	(0·0498)
MAR	0·1519	(0·0106)	0·0683	(0·0490)	0·1173	(0·0500)	0·0435	(0·0085)	−0·0060	(0·0394)	0·0088	(0·0401)
WDS	0·1003	(0·0179)	−0·0821	(0·1007)	−0·0525	(0·1008)	0·0187	(0·0145)	−0·0579	(0·0812)	−0·0342	(0·0810)
$SWKR$	−0·0971	(0·0112)	−0·0449	(0.0517)	−0·0617	(0·0510)	−0·0279	(0·0090)	−0·0296	(0·0417)	−0·0449	(0·0409)
PSE	−0·0116	(0·0429)	−0·1593	(0·0346)	−0·1358	(0·0353)	−0·0239	(0·0345)	−0·1071	(0·0278)	−0·1072	(0·0283)
FTT	0·1075	(0·0058)	0·0619	(0·0354)	0·0582	(0·0356)	0·0741	(0·0047)	0·0076	(0·0286)	0·0051	(0·0287)
EVT	0·0721	(0·0079)	0·0688	(0·0529)	0·0783	(0·0531)	0·0791	(0·0064)	0·1034	(0·0427)	0·1069	(0·0427)
X	0·0458	(0·0009)	0·0330	(0·0065)	—	—	0·0136	(0·0007)	0·0005	(0·0052)	—	—
X^2	−0·0081	(0·00002).	−0·00065	(0·00013)	—	—	−0·00025	(0·00001)	−0·00000	(0·00011)	—	—
A	—	—	—	—	0·0103	(0·0056)	—	—	—	—	−0·0042	(0·0045)
A^2	—	—	—	—	−0·00041	(0·00019)	—	—	—	—	0·00017	(0·00015)
$X-A$	—	—	—	—	0·0218	(0·0085)	—	—	—	—	−0·0062	(0·0068)
$(X-A)^2$	—	—	—	—	−0·00039	(0·00028)	—	—	—	—	0·00023	(0·00023)
Constant	3·2454		3·4878		3·5430		4·3128		4·5218		4·5649	
SEE	0·327		0·308		0·308		0·271		0·255		0·255	
'R^2'	0·39		0·32		0·32		0·25		0·20		0·21	
Sample size	17,116		435		435		17,116		435		435	
Estimated average differential			−17.2%		−9·1%				−13·0%		−10·9%	

Table 4
Changes in the Differential Over Time

Year	Average differential estimated using total experience	Average differential estimated using partitioned experience
1970	−11·66%	−9·53%
	(0·0165)	(0·0166)
1971	−11·82%	−9·86%
	(0·0162)	(0·0163)
1972	−13.14%	−11.32%
	(0·0159)	(0·0160)
1973	−12·68%	−10·91%
	(0·0157)	(0·0158)
1974	−11·89%	−10·23%
	(0·0154)	(0·0155)
1975	−11·74%	−10·02%
	(0·0152)	(0·0152)

Notes:
(i) Each differential is estimated on the basis of occupations at January 1st of the appropriate year.
(ii) The sample for a given year consists of those aged less than 60 at that date who had entered both the labour market and the United Kingdon by that date.
(iii) The standard errors given in parentheses are those for $\lambda = \text{Ln}(1+\Delta)$.

insignificant). Whilst black immigrants do not appear to move up the occupational ladder with age, they move up the earnings scales within occupations in the same way as white workers do. Again the policy problem involves access to higher-level occupations.

IV. MOVEMENT IN THE DIFFERENTIAL OVER TIME

The evidence presented in the previous two sections is for a single point in time: January 1975. This section examines how the relative economic position of black immigrants was affected by the changing labour market conditions of the 1970's. In particular the average differential is estimated for each year from 1970 to 1975 inclusive, each differential being estimated on the basis of the occupational level attained at January 1st of the appropriate year. This is made possible by the longitudinal information available in this data set. The sample for a given year is restricted to those aged less than 60 at January 1st of that year who had entered both the United Kingdom and the labour market by that data. This created comparable fixed-age samples across the years. The results of this analysis are presented in Table 4, both on the basis of equations using total experience variables and of equations using partitioned experience variables.

The two main questions of interest in such an analysis are whether there is any secular trend in the differential and how it is affected by changes in the aggregate unemployment rate. The results provide no evidence of either a worsening or improving trend in the average degree of direct discrimination over the period. The average differential in 1975 is almost identical to that in 1970.

During the 24 months January 1st, 1969 to January 1st, 1971 male unemployment in Britain was generally at or below the 500,000 level with rates of between 3 and 3·5 %. The 24 months January 1st, 1971 to January 1st, 1973 showed considerably higher levels of male unemployment at between 600,000 and 800,000 with rates of 4·5–5·5 %. Finally in the period January 1st, 1973 to January 1st, 1975 the level of male employment was generally lower again at around 500,000 once more. As is generally the case these changes were largely due to changes in the unemployment outflow rate rather than in the inflow rate. This is borne out by looking at engagement rates. Examination of the May 4-week counts for manufacturing industries done by the Department of Employment shows rates of 2·2 per 100 persons employed for 1971 and 1972 compared with considerably higher rates for the other 4 years which have an average of 2·8.[1] Such an economic climate might be expected to be particularly disadvantageous to the black immigrant labour force and indeed the average differentials for January 1st, 1972 and 1973 are approximately one percentage point greater in absolute terms than those for the remaining years. However, the standard errors for the individual years are at least as large as this, and hence it must be concluded that there is little or no evidence of the average differential widening during periods of worse general labour market conditions.[2]

V. OCCUPATIONAL PROGRESS AND INDIVIDUAL TEMPORAL CORRELATION

This section is concerned with individual mobility and utilises the longitudinal nature of the occupation data to investigate the key determinants of individual occupational progress over a five-year period and to examine whether or not black immigrants differ from U.K.-born white workers in this respect. Since it is occupational progress within the U.K. labour market that is being considered the sample is restricted to those who entered both the labour market and the United Kingdom prior to 1970. The shorter the period considered the less occupational change is exhibited in the sample whilst the longer the period the greater the reduction of the sample required. The latter is of course particularly important for the sample of black immigrants, which is reduced by 23 % when this five-year period is chosen.

To model the determinants of individual occupational progress two simple and intuitively appealing formulations suggest themselves.

$$\Delta y_i = \mathbf{z}_i'\boldsymbol{\gamma}_1 + v_i, \quad (1)$$

$$\Delta y_i = \lambda y_{iL} + \mathbf{z}_i'\boldsymbol{\gamma}_2 + v_i, \quad (2)$$

where Δy_i is the change in the logarithm of occupational position over the period being considered and y_{iL} is its value at the start of the period. $\mathbf{z}$ may contain both variables that remain unchanged over the period and start and finish values of variables that change.

[1] Figures are from Department of Employment – British Labour Statistics Yearbooks for 1969–74.

[2] This is in contrast to much evidence on the position in the United States. See, inter alia, Ashenfelter (1970) and Freeman (1973).

One possible interpretation of formulation (1) is as the result of differencing the original occupational position equation. If this is given by

$$y_{it} = \mathbf{x}'_{it}\boldsymbol{\beta}_t + u_{it},$$

then differencing gives

$$\Delta y_i = \mathbf{x}'_i\boldsymbol{\beta} - \mathbf{x}'_{iL}\boldsymbol{\beta}_L + \Delta u_i,$$

or alternatively

$$\Delta y_i = \mathbf{x}'_i\Delta\boldsymbol{\beta} + \Delta\mathbf{x}'_i\boldsymbol{\beta}_L + \Delta u_i.$$

Thus for variables that do not change over the period $\gamma_{1j} = \beta_j - \beta_{jL}$, whilst for variables that do change start-of-period values and either end-of-period values or differences should be included and both β_j and β_{jL} can be estimated. In addition the original equation may be permitted to contain an unobserved individual effect

$$y_{it} = \mathbf{x}'_{it}\boldsymbol{\beta}_t + f_i + u_{it},$$

which is then eliminated in the estimating equation by the differencing. (See Nickell (1982) for such an interpretation of an equation of this type.) An advantage of formulation (1) relative to (2) is that even if v is serially correlated, a consistent estimate of $\boldsymbol{\gamma}_1$ can still be obtained by OLS.

A possible defect of formulation (1) is that it does not explicitly account for the effect on occupational progress of the occupational position attained at the start of the period. If such an effect exists then estimation of (1) will produce biased estimates of $\boldsymbol{\gamma}_2$ in formulation (2). However, these two formulations should not be regarded as alternative specifications of the model. Rather they are to be regarded as measuring different quantities. One way of characterising the difference between the two formulations is in terms of conditional expectations. Formulation (2) specifies the determination of the expected value of Δy conditional on y_L and $\mathbf{z}$ whereas (1) specifies the determination conditional only on $\mathbf{z}$. As a model of the former (1) is misspecified but as a model of the latter it need not be. $\boldsymbol{\gamma}_2$ is to be regarded as the vector of 'direct' effects on Δy *given* y_L. Formulation (1) may be regarded as the result of substituting the determining equation for y_L into formulation (2) and hence $\boldsymbol{\gamma}_1$ is to be regarded as the vector of 'direct plus indirect' effects on Δy including those via y_L.

A possible problem with the estimation of formulation (2) occurs if the v_i are serially correlated. However, one possible interpretation of (2) is as the result of transforming an original occupational position equation with a serially correlated error term assumed to follow a first order autoregressive process with parameter ρ. This gives

$$\Delta y_i = (\rho - 1)\, y_{iL} + \mathbf{x}'_i(\boldsymbol{\beta} - \boldsymbol{\beta}_L\rho) + \Delta\mathbf{x}'_i\boldsymbol{\beta}_L\rho + \epsilon_i.$$

Unless it is desired to impose $\boldsymbol{\beta} = \boldsymbol{\beta}_L$, which it is not, this interpretation does not imply any restrictions on the parameters. Since ϵ_i is serially independent, and in particular not correlated with y_{iL}, the equation can be consistently estimated by OLS. Of course one can only estimate $\boldsymbol{\beta}_j$ and $\boldsymbol{\beta}_{jL}$ for variables that change over the period.

Unobserved individual effects are not allowed for in formulation (2). Hence formulation (1) may be thought of as the model with fixed effects and formulation (2) as the model with serial correlation. Nickell (1982) investigates a model in which both serial correlation and individual effects are allowed for. However,

Table 5

Estimates of Occupational Progress Equations

Dependent variable ...	Δy	Δy	Δy	Δy	Δy	Δy	y	y	y
Sample ...	White	Black	Black	White	Black	Black	White	Black	Black
y_L	−0·1973	−0.2147	−0.2146						
	(0·0048)	(0·0336)	(0·0337)						
$S16$	0·0493	−0·0266	−0·0232	0·0142	−0·0259	−0·0237	0·1919	−0·0291	−0·0212
	(0·0039)	(0·0232)	(0·0232)	(0·0040)	(0·0244)	(0·0238)	(0·0060)	(0·0417)	(0·0355)
$S17$	0·0785	0·0317	0·0332	0·0264	0·0163	0·0181	0·2904	0·0880	0·0884
	(0·0062)	(0·0274)	(0·0276)	(0·0064)	(0·0286)	(0·0289)	(0·0096)	(0·0417)	(0·0421)
$S18$	0·0914	0·0361	0·0362	0·0274	0·0112	0·0128	0·3517	0·1270	0·1218
	(0·0083)	(0·0321)	(0·0327)	(0·0085)	(0·0334)	(0·0341)	(0·0129)	(0·0487)	(0·0497)
$S19$	0·1063	0·0013	−0·0033	0·0480	−0·0154	−0·0182	0·3435	0·0624	0·0512
	(0·0139)	(0·0414)	(0·0418)	(0·0145)	(0·0433)	(0·0437)	(0·0220)	(0·0633)	(0·0638)
$S20$	0·0687	0·0908	0·0901	−0·0039	0·0534	0·0538	0·3643	0·2272	0·2225
	(0·0175)	(0·0371)	(0·0376)	(0·0182)	(0·0384)	(0·0389)	(0·0275)	(0·0561)	(0·0568)
$S21+$	0·0828	0·1094	0·1033	−0·0256	0·0517	0·0491	0·5240	0·3201	0·3016
	(0·0082)	(0·0331)	(0·0333)	(0·0081)	(0·0334)	(0·0337)	(0·0123)	(0·0488)	(0·0492)
MAR	0·0203	0·0134	0·0221	0·0113	0·0118	0·0175	0·0571	0·0195	0·0390
	(0·0052)	(0·0260)	(0·0268)	(0·0054)	(0·0273)	(0·0281)	(0·0082)	(0·0398)	(0·0410)
WDS	0·0039	−0·0123	0·0004	−0·0033	−0·0022	0·0055	0·0328	−0·0495	−0·0179
	(0·0081)	(0·0475)	(0·0477)	(0·0085)	(0·0497)	(0·0500)	(0·0128)	(0·0726)	(0·0730)
$SWKR$	−0·0100	0·0186	0·0095	−0·0076	0·0266	0·0229	−0·0199	−0·0105	−0·0396
	(0·0056)	(0·0280)	(0·0281)	(0·0058)	(0·0293)	(0·0294)	(0·0088)	(0·0428)	(0·0429)
PSE	0·0146	0·0013	0·0021	0·0225	0·0195	0·0211	−0·0178	−0·0656	−0·0672
	(0·0193)	(0·0182)	(0·0186)	(0·0202)	(0·0188)	(0·0192)	(0·0306)	(0·0274)	(0·0281)
FTT_L	−0·0053	0·0421	0·0394	−0·0168	0·0290	0·0282	0·0414	0·0900	0·0804
	(0·0035)	(0·0221)	(0·0222)	(0·0036)	(0·0231)	(0·0231)	(0·0054)	(0·0337)	(0·0338)

Table 5 (*cont*).

EVT_L	0·0184	0·0069	0·0126	0·0084	−0·0004	0·0019	0·0589	0·0337	0·0516
	(0·0056)	(0·0376)	(0·0378)	(0·0059)	(0·0394)	(0·0396)	(0·0089)	(0·0575)	(0·0578)
FTT	0·0274	0·0259	0·0256	0·0218	0·0304	0·0296	0·0499	0·0096	0·0108
	(0·0034)	(0·0223)	(0·0225)	(0·0036)	(0·0234)	(0·0235)	(0·0054)	(0·0342)	(0·0344)
EVT	0·0267	0·0566	0·0577	0·0192	0·0469	0·0498	0·0569	0·0921	0·0869
	(0·0056)	(0·0406)	(0·0412)	(0·0059)	(0·0425)	(0·0432)	(0·0089)	(0·0621)	(0·0630)
X	0·00041	0·00397	—	−0·00221	0·00258	—	0·0111	0·0090	—
	(0·00054)	(0·00389)		(0·00056)	(0·00407)		(0·0008)	(0·0059)	
X^2	−0·00003	−0·00007	—	0·00002	− 0·00005	—	−0·00021	−0·00017	—
	(0·00001)	(0·00008)		(0·00001)	(0·00008)		(0·00001)	(0·00012)	
A	—	—	−0·00075	—	—	−0·00069	—	—	−0·00098
			(0·00306)			(0·00321)			(0·00468)
A^2	—	—	0·00003	—	—	0·00002	—	—	0·00007
			(0·00011)			(0·00012)			(0·00017)
$X-A$	—	—	−0.00375	—	—	−0·00111	—	—	−0·01340
			(0·00668)			(0·00699)			(0·01021)
$(X-A)^2$	—	—	0·00015	—	—	0·00007	—	—	0·00045
			(0·00020)			(0·00021)			(0·00030)
Constant	0·8986	0·9036	0·9598	0·0549	−0·0486	−0·0238	4·3313	4·3859	4·5588
SEE	0·1754	0·1645	0·1649	0·1832	0·1724	0·1728	0·2775	0·2517	0·2522
R^2	0·100	0·123	0·124	0·019	0·035	0·036	0·222	0·224	0·224
F	124·3	3·4	3·0	22.5	0·9	0·8	336·6	7·3	6·5
Sample size	18,946	424	424	18,946	424	424	18,946	424	424
Estimated average differential		−4·4 %	−5·1 %		−2·1 %	−3·3 %		−13·4 %	−12·1 %

limitations on computing resources force him to restrict drastically the number of independent variables used and to assume that the coefficients on all variables remain constant over time (i.e. $\boldsymbol{\beta} = \boldsymbol{\beta}_L$) thereby absorbing those variables which are time independent into the individual effects. These restrictions are felt to be undesirable in the context of the present investigation and thus Nickell's more general model is not considered here. It should also be noted that the extension of the formulation to include a second order lag on y would considerably reduce the size of the black sample and hence is also not investigated.

The results from estimating formulations (1) and (2) are given in Table 5, together with the corresponding estimates with y as the dependent variable using the same sample. Estimates are presented using both total and partitioned experience variables.

One of the main findings of Section II where only a single cross-section was examined was the relative flatness of the experience-occupation profile for black immigrants. This is supported by the longitudinal analysis in this section. When individual movements over time are considered black immigrants can be seen to experience less upward movement than comparable white U.K.-born workers. Consider first the *ceteris paribus* differentials in the ratio

$$\frac{\text{1975 occupational position}}{\text{1970 occupational position}},$$

since these differentials are calculated as outlined in Section I. When y_L is excluded, the average differential is $-2{\cdot}1$ % (using total experience). This is a composite of a direct effect given y_L and an indirect effect via y_L. The two have opposite signs and the composite effect is smaller in absolute terms than the direct effect alone. This is because upward movement for both groups is greater *ceteris paribus* the lower the starting level and black immigrants have starting levels that are *ceteris paribus* lower than those of whites. The average differential given y_L is $-4{\cdot}4$ %.

Alternatively the differentials in the absolute or proportional change, which are perhaps more usual concepts, can be considered. It should be noted in these cases however that there is a difference between the estimated differential for an individual with characteristics equal to the black sample mean, which will be examined here, and the mean differential for the black sample. (For the differentials examined up to this point they were the same.) Considering first the unconditional differentials (based on the equations without y_L), the estimated differential for an individual with these average characteristics is $-51{\cdot}9$ % in the proportional increase and $-57{\cdot}3$ % in the absolute increase.[1] In each case the

[1] (*a*) The mean value of Δy for the sample of black inmigrants is 0·0201. The predicted $\Delta\hat{y}^W$ for an individual with characteristics equal to the means of the black inmigrant sample is 0·0413. (*b*) The difference between the geometric means of Y and Y_L for the sample of black immigrants is 1·92. The predicted difference for an individual with characteristics equal to the means of the black sample is calculated from

$$(Y^W \triangle Y_L^W) = [1 - \exp(-\Delta\hat{y}^W)]\ \bar{Y}1(1+\hat{\hat{\Delta}}),$$

where $\hat{y}$ is the geometric mean for the black sample and $\hat{\hat{\Delta}}$ is the estimated average differential in levels for the sample used in table 5. The calculated value is 4·50.

Table 6

Predictions of Percentage Increase in Occupational Position 1970–75 for Men with Various Characteristics

	Initial occupational position	Predicted increase (%) White	Predicted increase (%) Black
Basic set of characteristics	Unconditional	4·5	−3·1
	73p	12·5	2·1
	96p	6·6	−3·7
	127p	0·9	−9·4
School leaving age = 18	Unconditional	5·9	0·6
	73p	17·4	8·7
	96p	11·2	2·5
	127p	5·2	−3·5
Full-time training spell during period	Unconditional	6·8	−0·1
	73p	15·6	4·8
	96p	9·6	−1·2
	127p	3·7	−7·0

Notes:
(i) A man with the basic set of characteristics has 20 years of experience, left school at 16 and is married. All other variables in the equation take the value zero.
(ii) All predictions calculated from the estimated equations in Table 5 using total experience variables.
(iii) The two deviations from the basic set of characteristics are considered singly.

actual increase observed is less than half that predicted for comparable white U.K.-born workers.

Turning to the conditional differentials, given y_L equal to the mean for the black sample, the estimated differential for an individual with average characteristics is −69·8 % in both the proportional and the absolute increase.[1] The actual increase observed is less than one-third that predicted for comparable white U.K.-born workers.

Additional information is provided by examining such differentials for different types of individual. Accordingly predicted movements for black and white workers with the same characteristics are examined next for various sets of characteristics. These predictions are of the percentage increases in occupational position over the period 1970–5. They are presented in Table 6 for men with the basic set of characteristics (as used in Section II) and two variants on this set. For each of these the calculations are performed on the unconditional equations and also conditional on three levels of initial occupational position. These three levels are the geometric mean of the black sample and one standard deviation (in logarithmic terms) above and below this level.

[1] (*a*) The predicted $\Delta\hat{y}^W$ for an individual with characteristics (including 1970 occupational position) equal to the means of the black inmigrant sample is 0·0651. (*b*) The predicted difference for an individual with characteristics (including 1970 occupational position) equal to the means of the black sample is calculated from

$$(Y^W \triangle \bar{Y}_L) = [\exp(\Delta\hat{y}^W) - 1]\,\bar{Y}_L,$$

where $\bar{Y}_L$ is the geometric mean for the black sample. Hence the differential in the absolute change is identical to that in the proportional change.

Clearly in all cases the predicted extent of occupational progress of a worker is greater, other things equal, if he is white and U.K.-born. The *difference* between the predicted increases for the two groups varies between 5·3 and 10·8 percentage points in the illustrations given. It is also noticeable that in many of the cases the prediction for black immigrants is of a decrease in occupational position over the 5-year period. As before the analysis indicates that black immigrants make considerably less progress in occupational terms as their length of time in the labour market increases than do comparable white U.K.-born workers.

Finally, it is relevant to note that given the temporal correlation of occupational level for black immigrants, variations from this are virtually random. In particular the undertaking of training during the period does not appear to increase the expected extent of occupational progress. This suggests that the effects of evening training found in Section II may possibly be the result of the selection (possibly self-) for training of those with higher occupation-paths rather than any positive impact of the training itself.

VI. CONCLUSIONS

This paper has presented a body of evidence on the degree of racial discrimination in occupational attainment in Britain. The average differential was estimated at between −9 % and −12 %. Considerable dispersion around this mean was found with lower returns to education and a flat experience profile being the main contributory factors. It appears that barriers reduce entry by black immigrants into those higher-level jobs normally accessible to whites with education/training/experience.

The average differential in earnings was also estimated and suggested that between 75 and 100 % of it is caused by differences in occupational attainment, indicating that the policy problem concerns occupational entry rather than pay within an occupation. Despite changing economic conditions, no evidence was found of movement in the average differential over the period 1970–1975. Finally it was found that during this period individual black immigrants made considerably less occupational progress than comparable white U.K.-born members of the labour force. In particular a black immigrant with average characteristics had a proportional increase in occupational position less than half that of a comparable white U.K.-born worker.

Whilst this paper has presented much evidence on the 'form' that racial discrimination takes in the labour market in Britain, many questions remain unanswered and much further information is required if appropriate policies are to be designed.

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