The Age Structure of Unemployment in Great Britain

1953-1980.

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I. Introduction

As unemployment increases to record levels in the U.K. increasing attention has been devoted to the distribution of unemployment. This has revealed substantial inequality in the incidence of unemployment not only by occupation, region, race and sex, but also amongst individuals. Moreover it also becomes apparent that as the total number out of work has increased so has the degree of inequality of its distribution. Nowhere is this more apparent than in the age distribution of the unemployed. A great deal of emphasis has been placed on the phenomenal increase in youth unemployment since the mid-seventies but of considerable significance has been the deterioration in the position of older workers, especially males. The evidence suggests this to be a process that has been going on since the mid-sixties in the U.K.

In this paper we analyse the age structure of unemployment in a way that gives considerable emphasis to demand side decisions made by employers. In section II we outline a model of the age structure of employment and the associated unemployment structure. In section III we describe some empirical tests of the model for both male and female workers giving particular attention in section IV to the structural stability and the points in time at which major changes may have taken place. Some general conclusions for unemployment theory and policy are included in section V.

II. The Age Structure of Employment and Unemployment

We view the unemployment total as a stock of workers who are currently unwanted by employers, i.e. as a discard stock. This does not imply an exclusively demand side or Keynesian view of unemployment. As will be seen our approach makes possible both the occurrence of an unemployment spell because workers require too high a wage as well as employees not being able to dispose of the marginal product of an unemployed worker in the market place.

Our concern is not with the absolute scale of unemployment but rather with its relative incidence by age. The relative significance of any age group in the registered discard or unwanted stock of workers obviously depends crucially upon its relative incidence in the employed (i.e. the wanted) stock. We write this relationship

$$\ln Ui_t - \ln U_{jt} = \sigma \left[\ln Ei_t - \ln E_{jt} \right] \qquad (1)$$

where U_{it} = number in group i registered unemployed at time t

E_{it} = number in group i employed at time t

and $U_{jt} = \sum_{k=1}^{n-i} U_{kt}$ and $E_{jt} = \sum_{k=1}^{n-i} E_{kt}$

Normally we would expect σ to be negative to give an inverse relationship between the two stocks. Clearly its exact numerical value is sensitive to differential registration probabilities of different groups of unemployed workers though we don't view this as a major problem at least for males. A more serious difficulty

arises in respect of younger age groups for which large rates of new entry could increase relative unemployment without there being any inverse movement in the employed stock.

What governs the relative incidence of employment by age ? We atart by examining the preferences of employers in equation 2.

$$\ln E^*_{it} - \ln E^*_{jt} = \ln A + \alpha \ln Y_t = \beta \ln W_{irt} \qquad (2)$$

where E^*_{it} = desired employment of age group i

Y_t = real output

W_{it} = <u>relative</u> wage of age group i

The argument is easily illustrated for the case of two age groups and is shown in Figure 1. There are two age groups i and k producing output Y. We assume diminishing marginal products in the employment of each of the groups. This is not difficult to justify if we view the labour force in each category as heterogenous in terms of ability, experience, etc. Increasing recruitment from a particular age group will, with a constant search strategy, lead to declining marginal productivity of new recruits. This assumption gives us the conventional isoquant Y_1Y_1 for a given level of output Y_1. The optimal mix of i and k from the employer's point of view will be determined by the relative wage of the age group i (W_{it}). The greater is W_{it} the

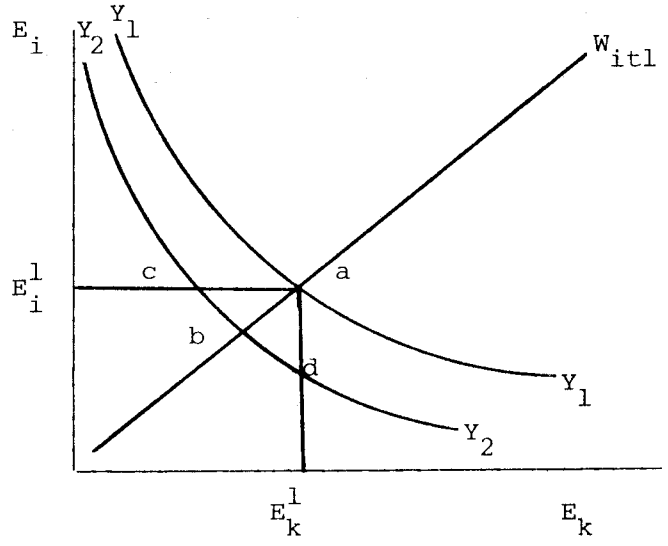


Figure 1.

more k-intensive will be the optimal combination. Hence $\beta<o$ is expected in equation 2. Can we assume the input mix is constant with a given relative wage ? Consider the impact of a cut in the level of real output to Y_2. This shifts the isoquant to Y_2Y_2 and implies a cut in the demand for both inputs. If that cut is equiproportional firms move from a to b. If this were to happen the relative employment of the two age groups would be unaffected by the cut in output and $\alpha = o$ in equation 2. We categorise this as the zero age discrimination case. If on the other hand the firm were to move to c since this involves no job loss for the ith age group we categorise this as the positive discrimination case and $\alpha<o$ in equation 2. A move to d is the opposite polar case which involves negative discrimination against the ith age group and leads to $\alpha>o$ in equation 2. The sign of α can be seen to be indeterminate and depends on the form of age discrimination. This age discrimination may take place following a fall (or a rise) in output levels due to the existence of significant differences between two age groups in non wage (including adjustment) costs. If group i

embodies a substantial non amortised training investment or is expensive to fire due to institutional or legal reasons then the firm may seek to place the burden of adjustment on group k. There are many other possibilities but where there exists substantial inter age variations in hiring, firing, training and other overhead costs we would expect α to be non zero in equation 2.

Since we do not expect this equilibrium outcome to prevail at all points in time we introduce a conventional adjustment process in equation 3.

$$\ln E_{it} - \ln E_{it-1} = \lambda(\ln E^*_{it} - \ln E_{it-1}) \qquad o<\lambda<1 \tag{3}$$

Hence

$$\left[\ln E_{it} - \ln E_{jt}\right] - \left[\ln E_{it} - \ln E_{jt-1}\right]$$

$$= \left\{\left[\ln E^*_{it} - \ln E^*_{jt}\right] - \left[\ln E_{it-1} - \ln E_{jt-1}\right]\right\} \tag{4}$$

Combining equations 1, 2 and 4 gives our final estimating equation.

$$\ln U_{it} - \ln U_{jt-1} = \sigma\lambda \ln A + \sigma\lambda\alpha \ln Y_t + \sigma\lambda\beta \ln$$

$$W_{irt} + (1 - \lambda)\left[\ln U_{it-1} - \ln U_{jt-1}\right] \tag{5}$$

The results of estimating these equations are presented in section III. It should be noted that of the original parameters only λ is identified in (5).

III. Empirical Results

Equation 5 was estimated for Great Britain using time series from 1953 to 1980. Annual data[4] for male and female is available from the Department of Employment's biannual series on the age and duration of unemployment. Since the data was available for different duration groups equation 5 was estimated for four such groups. This enables us to examine the impact of output and relative wage changes on the relative unemployment prospects of different duration groups. Of particular interest is the response of relative unemployment rates of the long term unemployed. Recent research by Lancaster and Nickell (1980), has shown the importance of duration dependence in unemployment experience, i.e. the much lower probability of re-employment of the longer term unemployed. The evidence for this is taken from cross section analysis where the cyclycal condition of the macroeconomy does not change. Our estimates should give some indication of the relative re-employment chances of different duration groups when the cyclical state of the macroeconomy is changing. The basic results for males and females are presented in Table 1 and 2.

TABLE 1

RESULT OF ESTIMATION OF EQUATION 5 BY AGE AND UNEMPLOYMENT DURATION

GREAT BRITAIN 1954-80 MALES

	UE1	UE2	UE3	UE4	UE All	ET1	ET2	ET3	ET4	ET All	PA1	PA2	PA3	PA4	PA All	FO1	FO2	FO3	FO4	FO All
Constant	.501 (2.166)	.405 (1.704)	- .695 (1.726)	-1.801 (2.867)	- .328 (.154)	.580 (.420	- .304 (1.730)	- .377 (1.530)	- .958 (2.303	- .458 (2.329)	- .367 (2.849)	- .510 (.391	.813 (3.543)	.518 (3.031)	.845 (.833)	-2.368 (5.576)	-2,058 (5.133)	-1.820	- .837	-1.638
Log Relative Wages ($\ln Wir_t$)	1.585 (2.789)	2.488 (4.304)	1.868 (2.771)	1.634 (2.303)	1.553 (3.446)	1.176 (2.003)	1.305 (2.969)	1.877 (3.299)	2.468 (3.509)	1.544 (3.172)	- .824 (2.837)	.430 (1.972)	.592 (2.442)	.579 (2.266)	-.389 (1.856)	-1.559 (5.542)	-1.734 (4.822)	-1.737 (4.32)	- .947 (3.001)	-1.131 (4.964)
Log Output ($\ln Y_t$)	-2.634 (1.813)	-7.415 (4.034)	-5.838 (2.823)	-6.255 (2.593)	-3.748 (2.895)	- .800 (.826)	- .539 (.651)	-1.872 (1.515)	-3.632 (1.982)	.189 (.209)	1.080 (1.621)	1.697 (1.863)	- .936 (1.641)	-4.479 (3.749)	- .698 (1.032)	1.177 (2.349)	2.659 (2.968)	3.365 (2.770)	5.138 (3.724)	3.790 (4.297)
Lagged Dependent Variable ($\ln U_{it-1}$) ($\ln U_{jt-1}$)	.701 (6.500)	.555 (5.225)	.481 (3.382)	.423 (2.763)	.624 (5.771)	.672 (5.077)	.577 (4.374)	.494 (3.454)	.377 (2.383)	.498 (3.501)	.713 (6.826)	.650 (4.239)	.264 (1.400)	.120 (.714)	.319 (1.547)	.327 (2.576)	.326 (2.347)	.255 (1.665)	.185 (1.154)	.106 (.724)
$\bar{R}^2$	.913	.929	.772	.662	.904	.945	.917	.875	.802	.908	.935	.737	.456	.603	.440	.953	.896	.802	.674	.794
DW	1.281	1.920	1.682	1.603	1.482	2.582	1.817	1.676	1.772	2.009	1.458	1.841	1.619	2.166	1.683	2.154	1.743	1.716	2.138	1.845
σ	1.675	.910	-1.399	-3.121	- .695	1.768	- .719	- .745	-1.538	- .912	-1.279	-1.457	1.105	.589	.681	-3.518	-3.053	-2.443	-1.027	-1.832
α	-5.257	-18.308	8.400	3.473	11.427	2.632	1.773	6.158	3.509	- .197	-2.943	-2.118	- .761	-8.647	- .826	- .497	-1.292	-1.845	-6.139	-2.314
β	3.164	1.370	-2.688	- .907	-4.735	1.176	-6.066	-4.979	-2.576	-1.617	-2.245	.843	.481	1.118	- .151	.658	.843	.954	1.131	.690

NOTES: (1) Key to age groups UE = under 18, ET = 18-20, PA = 20-50, FO = 50 and over

(2) Key to duration groups 1-4 weeks (1), 4-12 weeks (2), 12-26 weeks (3), 26 weeks (4) and over
All - all workers in that age group.

(3) 't' values in parenthesis

(4) $Wi_{rt} = \frac{\text{hourly earnings of youths}}{\text{hourly earnings of adult males}}$ Source: The Old and New Earning Survey Ministry of Labour, Department of Employment Gazettes.

(5) Y_t = deviation from trend of GDP at constant prices. Source: NIESR Statistical Appendix

TABLE 2.

RESULTS OF ESTIMATION 5 BY AGE AND UNEMPLOYMENT DURATION

GREAT BRITAIN 1954-1980 FEMALES

	UE1	UE2	UE3	UE4	UE All	ET1	ET2	ET3	ET4	ET All	PA1	PA2	PA3	PA4	PA All	FO1	FO2	FO3	FO4	FO All
Constant	1.171 (1.970)	.869 (1.445)	.427 (.627)	- .051 (.077)	1.068 (2.280)	.413 (.218)	.263 (1.239)	.262 (.721)	.568 (1.151)	.488 (2.065)	- .817 (2.124)	- .487 (1.607)	-.101 (.394)	.130 (.703)	-.461 (2.288)	-1.353 (2.269)	-.700 (.401)	-1.129 (.550)	-1.151 (3.138)	-1.562 (4.059)
Log Relative Wages ($\ln Wir_t$)	2.887 (1.954)	2.103 (1.373)	1.945 (1.121)	1.430 (.760)	2.939 (2.430)	1.099 (1.879)	.877 (1.507)	.991 (1.014)	2.001 (1.530)	1.605 (2.472	-1.862 (2.019)	-1.119 (1.478)	.540 (.822)	-.123 (.238)	-1.150 (2.217)	-2.354 (2.306)	-1.320 (2.012)	-1.656 (1.854)	-1.238 (1.684)	-2.314 (3.997)
Log Output ($\ln Y_t$)	-1.526 (.868)	-2.116 (1.105)	-2.268 (1.105)	-1.672 (.713)	-1.236 (1.446)	.946 (1.456)	.341 (.510)	-.149 (.129)	-.713 (.451)	.921 (1.241)	1.608 (.562)	.905 (.963)	.372 (.401)	-1.433 (2.292)	.736 (.123)	-.356 (.292)	.604 (.907)	1.750 (1.332)	4.256 (3.319)	1.617 (1.813)
Lagged Dependent Variable ($\ln U_{it-1}$) ($\ln U_{jt-1}$)	.869 (11.483)	.940 (12.853)	.833 (8.107)	.862 (6.896)	.864 (12.202)	.930 (21.136)	.922 (16.682)	.911 (11.839)	.888 (10.466)	.883 (15.555)	.886 (13.079)	.944 (14.067)	.885 (8.679)	.796 (7.777)	.902 (16.783)	.905 (12.191)	.965 (.717)	.820 (6.637)	.574 (4.313)	.768 (8.253)
$\bar{R}^2$	.899	.917	.797	.734	.912	.970	.949	.891	.880	.947	.922	.928	.810	.837	.950	.928	.942	.830	.785	.892
DW	1.895	1.551	1.856	1.627	1.498	2.498	1.937	1.781	2.049	2.254	2.008	1.710	2.294	2.7929	1.737	2.323	1.318	2.001	1.567	1.311
σ	8.939	14.483	2.103	-.192	12.136	5.900	5.157	1.871	5.071	4.319	-7.167	-8.696	-.532	.798	-4.704	-14.242	-20.000	-6.641	-2.702	-6.759
α	-1.303	-2.435	-5.311	32.784	-1.157	2.291	1.297	- .568	-1.251	1.887	-1.968	-1.858	-3.683	11.023	-1.597	.263	-.863	-1.550	-3.398	-1.035
β	2.465	2.420	4.555	-38.137	2.752	2.661	3.335	3.782	3.522	3.289	2.279	2.298	5.346	-.946	2.495	1.740	1.886	1.467	1.076	1.481

Notes:

(1) Key to age groups UE = under 18, ET = 18-20, PA = 20-25, FO = 50 and above.

(2) Key to duration group 1-4 weeks (1), 4-12 weeks (2), 12-26 weeks (3), 26 weeks and above (4).

All - all workers in that age group.

(3) 't' values in parenthesis.

(4) $Wi_{rt} = \frac{\text{hourly earnings of full-time girls}}{\text{hourly earnings of full-time adult females.}}$

(5) Y_t = deviation from trend of GDP, at constant prices.

Source: The Old and New Earnings Survey. The Ministry of Labour, Department of Employment Gazette.

Four age groups were employed in the empirical analysis. These were under eighteen (UE), eighteen to twenty (ET), twenty to fifty (PA) and fifty and over (FO). All the equations were estimated by ordinary least squares and are generally well determined. Using the more severe tests [5] required by the presence of a lagged dependent variable in the specification there is generally no evidence of positive autocorrelation.

As far as male workers are concerned the results are pretty much as expected. All the short run coefficients have the expected signs, although one or two problems arise with their long term equivalents. The relative wage coefficients are generally significant and of reasonable size. This contrasts with some of the previous work including that of the Department of Employment (1978). Our results imply that the steady increase of the relative earnings of young workers from 45% of adult earnings in 1953 to 62% in 1976 increased their relative unemployment and reduced that of older workers. Subsequently, the secular increase in this relative wage was arrested post-1976 and the calculated value for male workers fell from 62% of the adult wage in 1976 to 57% in 1980. If anything our results imply that in the current recession falling relative wages have helped (marginally) to contain the rise in youth unemployment. The long term coefficients for the under-eighteen have the "wrong" signs because of the bias in the δ coefficient caused by new entrants into the short deviation categories.[6] Generally, as expected, the long term impact of increasing relative wages of young workers are significantly greater than the short run. Although the pattern is not so clear cut for the under-eighteens, the impact of rising relative wages is more pronounced on long duration unemployment categories of young workers. Amongst older workers, the reduction of relative unemployment as a consequence of relative wage

changes is least pronounced in the long term unemployment of the over-fifties. In part this reflects the choice made by employers but it may also indicate the existence of de facto retirers in this category of unemployment. Even if employers increased their relative preference for older workers as our results imply there may be supply-side constraints of this type. Amongst prime age males the results are curious. In the shorter duration categories the expected response of the employer to the increased relative cost of young workers applies. In the longer duration categories the opposite is true. One explanation may be the heavy concentration in these duration categories of young workers in their early twenties who are treated as equivalent to the under-twenties by employers. They may exhibit the same lack of family responsibilities and stability in employment that some evidence suggests causes employers to reject them.

As far as the output coefficients are concerned both in the short run and the long run there are a number of significant results. Firstly, the estimated elasticities[8] are significantly larger than for relative wage movements.[9] Given the movements in output this suggests that scale effects are more important than relative costs effects in explaining high relative unemployment amongst male workers. As far as young workers are concerned it is clear that the high relative unemployment of the mid-seventies and later is principally the results of depressed levels of output although higher relative wages could have worsened their position. Secondly, there is clear evidence of age discrimination. As output contracts, for example, it is clear that there is a marked movement against the hiring of young workers and consequently major increases in their relative unemployment in recession. This is particularly the case with the job inexperienced under-eighteen

category. The results for older (over 50) workers confirms this pattern. The absolute unemployment amongst older workers may worsen during recesions but it is clear their relative position improves. This is also the case for shorter duration prime age males, but again among the long term unemployed the pattern is different and for this group relative unemployment worsens in recession. Our results show clearly that in recession employers turn against younger workers and prime age workers with long unemployment durations. This result is not surprising. Other studies ((e.g. Mc Gregor (1980), Lancaster and Nickell (1980)) have shown the probability of re-employment worsen as the duration of unemployment increases and our results show this to be a particular difficulty for prime age workers. Similarly the apparent stability of male unemployment inflows compared with outflows has led to the view (e.g. Knight (1981)) that the employers' principal response to recession is to cut hiring rates rather than increase firing rates. This reflects not only the gain to the employer of job stability but also the constraints imposed by trade unions.[10] The result of this is discrimination in favour of prime age and older males in recession. Any expansion in output confers particular benefits on younger workers so discrimination is in their favour in an upturn when hiring rates are being increased by employers.

The results relating to speeds of adjustment do reveal a clear cut pattern. They show firstly that the speed of adjustment of unemployment to the equilibrium level for employers is greater for older and prime age males than for the young. Secondly, is is clear that this adjustment process is more rapid with long duration unemployed workers than with short. Our view is that this reflects differential supply constraints in these various age and duration categories. If employers want more

workers it is quickestto get older and long term unemployed workers than younger (particularly if short duration) unemployed workers because their probability of accepting a job offer is higher. Similarly in a downturn, which contrasts with the evidence on output elasticities. Our conclusion is that the benefits of job stability and the pressure from organised labour limits the extent but not the speed at which the unemployment of prime age and older workers increases in this situation.

The results for female workers are shown in Table 2 and present an interesting contrast with those for males. The first notable difference is the general insignificance of the output coefficients and therefore of zero elasticities in both the short and long term. This suggests that there is no age discrimination among female workers. This is consistent with previous evidence that shows discrimination on the grounds of sex is unlikely to be compounded by discrimination for some other reason. It also implies that there are no significant differences in non-wage costs in the case of women. There are several reasons for this. Although there is evidence of significant occupational segmentation of women workers[11] there is no evidence of age segmentation. Women of different ages do similar jobs. This is partly because of the low training content of many of their jobs. Moreover where training has occurred it is likely to be of a general character. This means that firms are likely to invest a good deal less heavily in their female labour force. This is reinforced by the high labour turnover and shorter job tenure of female workers which means a lower likelihood of higher productivity through learning by doing. The net result is that both training and firing costs are lower for female workers and unlikely to vary by age. This contrasts with male workers where large training investment and learning by doing will inhibit the employer's desire

to fire workers in a downturn especially those of prime age. The cost of resistance to job cuts will also influence actual behaviour. Women are both less well organised in unions and less likely to resist by militant action.[12] Firing costs are, therefore, lower for women of all ages and this is reinforced by short job tenure which makes few women, of any age, eligible for redundancy payments. Our conclusion is that not only will unemployment flows vary a good deal more for women than men as the evidence suggests but there will be no significant additional age effects. If unemployment amongst young women is high in recession it is their femininity not their age which is responsible. This contrasts with the experience of young males.

The coefficients on the relative wage variable confirm this general view. Compared with males the coefficients are significantly larger and invariably significant. This is consistent with the view that it is wage not non-wage costs of female labour that vary by age. Increases in the relative wage of young women from 53% of the adult wage in 1953 to 66% in 1976 appear to have had some effect and certainly larger than males, on the relative unemployment rates of this age group.

Our general conclusion is that an expansion of the UK economy will have particular benefits for the relative unemployment of young men but will only improve the position of young women in so far as the relative unemployment positions of women as a whole is improved by such an expansion. Cuts in the relative wages of young workers will have small but significant effects on the relative position of young males but will have a more appreciable impact on that of young females.

IV. Stability

There is a good reason to suspect that the results from estimating equation 5 will exhibit some degree of structural instability. Several studies have shown evidence of the instability of labour market relationships in the U.K. since the mid-sixties. The seminal work of Gujerati (1972) showed instability in the relationship of unemployment and unfilled vacancies and this is confirmed for the 1970's by the National Institute of Economic and Social Research (1981). On the employment side Knight and Wilson (1974) produce evidence in support of a structural break in the sixties while Briscoe and Roberts (1977) show more wide spread instability in the 1960's and early 1970's. In view of this previous work we have devoted some attention to exploring the stability of the relationships described in tables 1 and 2 and discussed in section III. In order to do this we used three methods. Firstly we estimated equation 5 by an 18-period moving regression. The basic results for each age group are shown in Tables 3 and 4 .

TABLE 3

18 - PERIOD MOVING REGRESSION - SHORTRUN RELATIVE WAGE (W) AND OUTPUT (Y) ELASTICITIES - MALES

Age Group	Elasticity	1954-1971	1955-1972	1956-1973	1957-1974	1958-1975	1959-1976	1960-1977	1961-1978	1962-1979	1963-1980
UE All (Under 18)	W	1.071	1.178	1.366	1.369	1.485*	1.647*	1.342*	.978	.523	.814
	Y	-3.623	-3.577	-5.797	-5.217	-5.762*	-7.420*	-6.962*	-8.712*	-10.777*	-7.004*
ET All (18-20)	W	2.884*	2.874*	2.771*	1.836*	2.017*	2.092*	2.066*	1.741*	1.745*	1.728*
	Y	-3.351	-3.119	-2.911	-1.753	-2.354	.281	.602	- .161	- .608	- .691
PA All (20-50)	W	.459	.489	.462	.537	.836	-.745	-.103	-.204	-.215	.070
	Y	-4.951*	-4.989*	-4.656*	-4.718*	-3.184*	-1.906	- .925	- .700	- .217	.788
FO All (50 and over)	W	-1.500*	-1.586*	-1.432	-1.094	-1.220*	-1.322*	-1.326*	-1.042*	- .823*	- .970*
	Y	4.954*	5.083*	5.086*	4.609*	4.973*	4.722*	4.601*	5.456*	5.917*	3.683*

NOTES: (i) * Indicates the coefficient was significantly different from zero at the 5% level

TABLE 4

18 - PERIOD MOVING REGRESSION - SHORTRUN RELATIVE WAGE (W) AND OUTPUT (Y) ELASTICITIES - FEMALES

Age Group	Elasticity	1954-1971	1955-1972	1956-1973	1957-1974	1958-1975	1959-1976	1960-1977	1961-1978	1962-1979	1963-1980
UE All (Under 18)	W	1.655	1.541	3.067	2.678*	2.792*	2.775*	2.500*	1.889	1.054	1.446
	Y	-1.732	-2.183	-4.926	-4.138	-3.796	-6.473*	-5.389*	-6.739*	-8.069*	-4.880*
ET All (18-20)	W	1.821	1.315	1.690	1.206	1.521*	1.675*	1.465*	1.185	1.123	1.191
	Y	- .734	- .849	-1.262	- .680	-1.356	1.150	.343	- .438	- .104	.548
PA All (20-50)	W	- .845	.886	-1.535	-1.084	-1.015*	- .982*	-1.001*	- .990	- .697	- .811
	Y	2.772	- .886	3.139	2.673	2.083*	2.658*	1.828*	1.730	1.902*	.819
FO All (50 and over)	W	.644	-1.099	.317	- .682*	-2.579*	-2.566*	-2.343*	-1.859*	-1.738*	-1.846*
	Y	2.772	- .886	3.139	2.673	2.083*	2.658*	1.828*	1.730	1.902*	.819

NOTES: (i) * Indicates the coefficient was significantly different from zero at the 5% level

As far as males are concerned the clearest evidence of instability is for the under eighteen group. This seems most pronounced for the output elasticity where extending the sample period triples the coefficient which is more than four times the standard error of the calculated coefficient for the whole sample period. The implication is that very small increases in output will have very large (and much larger than ten years ago) effects on the relative unemployment rates of young men. Surprisingly this is not true for the eighteen to twenty group where the estimated (but insignificantly different from zero) coefficient actually falls through time. The increasing benefits of a general reflation appears to apply to the younger (largely school-leaver) age group. The output elasticities for the oldest age group exhibit the greatest stability but one of the surprising results is the reduction in size and significance of the output coefficient for the prime age group. Once we extend the sample period beyond 1977 the measured output elasticity is insignificantly different from zero. This represents a major deterioration in the benefits of general reflation of output to prime age workers since the benefits of such an expansion to their relative unemployment position no longer apply in the recent years. Taken together with our results for the eighteen to twenty age group it seems that the increasing importance of young long term unemployed males creates a major structural problem which cannot be solved by an increase in aggregate output. This group consists largely of male workers who have been left as the job market for new entrants has deteriorated in the mid seventies onwards. It is not unreasonable to assume that these workers are regarded as unemployable by employers who point to their long term unemployment as proof (i.e. they are duration dependent).

The relative wage elasticity also exhibits some instability most notably in the case of the under eighteen group. The coefficient increase for sample periods ending up to 1977 and decreases markedly in size and significance thereafter. The results suggest that although increases in the relative wages of the young may have increased their relative unemployment until 1977 cuts in that wage after they produce no significant improvement in their relative position. In the case of the eighteen to twenty group this is not the case and the coefficient exhibits greater stability. There is some reason to believe the quantitative impact on relative unemployment of cuts in relative wages has fallen recently but the effect is still there. As far as prime age males are concerned the coefficients are consistently insignificantly different from zero. The principal beneficiary of any cut in the relative wage of young workers is the oldest age group, but it is clear the impact has fallen through time. Our conclusion is that change in the relative wage of young workers are unlikely (and less likely than in the 1970's) to have significant effects on the relative unemployment levels of male workers in the 1980's.

The results for female workers are shown in Table 4 and reveal some interesting patterns. Firstly there is evidence of significant parameter variation. Secondly and more importantly the basic model does not explain relative unemployment rates amongst females until the mid-seventies. Coefficients are invariably insignificantly different from zero until that time. There is no evidence of either age or wage discrimination up until 1975. Women workers seem sufficiently homogeneous in the sense that any wage difference exactly reflect productivity differences so that their relative unemployment rates are totally insensitive to change either in the level of output or the relative wage

by age. It is only after 1975 that the model explains relative female unemployment rates by age. There is evidence of both output and wage effects on unemployment increase. Of particular importance are the output coefficients which reveal growing discrimination against young (especially under 18) and in favour of older (especially over 50) women. As far as the relative wage effect is concerned this seems to have had a much smaller impact but in the mid-seventies there is some evidence that increasing relative pay of young women worsened their relative unemployment position and improved that of older workers. Subsequently the impact of relative wage movements has declined to virtual insignificance. As might be expected the inclusion of the 1980 shows a significant fall in the output elasticity and hence a marked improvement in the relative unemployment rates of young women given the level of output. This is an indication of the impact of YOP on unemployment rates by age and is identical to the experience of young (under 18) males.

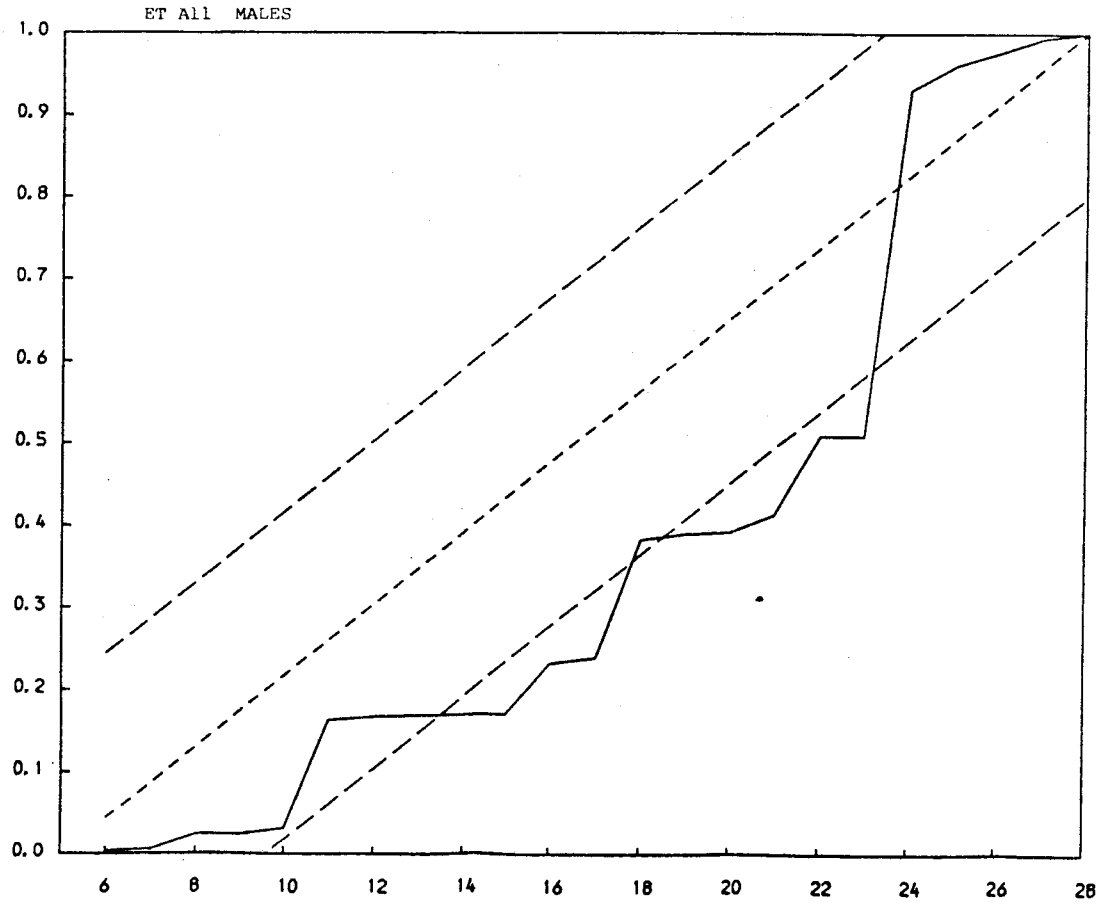
How can these developments be explained ? It certainly seems that as the female labour market has deteriorated since the mid-seventies this has had the effect of making their situation more like that for males for whom market conditions have been deteriorating much longer.[15] A fall in the rate of growth of demand for female labour cuts employment inflows more than employment outflows and although this effect is likely to be less noticeable than for males it will still have particular effects on new entrants to the female labour market, i.e. young women. This however, seems much less important than the continuing trend in favour of part-time employment of women. Between 1975 and 1980 the proportion of women employed part-time has grown from 32% to 35% with particularly strong movements for manual workers (from 44% to 49%).[16] Young women tend to work full-time and older women part-time so increased discrimination

against younger women arises from the relative preference of employers for part-time workers. Why should this be the case ? The answer is that part-time workers have lower fixed employment costs like national insurance and other fringe benefits. They also have lower firing costs - few direct costs and since they are less likely to organize collective resistance, they carry a smaller risk of indirect costs being incurred. Of course this has been working against young women since the early sixties when part-time employment began to increase at a significant rate. However the buoyant market for female labour in general, left their relative unemployment rates unaffected by these performances even when output was below the trend level. Since the mid-seventies the position has changed. Output is generally significantly below trend and this has led to a major deterioration in the job market for women workers.

Given the considerable instability exhibited by the 18 period regression estimates two further tests of structural stability were performed: the Cusum and Cusum-of-square tests proposed by Brown, Durbin and Evans (1975). Despite the inappropriateness of the conventionally used bounds in the presence of a lagged dependent variable these tests provide useful additional evidence on the question of structural breaks in our estimated relationships and provide some confirmation of the results from the moving regression procedure. There is some evidence in figures 2 and 3 for a structural break in the female labour market in the mid-seventies and for males rather earlier in the mid-sixties.

FIGURE 2

CUSUM TESTS FOR STRUCTURAL BREAKS - MALES.


ET All MALES
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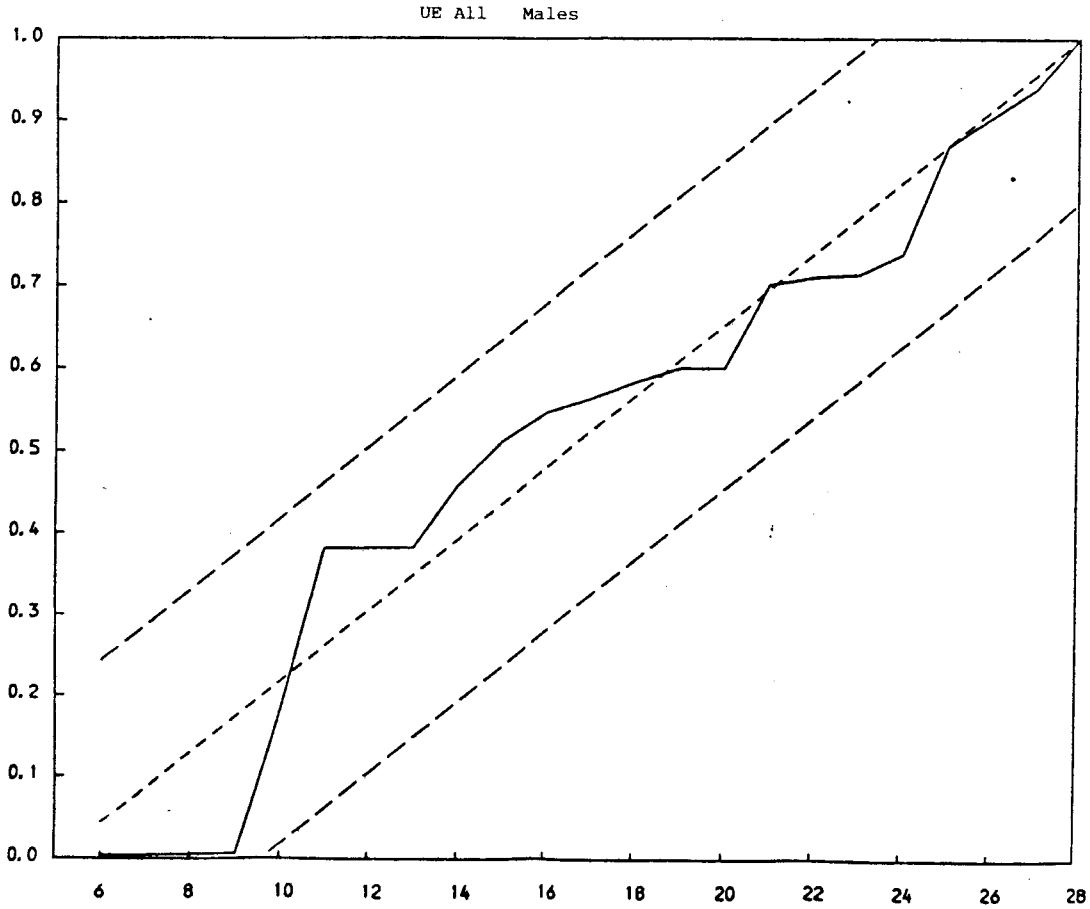
UE All Males
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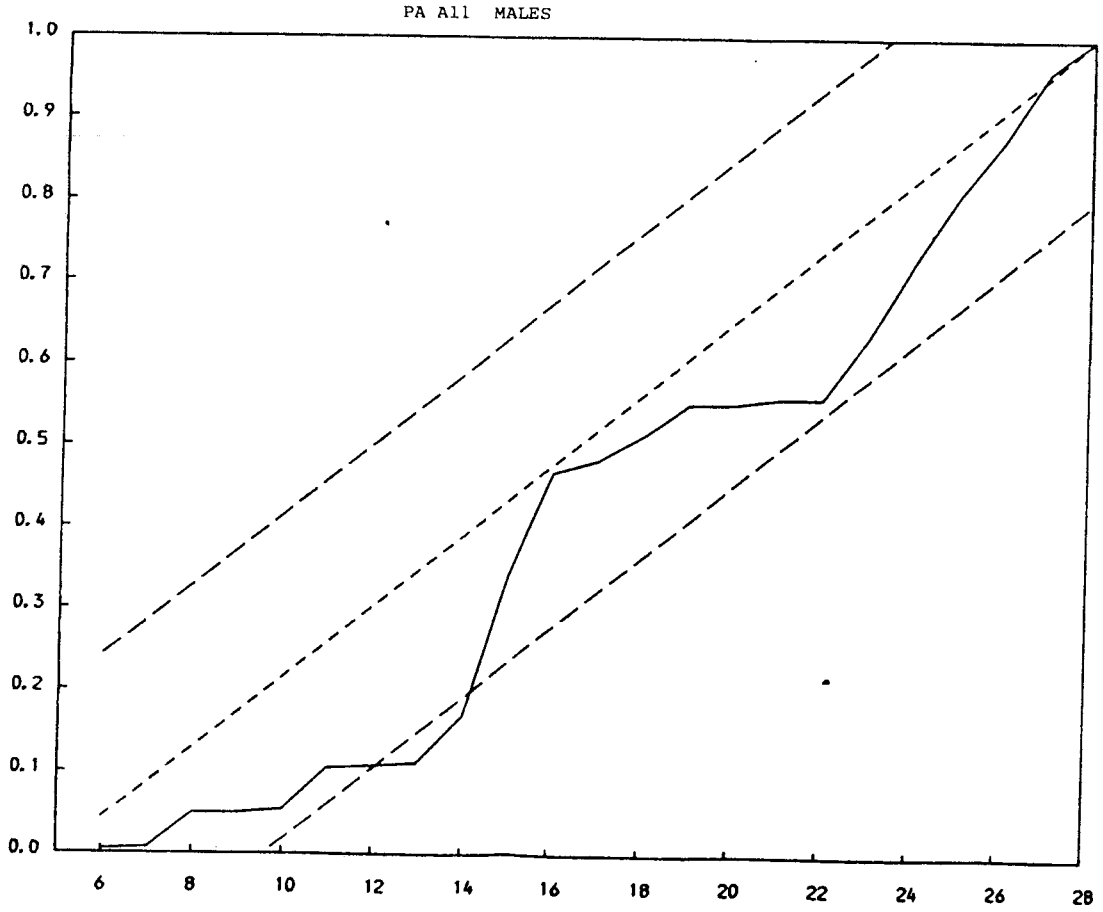
PA All MALES
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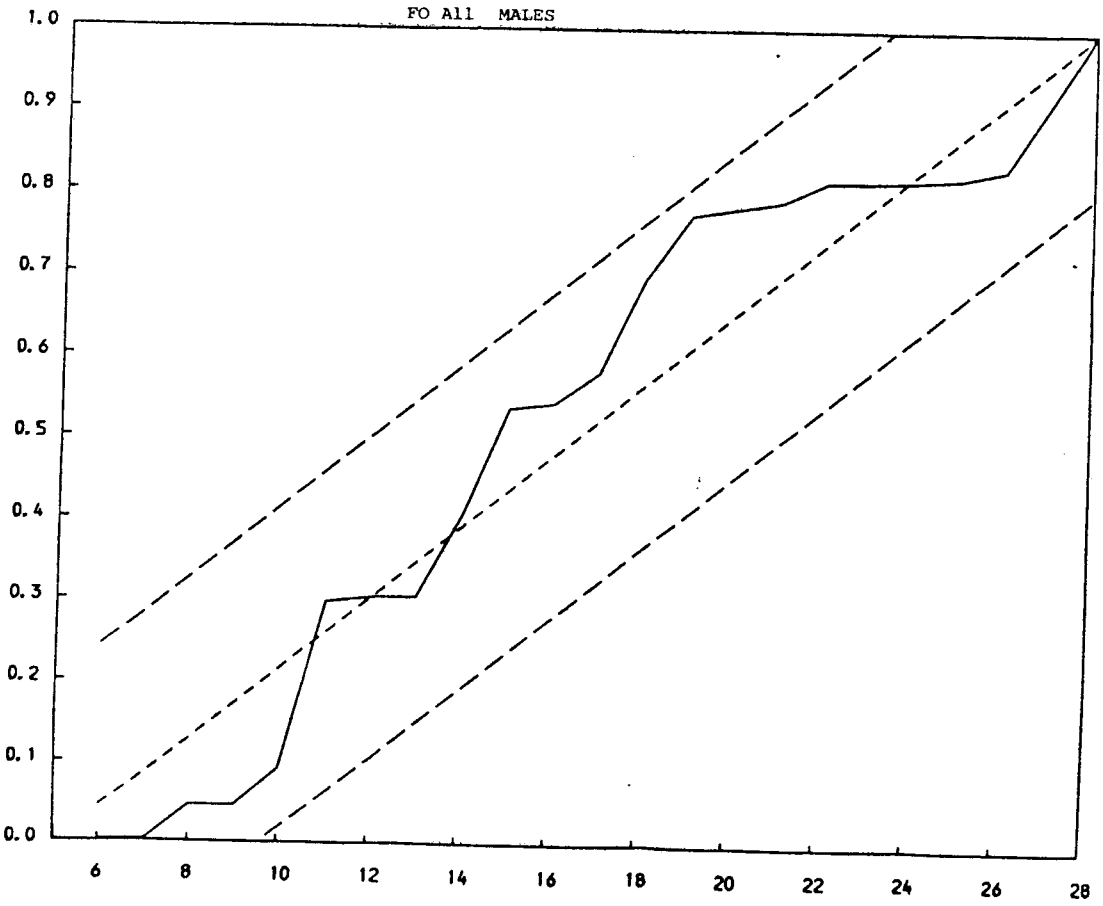
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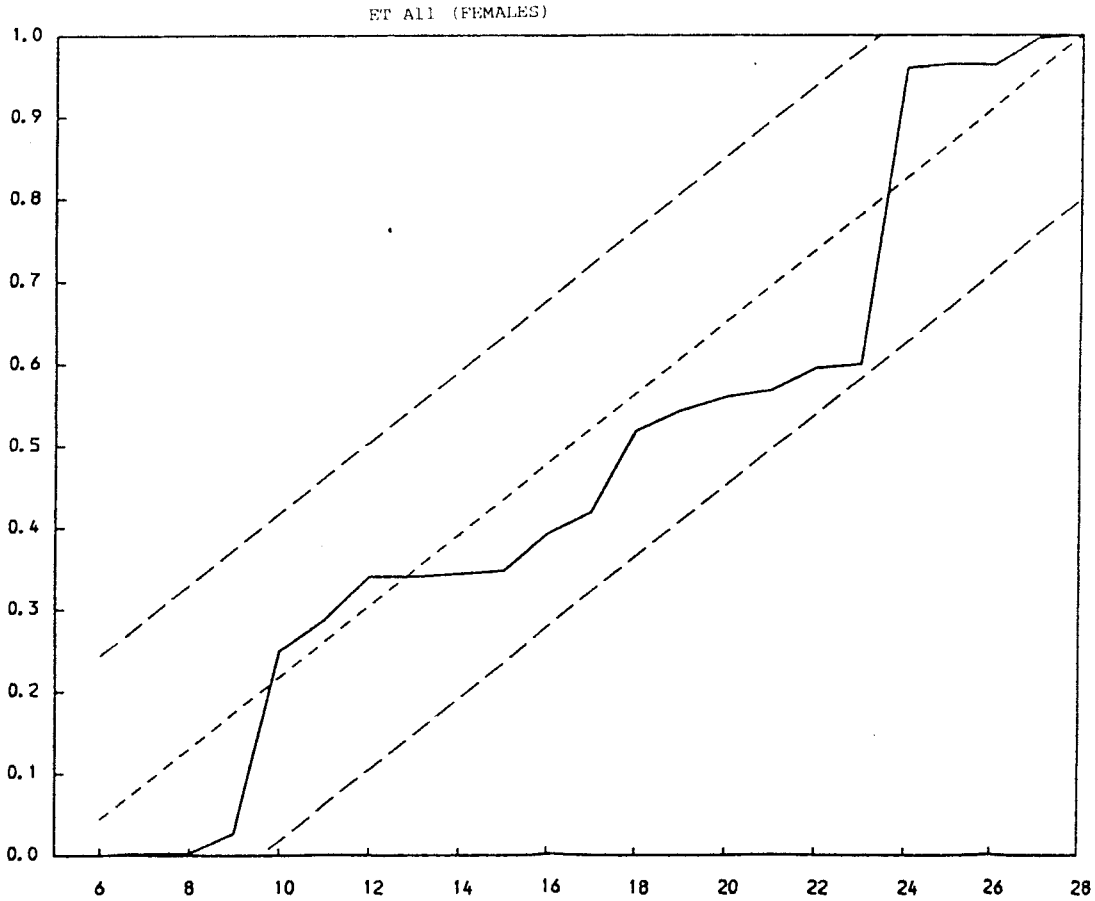
FIGURE 3

CUSUM TEST FOR STRUCTURAL BREAKS - FEMALES.


ET All (FEMALES)
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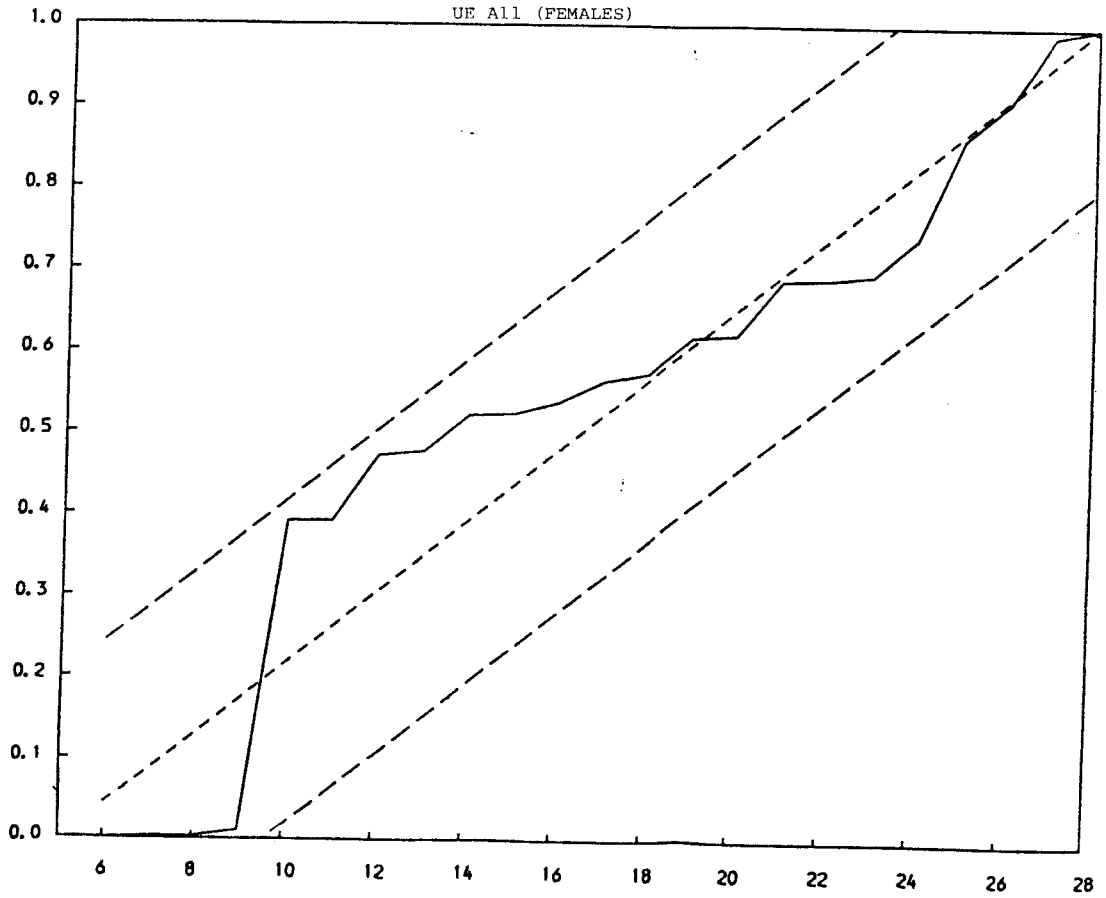
UE All (FEMALES)
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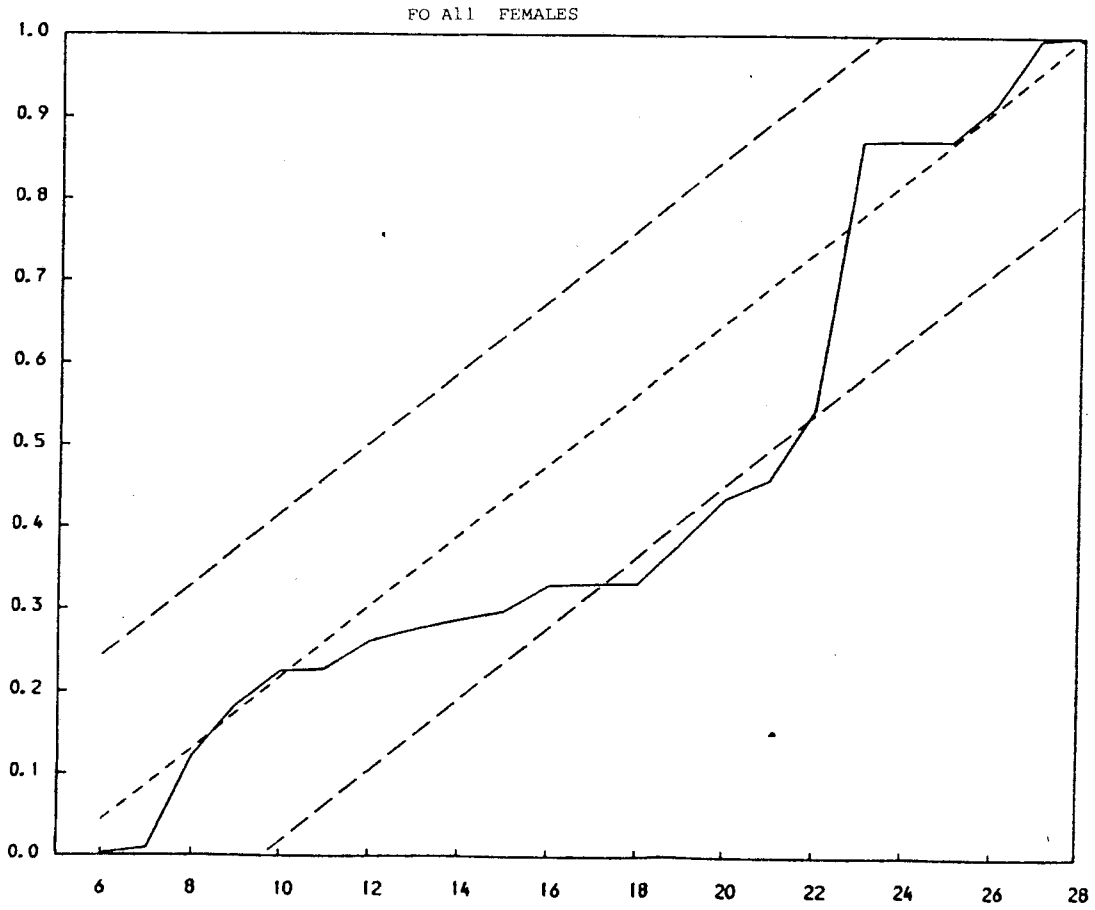
FO All FEMALES
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0.7
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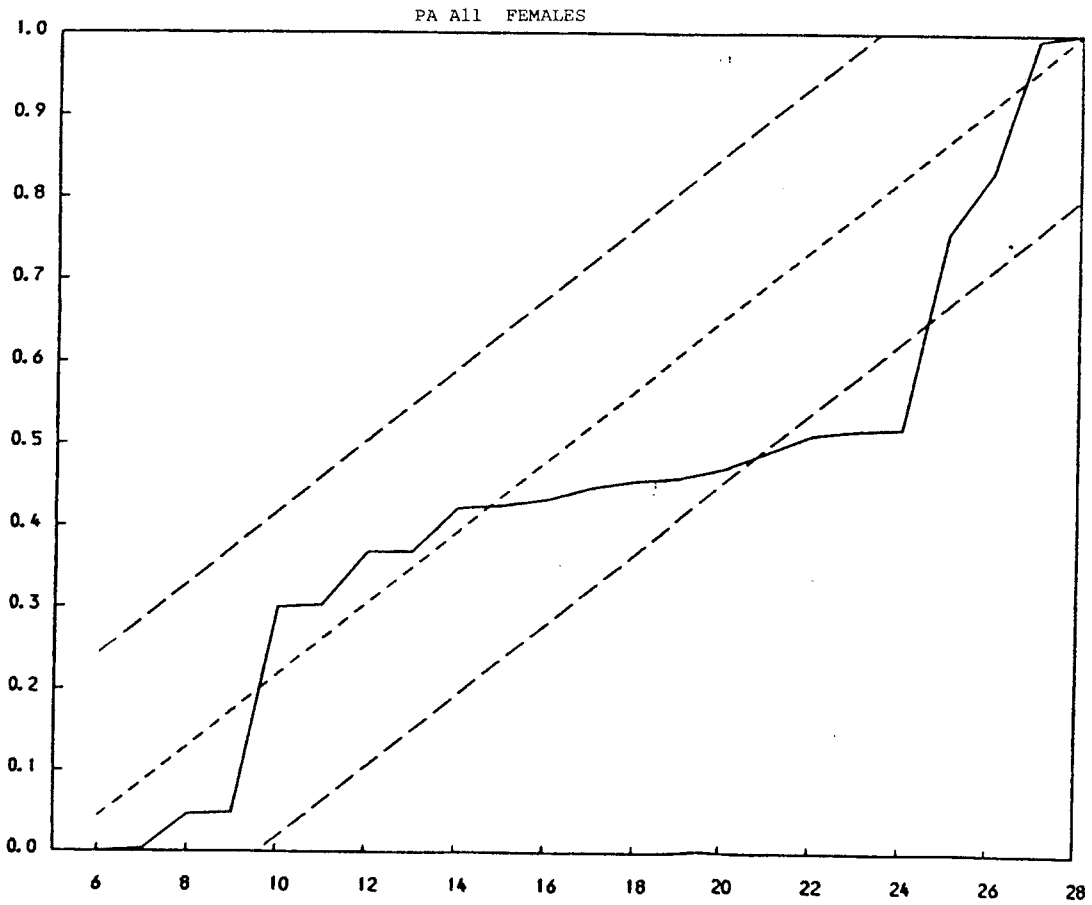
PA All FEMALES
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We also explored the possibility of such a break using industrial rather than total output.[17] The evidence for a break in the mid-sixties is even stronger in this case. These results are consistent with the evidence that the mid-sixties shift in the UV relationship only affected male and was of particular importance in the production industries.[18] Similar results were obtained from the Cusum-of-square tests to those obtained from the Cusum tests.[19]

Conclusions

Our results have shown on important age dimension to the pattern of unemployment in Britain. Although we have shown that changes in output have much greater effects on male unemployment by age than changes in the relative wage of labour the impact of a general reflation or recession varies quite considerably. The relative position of young and long duration prime age males, deteriorates particularly severely in recession while a general reflation worsens particularly the relative position of older (over 50) males.

Amongst females relative wage changes have a larger impact both absolutely and relative to output changes. However our results have also shown that a significant age dimension to the pattern of female unemployment only occurs after the mid-seventies. In general, changes in both relative wages and output have significant effects on relative unemployment rates after that date. This result is also indicative of the instability of some of our estimated parameters. Policy proposals need to take this instability into account. The necessity of cutting the relative wages of young workers seems much less relevant in 1980 than in 1976 because the cuts that have taken place had little effect and hence many of the relevant

coefficients become insignificantly different from zero once the years after 1976 are included in the sample. Our results suggest a proposal of this type so much favoured by the current government is now irrelevant to the problem of high youth unemployment. Of much greater potential benefit to young workers, both male and female, would be a general reflation leading to a rise in GDP. However, such a reflation is likely to be much less effective now than in the past in assisting any age group other than the under eighteens. In order to assist these older workers particularly those with long unemployment durations, our results suggest special measures will be necessary.

Footnotes

1. Nickell (1980) has documented the extent and source of inequality amongst male workers while Disney (1979) and McGregor (1980) for example, have shown the vulnerability of individuals to repeated unemployment spells.

2. Casson (1979) has provided a general survey of the extensive literature on this subject.

3. Bowes and Harkess (1979) show this and other studies, e.g. Mackay (1972) have shown the heavy concentration of redundancies upon older workers who have a low probability of re-employment.

4. Annual data was selected because of the gaps in the biannual series. Particularly troublesome were the gaps caused by industrial disputes in 1975 and 1977.

5. There are a couple of exceptions, e.g. the results for the under-eighteen/short duration group using the test suggested by Durbin (1970).

6. This proved a persistent problem particularly with female workers where there are new entrants to all the age categories of the labour force. This led us to attach greater caution to our calculated long term coefficient than the short term elasticities.

7. Recent figures from the Department of Employment (1982) have drawn attention to the increasing long term unemployment amongst young workers. In January 1982 46% of all those unemployed aged 25 and under had been out of work for more than 26 weeks.

8. Equation 5 was estimated using the deviation from trend of both GDP and the Index of Industrial Production. Results reported in Tables 1 and 2 make use of the GDP measure. Although there are quantitative differences there are no major qualitative differences. Detailed results are available on request.

9. This result is totally consistent with estimates for manufacturing for all workers using employment functions. See for example Briscoe and Peel (1975).

10. There is now an extensive literature which indicates the gain to employers if job stability emphasising such factors as investment in human capital (following Oi (1962)) learning by doing and other efficiency effects. A recent study is that of Bowers, Deaton and Turk (1982).

11. See for example Hakim (1978).

12. Main (1981) has calculated that the average job tenure of male workers in Britain is 20 years compared with 12 years for females.

13. For evidence on this point see Bain and El Sheikh's study (1980) of Unionization and the Strikes in Britain (1978) study of the Department of Employment. (page 168)

14. See the Department of Employment's data on unemployment flows published in the statistical appendix to the Department's Gazette.

15. For a discussion along these lines see Knight (1981).

16. These data are taken from the New Earnings Survey.

17. Detailed results are available on request.

18. See Evans (1977) for evidence.

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