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15 Youth Unemployment in Britain and the United States Compared

Richard Layard

British unemployment differs markedly from U.S. unemployment in two ways: (1) youth unemployment has been much lower relative to adult unemployment for decades; and (2) spells of unemployment last on average about twice as long (at a given point of the cycle), with the difference being greater for adults.

There are also two points of similarity: (1) in both countries youth unemployment rises relative to adult unemployment in slumps; and (2) in both countries the demand for young workers is very sensitive to wage levels. I shall examine these phenomena in turn, devoting one section to each.

Youth unemployment is relatively low in Britain, but why? It seems likely that both equilibrium and disequilibrium factors are involved (see section 15.1). An equilibrium approach to unemployment leads one to look mainly for supply-side factors which might affect the choice of whether to be "unemployed", rather than employed. I find good evidence that the higher relative youth unemployment in the U.S. reflects in part higher U.S. incomes, which also explain the remarkably low U.S. levels of labor force participation compared with Britain. Supply behavior is also influenced by price effects: income maintenance for adults is less generous in the U.S. than in Britain and this tends to reduce the relative unemployment of adults. Another price effect in supply comes from the rigidity of the British labor market, which refuses admission to

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apprenticeship programs to most people over the age of sixteen; this provides a strong incentive for youths to be employed.

I next explore whether differential disequilibrium can help to explain higher relative youth employment in the States. The obvious influence here is the minimum wage law, which does not exist in Britain. Though there is some noncompliance, it seems probable that the minimum wage has contributed to youth unemployment in the U.S. But the structure of age-wage profiles does not reveal any sharp differences between the countries.

Finally, there is an important difference in information. Almost every school-leaver in Britain is interviewed by the Careers Service before leaving school, and nearly a quarter find their first job through the Service. By contrast, in the U.S. the state plays little more role in the placement of youths than in the placement of adults. Unfortunately, I cannot say how important this factor is, nor could one estimate the influence of any of the factors that I document without analyzing data on many more countries. This should soon be feasible.

The next issue is the efficiency cost of the unemployment in each age group, and the impact of the unemployment upon the level of social inequality. To do this one needs to look at duration (see section 15.2). If unemployment arises from disequilibrium job-rationing, its cost (relative to the gross output lost) is approximately proportional to the average duration of the uncompleted spells. Taking all age groups at a given point in the cycle, average durations are about twice as high in Britain as in the U.S. And the average number of spells per year among those experiencing any unemployment has been about the same. Thus, even though average levels of unemployment have been higher in the U.S. than in Britain, the efficiency cost (relative to GNP) has been lower. Furthermore, annual unemployment has been more evenly distributed across people.

As between youths and adults, the higher relative rate of youth unemployment in the U.S. turns out to be mainly due to higher relative durations. Thus the share of youth unemployment in the total efficiency cost of unemployment may be higher in the U.S. On the other hand, the less generous scales of unemployment benefit may mean that adults suffer more when they are unemployed than youths do. Thus while the British worry particularly about youth unemployment (and now about long-term adult unemployment), the Americans may be right to worry particularly about adult male unemployment. The British experience, however, does suggest that a good case can be made for a Careers Service for youth. Feldstein argued some years ago that the U.S. should have such a service. Given the market failures that arise in the presence of asymmetrical information, there does seem to be a case for this proposal.

A further issue is the time-series behavior of youth unemployment rates (see section 15.3). In the late 1970s youth unemployment was much higher in Britain than ever before. This phenomenon has led to endless speculation about structural change. But in fact it is due almost entirely to cyclical factors. For in Britain, as in the U.S., the age structure of unemployment rates can be well explained by the state of the cycle, by relative youth earnings, and by demographic factors. In the 1970s the size of the youth cohort increased, as did relative youth earnings, so our equations tend, if anything, to overpredict recent levels of youth unemployment. There is no clear evidence that Britian has moved permanently toward the American pattern of high relative youth unemployment rates.

Across towns, the level of youth unemployment varies with the level of adult unemployment, in Britain as in America. The elasticity of youth unemployment with respect to adult unemployment is much less in the cross-section (0.6) than in the time series (1.4). This is what I would expect since over time youths are particularly strongly affected by cyclical variations in rates of hiring, and these cyclical effects are not present in the cross-section. American findings, however, do not in this respect mirror British experience.[1]

Finally, in section 15.4, I confirm that it is reasonable to find wage effects on youth unemployment by looking at the effect of wages on youth employment. I estimate the demand system derived from the trans-log cost function on time series data for British manufacturing (April and October 1949-69). Holding constant output and capital, the own-wage elasticity of demand is around -1.3 for youths, -1.6 for women, and -0.3 for girls and men. These effects are broadly consistent with the American evidence. Thus, if there must be minimum wages, the case for a separate youth rate seems overwhelming.

15.1 Why Is Relative Youth Unemployment Higher in the U.S.?

15.1.1 The Puzzle

In the U.S., unemployment rates for young people are much higher relative to rates for adults than they are in Britain. There are various ways of looking at this. A crude way is to examine the unemployment rate of, say, all those under 25 relative to the unemployment rate of those over 25. This comparison is made in table 15.1, which is based on Census data since this is the source that is most truly comparable between the two countries, both in its questions and method of data collection.[2] It does not matter that it is rather out of date since I am mainly concerned with long-run differences between the countries. As the table shows, for males the rate for those under 25 is nearly twice as high (relative to the adult

Table 15.1 **Age-specific Unemployment Rates for Nonstudents in Britain (1971) and U.S. (1970)**

	Percentage			
	Males		Females	
	Britain	U.S.	Britain	U.S.
Under 25	6.6	9.6	5.1	8.2
25+	3.6	2.8	3.2	4.1
Total	4.2	3.6	3.7	4.9
(Under 25 rate divided by 25+ rate)	(1.8)	(3.4)	(1.6)	(2.0)

SOURCE AND NOTES: See appendix A.

rate) in the U.S. as in Britain.[3] There is less difference for women, but still some.

However, these differences could be misleading. For the U.S. labor force aged under 25 is much more recently out of school than the British labor force under 25; so one might *expect* that fewer of its members would have been absorbed into employment.[4] To deal with this problem one can compare the unemployment rates of people with similar periods of experience since leaving school. This comparison can be made in table 15.2.[5] For example, if one wants to compare British youths with U.S. whites [US(W)], one notes that a half of 16 year olds in Britain were out of school, as were a half of 19 year old U.S. whites, and in each case about one-third had left school in the last year. If we now compare the unemployment rates of these groups for males, we find they were 8.8% in Britain and 11.2% for U.S. whites. By contrast, the adult unemployment rates (for those aged 30–34) were in the opposite order: 3.9% in Britain and only 2.6% for U.S. whites.

For women, the difference in age profiles between Britain and the U.S. is less striking. This may be because the concept of unemployment is more slippery for adult women than for any other group. In any case, there are no comprehensive data on female unemployment in Britain except at Census years, so I shall henceforth confine my remarks to men. For unemployed men the regular data come from registrations at employment offices, and these are quite comprehensive since most unemployed men register. The data show that at any point in the cycle the youth unemployment rates are lower relative to the adult rate than they are in the U.S. (see tables 15.3 and 15.4).

In passing, one should note the profound implications of this for the comparison of aggregate unemployment rates between Britain and the U.S. The normal assertion is that the British rate of registered unemployed needs to be raised by a fifth or less to allow for unregistered female unemployment and thus to get it onto a "survey basis" comparable with

the U.S. rate.[6] This comparison always makes the U.S. rate look awfully high. For example, in 1976 the U.S. Bureau of Labor Statistics estimate that British unemployment adjusted to U.S. concepts was 6.4% compared with the published British figure of 5.6% and the U.S. figure of 7.7%. Thus the U.S. rate is still 1.3% higher. But at the same time the prime-age male rate (aged 25–54) was about 0.8% *lower* in the U.S. than in Britain.[7] In fact, it seems likely that in every year in the 1970s except 1976 the U.S. prime-age male rate was below the British. It is therefore well to remember how much the aggregate U.S. rate is boosted not only by the relatively high rate of female unemployment but also by the relatively high rate of youth unemployment.[8]

The question is why the youth rates should be so much higher (relative to adult rates) than in Britain. At least five possibilities come to mind.

15.1.2 Income Effects in Labor Supply

The U.S. is a richer society. To investigate the effects of income I shall begin by looking at labor force participation. Participation rates are

Table 15.2 **Schooling, Labor Force Participation and Unemployment in Britain (1971) and U.S. (1970)**

	% of population who are nonstudents			% of nonstudents who are in labor force			% of nonstudents in civilian labor force who are unemployed		
Age	Britain	US(*W*)	US(*B*)	Britain	US(*W*)	US(*B*)	Britain	US(*W*)	US(*B*)
	1	2	3	4	5	6	7	8	9
Males									
(15)	(31.4)	(4.4)	(7.6)	(87.3)	(32.5)	(26.5)	(21.7)	(16.0)	(20.6)
16	52.3	7.9	11.8	97.1	48.6	34.7	8.8	21.6	27.0
17	71.0	13.3	20.5	97.9	65.3	48.0	6.7	19.0	27.1
18	78.8	30.2	45.0	98.1	82.8	71.8	7.2	12.9	20.8
19	83.6	48.2	61.6	98.0	86.4	71.8	7.1	11.2	18.6
20	85.5	59.8	77.8	97.8	88.3	76.0	6.9	9.6	14.6
21–24	92.8	75.8	87.5	98.2	92.4	82.1	5.4	6.4	10.4
25–29	98.2	89.5	93.3	98.3	95.6	87.3	4.2	3.3	6.0
30–34	99.2	94.7	95.3	98.2	96.2	89.1	3.9	2.6	4.7
Females									
(15)	(31.7)	(5.0)	(8.4)	(87.0)	(19.5)	(16.7)	(14.9)	(15.9)	(25.4)
16	52.0	8.5	13.1	94.1	26.5	20.7	6.8	21.9	33.0
17	69.7	15.0	22.2	91.6	35.2	29.2	5.3	19.3	31.1
18	79.6	38.9	46.9	86.5	59.6	44.4	5.0	11.7	24.4
19	85.2	54.9	63.6	80.9	63.1	50.6	4.8	9.3	21.0
20	87.2	67.6	79.5	74.4	62.4	55.3	4.5	7.8	15.9
21–24	95.9	85.6	89.8	61.1	56.9	58.9	4.1	5.7	11.8
25–29	99.2	95.4	95.5	43.1	43.1	58.3	4.3	4.9	8.5
30–34	99.4	96.6	96.3	44.8	41.8	59.1	4.2	4.6	7.0

SOURCE AND NOTES: See appendix A.

Table 15.3 **Male Unemployment Rates for Nonstudents: By Age (1976)**

Age	Britain (Jan.)	Britain (July)	U.S. (All year)
16–17	12.4	26.8	28.4
18–19	11.1	10.6	17.3
20–24	10.0	9.3	11.0
25–34	6.6	6.2	6.2
35–44	5.5	5.2	4.1
45–54	4.6	4.5	4.0
55–59	4.9	4.9	4.2
60–64	9.5	9.5	
65+			5.2
Total	6.9	7.3	7.0

SOURCE: *Department of Employment Gazette*, January 1979, p. 40. *Employment and Training Report of the President, 1978*, tables A3, A19 and B7.

NOTES: 1. U.S. data include persons in school if they were also in the labour force.

2. A fine age breakdown of youth unemployment is only available in the U.S. in October and in Britain quarterly (and till recently only in January and July). The first three U.S. figures relate to October, but other data show that for those aged 16–21 not in school the October rate is quite close to the annual average (Bureau of Labor Statistics, *Handbook of Labor Statistics* 1977 p. 57). There is surprisingly little month to month variation in the unemployment rate for such people. In Britain the youth unemployment rate is much higher in June/July than at any other time.

dramatically lower at all ages in the U.S. (except among the old). Table 15.2, gives the figures for those under 35, and the same is true for all age groups under 65. Whereas virtually all British males who are not incapacitated participate, the number of U.S. males not in the labor force is greater at every age than the number who are unemployed. (This has been true in most years, except for those aged 25–34 in a few recent years.)

If income accounts for this difference between the two countries, it should also have produced a decline in age-specific participation rates over time within the U.S., which we do indeed observe. It should also lead to lower participation rates in higher income groups, which we again observe for adults. But for youths, cross-sectional data may suggest the reverse pattern.[9] I believe that this can be explained by the role of job-rationing in the youth labor market. Suppose that family connections have an important effect on a teenager's ability to find a job, and thus in turn on his willingness to participate. If family connections can be represented by income relative to the mean $(y/\bar{y})$ then the probability of participation might be approximated by some function such as

$$p = f\left[y^{-\alpha}\left(\frac{y}{\bar{y}}\right)^{\beta}\right] \qquad \alpha, \beta, f' > 0$$

If $1 > \beta - \alpha > 0$, we should observe (1) that in a cross-section high-income youths participated more than low-income youths and (2) that over time and across countries, participation fell as average income rose.

Our main concern, however, is with the participation rate of youths relative to adults. This is much lower in America than in Britain (where it is roughly equal).[10] Can this be explained by income levels? It seems quite likely. For over time youth participation rates (of nonstudents) have fallen by a greater proportion than adult participation rates.[11] Thus it may

Table 15.4 Unemployment Rates by Age

	Males				Females			
	Britain		U.S.		Britain		U.S.	
	Under 20*	All ages	18–19	All ages	Under 20*	All ages	18–19	All ages
1959	1.6	2.2	15.1	5.3	0.8	1.5	13.1	5.9
1960	1.0	1.7	16.5	5.4	0.6	1.2	13.0	5.9
1961	0.8	1.5	15.2	6.4	0.5	1.0	14.5	7.2
1962	1.7	2.1	13.0	5.2	1.1	1.3	12.3	6.2
1963	1.9	2.6	14.8	5.2	1.4	1.5	14.9	6.5
1964	1.3	1.8	13.3	4.6	0.8	1.1	15.3	6.2
1965	1.1	1.6	10.4	4.0	0.7	0.9	13.7	5.5
1966	1.2	1.7	8.4	3.2	0.7	0.8	12.6	4.8
1967	2.6	2.8	10.7	3.1	1.3	1.1	16.1	5.2
1968	2.6	3.1	9.5	2.9	1.2	1.0	12.9	4.8
1969	2.7	3.1	8.9	2.8	1.1	0.9	11.0	4.7
1970	3.4	3.4	14.1	4.4	1.4	1.0	16.4	5.9
1971	5.4	4.5	14.6	5.3	2.4	1.3	16.7	6.9
1972	6.8	4.9	11.9	4.9	3.1	1.5	15.2	6.6
1973	3.3	3.5	9.9	4.1	2.0	1.1	13.8	6.0
1974	3.6	3.5	15.3	4.8	2.0	1.0	16.9	6.7
1975	7.4	5.2	18.6	7.9	5.3	1.9	19.0	9.3
1976	9.1	6.7	17.3	7.0	8.0	3.0	18.5	8.6
1977	9.6	7.0	—	6.2	9.4	3.8	—	8.2

SOURCE: British data kindly supplied by Peter Makeham of the Department of Employment from his forthcoming study of youth unemployment. For his basic findings see Department of Employment *Gazette*, August 1978. U.S.: *Employment and Training Report of the President, 1978*, tables B7 and A19.

NOTES: 1. *The British youth rates relate to July but exclude from the unemployed "unemployed school-leavers" (i.e., people under 18 who have never had a full-time job). This is to eliminate variation due to changes in school-leaving dates and dates of the unemployment count. If school-leavers are included the youth figures are males: 1959, 1.7; 1975, 9.8; females: 1959, 1.0; 1975, 7.4. Adult students are also excluded—there were very few of these till about 1975 when the National Union of Students began encouraging students to claim benefit (they are now no longer able to claim).

2. If British youth unemployment rates are measured in January (which is impossible for 1974 and 1975), they have similar year to year movements to this series but with the ratio of July to January rising secularly as the employment situation worsens.

3. U.S. rates are all-year rates.

Table 15.5 **Average Hourly Earnings of Manual Workers within Each Age Group as Percentage of Average Hourly Earnings of All Manual Workers in the Same Column 1976–77**

	Britain			U.S.	
Age	Males	Females	Age	Males	Females
Under 18	51	68			
18–20	76	90	16–19	56	74
21–24	96	100	20–24	82	97

NOTE: U.S. data relate to workers paid at hourly rates (including part-timers and students) in May 1976. British data relate to full-time manual workers in April 1977.

SOURCE: Britain: Department of Employment, *New Earnings Survey 1977*, pp. A18 and A19. U.S.: U.S. Department of Labor, B.L.S. *Weekly and Hourly Earnings Data from the Current Population Survey*, Special Labor Force Report 195, 1977, table 4.

well be that higher income leads to disproportionate reduction in working-time at the beginning of life. Otherwise it is difficult to explain why so many American parents are willing to support children who are not even looking for work.[12] It is hard to imagine such a phenomenon occurring in a much poorer country.

Turning to unemployment, we again find that the unemployment rate of youths relative to adults has an upward trend in the U.S.[13] This is consistent with the notion that the U.S./British differences may be partly a function of the difference in income levels,[14] with leisure in youth being more luxurious than leisure in middle age. However, the story is much more complicated than this, and, while arguing that income effects are a part of the story, I now turn to other possible explanations.[15]

15.1.3 Price Effects in Labor Supply: Social Security

Does social security help to explain the lower relative unemployment of adults in the U.S.? Quite possibly. For adults, the key variable is net income out of work relative to net income in work. This is much lower in the U.S. than in Britain. In Britain the average male replacement ratio is .75 for all those currently unemployed and .69 for those currently employed.[16] In the U.S. the best data I can find are Feldstein's, which relate to individuals aged 25 to 55 excluding labor force entrants and reentrants.[17] Nearly all of these were entitled to UI, which would not be true of many younger people nor of many labor force entrants and reentrants. Yet even for the relatively "privileged" group the average replacement ratio was .59 for the unemployed and .55 for the population as a whole. Thus the U.S. system is less generous than the British system to the adult unemployed.[18]

But the U.S. system is also of course less generous to youths (see appendix B). However, for youths it is not the income replacement ratio that matters. What matters is the *consumption* "replacement ratio," and, given the indulgence of American parents, this may be quite high.[19]

Thus the lower adult income replacement ratios in the U.S. are probably an important reason for relatively high youth unemployment rates. But it is sometimes suggested that in addition Aid to Families with Dependent Children (AFDC) claimed by the family head raises relative youth rates. The argument is this. In Britain a child not in school is treated as an independent economic unit, even if living with the family. Thus the income received by a single parent mother with dependent children will be independent of the work behavior of the older child. The fact that she is subsidized will have an income effect on the youth's behavior, but that is all. In the U.S., however, a single-parent mother on AFDC has her AFDC income reduced (at a two-thirds marginal tax rate) for any income earned by a child who contributes to the family expenses. This would set up a substitution effect against the child working as well as an income effect. Moreover, if AFDC is lost because of excessive family earnings, the family also loses its Medicaid privileges. However, one would expect the mother would normally say the youth did not contribute to family expenses.[20] In this case AFDC sets up a substitution effect in favor of the child's working, since the parent's earnings are taxed, the child's are not, and the child's and parent's leisure must be substitutes.

In any case, the data show clearly that welfare is not a major part of the teenage unemployment story. For in families where the head is not on welfare the ratio of unemployment to employment is 97% of the overall ratio (including those on welfare); for blacks the comparable figure is 88%.[21] I conclude that AFDC does not explain the high relative youth unemployment rate, but the lower level of adult benefits may help to explain the low relative level of U.S. adult unemployment.

15.1.4 Price Effects in Labor Supply: Age Limits for Apprenticeship

Labor supply is affected not only by the cost of being unemployed, but by the returns to being employed. For many British teenagers these returns are very high. To become a skilled worker you will generally have to serve an apprenticeship, and most apprenticeships have to be entered at the age of 16. Thus the discounted cost of not getting a job at 16 can be quite high. This helps to explain low unemployment rates *and* high participation rates for young males. It does not apply to young women, few of whom become apprentices. This may explain why the U.S./British age profiles of unemployment differ more for men than for women (see table 15.1).

In the more flexible U.S. situation, the youth market is less separated and less institutionalized than in Britain. It may be disadvantageous to be in a somewhat separated market in the face of business cycle variations in demand, but it may be an advantage to be separated when it comes to the

effect of exogenous increases in youth wages. This brings me to the question of the minimum wage.

15.1.5 Price Effects in Labor Demand

The U.S. has statutory minimum wages (identical for young and old) now covering most of the labor force. Britain only has statutory minimums in a few industries (mainly retailing and catering), though most other wages are covered by collective bargaining, which may also introduce rigidities into the structure.[22] However, in both statutory sectors and those covered by bargaining, youths and young women have special rates that are lower than those for adults.

It is difficult to draw any conclusions about the effects of minimum wages on relative youth unemployment by comparing the slope of British and American age-wage profiles, since so many *cetera* are not *para*. However, table 15.5 shows hourly earnings for manual workers of each age relative to the average for all ages. This does not suggest that on average American youths are relatively overpaid. As a further check, table 15.6 shows the average *weekly* earnings of youths relative to the all-age average. The median age of U.S. nonstudent workers aged under 25 is about 22, and British workers with comparable work experience are aged about 19. Again, it does not seem that young U.S. workers have higher relative pay than young British workers.[23]

But of course there is always the problem that we never observe the wage that would have been paid to those who do not get employed. The same problem arises when we look at the relation between the *distribution* of youth wages and the minimum wage. According to Ashenfelter and Smith, in the covered sector the proportion of workers aged 17–19 paid the federal minimum wage or less was only 8% in 1973 and 12% in

Table 15.6 **Average Weekly Earnings within Each Age Group as Percentage of Average Weekly Earnings of Workers of All Ages in the Same Column 1976–77**

	Britain		U.S.	
Age	Males	Females	Males	Females
Under 18	42	58		
18–20	63	78	59	80
21–24	84	96	59	80
25–29	98	116	89	104

NOTE: U.S. data relate to annual earnings of year-round, full-time workers. British data relate to weekly earnings of full-time employees in the survey week or month.

SOURCE: Britain: Department of Employment, *New Earnings Survey 1977*, pp. A18 and A19. U.S.: Department of Commerce, Bureau of the Census, *Current Population Report*, Series P–60 no. 114., *Money Income in 1976 of Families and Persons in the U.S.* 1978 pp. 203–4.

1975.[24] The proportion in the uncovered sector was about one-half in 1973, but this sector was small. Thus the fraction of employed workers who would have been paid less than the minimum wage is not enormous; and, in addition, for employed workers the minimum wage is not paid in about a third of such cases. However, against this we have not allowed for the possible employment effects of the minimum wage, which could have ejected many low wage workers from the population being observed. It is therefore interesting to compare the shape of the British and U.S. wage distribution for young people, to see whether the U.S. distribution looks as though it is missing its lower tail. For males, the lower quartile was about 80% of the median for both U.S. whites aged 16–19 and for British youths aged under 18 and 18–20,[25] providing no evidence of a reduced lower tail in the U.S. Unfortunately, the published figures do not permit a similar calculation for U.S. blacks. Given the good time-series evidence for the effect of minimum wages on youth employment and unemployment,[26] I am inclined to conclude that minimum wages may contribute a little toward the higher rates of white youth unemployment in the U.S. and a lot to the higher still rates of black youth unemployment.

15.1.6 Information: The British Careers Service

Finally, we consider an important institutional feature of the British youth labor market: the Careers Service. About 97% of school-leavers register with the Careers Service.[27] Most of them are interviewed by a Careers Officer while they are in school and about a quarter get their first job through the Service. The state apparatus makes much more effort to find jobs for school-leavers than it does for adults.[28]

The following shows the process by which school-leavers find jobs. Each year over 650,000 youngsters leave school before the age of 18, most of them in June and July. The number who had still not found jobs is as follows (figures given in thousands):[29]

	1974	1975	1976	1977	1978
September	33	118	142	166	131
October	13	65	78	93	76
November	8	40	n.k.	69	53
December	n.k.	32	48	54	40

Since the school-leaving age was raised to 16 (with effect from 1973), the vast majority of all school-leavers have been leaving at the age of 16. Yet the unemployment rate has been hardly any higher for people aged 16–17 than for those aged 18–19 or 20–24 (see table 15.3). This suggests a relatively successful initial absorption of school-leavers, but considerable problems arising after the first job is over.

15.2 Duration as an Indicator of the Cost and Distribution of Unemployment

We have not so far compared the economic cost of unemployment in Britain and the U.S. To assess the economic cost of a given *stock* of unemployment one needs to know how long it has lasted. The key statistic is the distribution of those currently unemployed by the length of time they have been unemployed to date (i.e., the distribution of "interrupted spells"). Since this is not universally agreed, I should perhaps first justify this focus on interrupted spells.

It seems reasonable to suppose that the value of additional leisure varies with the amount of leisure already experienced. Thus if we want to cost the unemployment experienced in a particular week we look at the amount of unemployment already experienced by the unemployed. If a person could produce W per week (gross) and values his t^{th} week's leisure at V_t, then the economic cost of the t^{th} week of unemployment is

$$C_t = W - V_t$$

Thus the total cost of unemployment per week is

$$(1) \qquad \sum_{t=1}^{\infty} N_t C_t = N \cdot \left(\sum_{t=1}^{\infty} \frac{N_t}{N} \cdot C_t \right)$$

where N_t are the numbers with t weeks unemployment experience and $N = \Sigma N_t$.[30] The significance of a given stock of unemployment (N) thus depends on the distribution of the interrupted durations (N_t/N).

This applies equally in a steady or a nonsteady state. However, for those who are naturally inclined to think of unemployment in terms of flows, there is of course an analogous expression which shows how in a steady state the significance of a given *flow* of unemployment (F) depends on the distribution of *completed* durations. Suppose F is the flow per period of entrants whose completed duration will be d periods, and T_d is the total cost of a completed spell lasting d weeks. Then the total cost per week in a steady state is

$$(2) \qquad \sum_{d=1}^{\infty} F_d T_d = F \cdot \left(\sum_{t=1}^{\infty} \frac{F_d}{F} \cdot T_d \right)$$

where $F = \Sigma F_d$. Most members of the public, however (and even most academics), have no idea what the flow into unemployment is, and it seems much better to focus on the average cost of the stock of unemployment rather than of the flow.[31]

To measure this average cost it is probably sufficient to concentrate on the mean spell length, at any rate on the assumption that unemployment is involuntary. For then, in the case of a person who has been unemployed so far for t weeks and who is normally paid his marginal product[32]

$$C_t = W - V_t = \frac{t}{52\varepsilon} W$$

where ε is the compensated elasticity of supply of annual weeks. The total cost relative to potential labor earnings is

$$u \frac{(\overline{tW})_U}{52\varepsilon} \frac{1}{\bar{W}_T}$$

where u is the unemployment rate, U relates to the unemployed, and T to the total labor force. If duration and wages are independent, this reduces to

$$u\bar{t}\left(\frac{1}{52\varepsilon} \frac{\bar{W}_U}{\bar{W}_T}\right)$$

Thus assuming the term in brackets to be similar in the U.S. and Britain, $u\bar{t}$ is a good index of the cost of unemployment relative to potential earnings.[33]

This index is shown in table 15.7. Since duration in Britain is generally twice as large as in the U.S. (at a similar point in the cycle), the relative cost is higher even though the rates are generally lower. This is why people in Britain tend to worry more about unemployment.

Another possible reason for being interested in the mean uncompleted duration is that it is also equal to the mean time that those currently unemployed will remain unemployed from now on.[34] The length of the uncompleted duration may thus give some idea of the plausibility of viewing workers as engaged in search rather than (as we have hitherto assumed) as being rationed. There certainly appears to be more search unemployment in the U.S. than in Britain.

Of course, if a given stock of unemployment is associated with a longer duration, this means not only that it is more costly but also that it is more unequally distributed. Fewer people will be experiencing more unemployment (if we ignore for the time being the problem of repeated spells). Table 15.8 gives some relevant figures for all age groups combined.[35] We find for 1972–77 an average male *completed* duration of about 7 weeks in the U.S. and 13 weeks in Britain, with corresponding differences in probability of an individual's becoming unemployed. These differences are consistent with the picture of a more mobile society in which all durations are shorter (job tenure, housing tenure, marital tenure). For example, the monthly turnover rate in manufacturing in 1977 was 3.8 in the U.S. and 2.1 in Britain.[36] However, in addition the shorter duration may be due to the fact that UI normally expires after some months. Public assistance may then be available at a much lower rate. In Britain, social security is in effect paid indefinitely, though at a lower rate after the first 26 weeks and a slightly lower average rate after a year.

Table 15.7 **Average Uncompleted Duration of Male Unemployment, and the Approximate Cost of Male Unemployment Relative to Potential Male Earnings**

Britain (July)	Average uncompleted duration (weeks) 1	Unemployment rate (%) 2	Approximate cost of unemployment relative to potential male earnings (index) 3 [= (2) × (1)]
1971	23.4	4.5	105
1972	27.8	4.9	136
1973	30.8	3.5	107
1974	26.4	3.5	92
1975	22.3	5.2	116
1976	26.5	6.7	177
1977	28.1	7.0	196
1978	29.5	6.7	197
U.S. (All year)			
1971	11.3	5.3	60
1972	12.0	4.9	59
1973	10.0	4.1	41
1974	9.7	4.8	46
1975	14.1	7.9	112
1976	15.8	7.0	110
1977	14.3		

SOURCE: Britain: Department of Employment *Gazette*, September 1978, p. 1049 and table 15.4 of this chapter. U.S.: G. Akerlof and B. Main, "Unemployment Spells and Unemployment Experience," Federal Reserve Board, Washington, D.C., Special Studies Paper no. 123, October 1978, and table 15.4 of this chapter.

NOTE: U.S. data assume duration to be the same for men as for men and women. This slightly understates duration (see table 15.12).

This reminds us that duration, though it may be the main determinant of the efficiency cost of a given unemployment rate, is not the only thing affecting the distributional consequences of unemployment. The social security system is probably more important. In the U.S., income out of work is lower relative to income in work than in Britain. Thus the disequalizing effect of unemployment is probably at least as high in the U.S. as in Britain. But it is relatively greater for adults than for youths, so far as consumption is concerned. Thus it is not obvious in the U.S. that there is any greater equity case for measures to relieve youth unemployment than adult unemployment. In fact, it is possible that the relative absence of measures to combat youth unemployment in the U.S., compared with Europe, can be explained by the comparatively low levels of income maintenance for adults in the U.S.

There is one obvious qualification, however, to be made to all of the preceding: the problem of repeated spells. If leisure in every week of one's life was a perfect substitute for leisure in every other period, the

efficiency cost of unemployment would depend on the amount of unemployment that each individual had had so far over his whole life. And the fairness with which unemployment was distributed would depend on the distribution of lifetime unemployment. But leisure in more closely adjacent weeks is in fact more closely substitutable than leisure in weeks more widely separated. So we could think of the efficiency cost as depending on the distribution of unemployment accumulated over a year, and equity also as depending on the distribution of annual unemployment. A key statistic is therefore the amount of repetition. Are the short U.S. durations associated with more repetition? Apparently not. Unfortunately, the only British data are available for 1971–72 (the highest postwar unemployment year before the oil price rise). In that year the average number of spells per unemployed person was 1.8—almost the same as in the U.S. in 1975, 1976 and 1977 (see table 15.9).

Finally, we can return to the basic question of section 15.1 and ask whether the higher U.S. youth unemployment (relative to adults) is due to higher relative flow or to higher relative duration. In table 15.10 the British duration figures (for January) overstate the relative duration of teenagers on an all-year basis (see table 15.11). It follows that the

Table 15.8 **Completed Duration of Unemployment (Weeks, Males)**

	Average completed duration (Weeks)	Probability of entering unemployment (% per week)	Unemployment rate (%)
Britain	1	2	3
1972	13	0.38	4.9
1973	10	0.35	3.5
1974	9	0.39	3.5
1975	14	0.37	5.2
1976	16	0.42	6.7
1977	17	0.41	7.0
U.S.			
1972	6.2	0.79	4.9
1973	7.0	0.59	4.1
1974	5.6	0.86	4.8
1975	9.1	0.87	7.9
1976	8.0	0.88	7.0
1977	7.2	0.86	6.2

SOURCE: Col. 1: 1. U.S. data from Akerlof and Main, (see table 15.8). They are got by applying the Salant method to the uncompleted durations. 2. The British data come from inflow data divided by stock data. *Department of Employment Gazette*, September 1978. They relate only to registered unemployment—most male unemployment is registered.

Col 3: Sources are *Employment and Training Report of the President* and Department of Employment *Gazette*.

Col 2: col. 3 divided by col. 1.

Table 15.9 **Distribution of Males Unemployed Sometime during a Twelve-month Period by Number of Spells**

	1	2	3	4–9	10+	All	Average number of spells
Britain June 71–72	66	20	7	5	2	100	1.8
U.S. Jan. 75–76	64	18		18		100	1.63
Jan. 76–77	61	19		20		100	1.67
Jan. 77–78	62	20		18		100	1.66

SOURCE: Britain: DHSS study of claimants cited in D. Metcalf and S. Nickell, "The Plain Man's Guide to the Out of Work" in *Selected Evidence submitted to the Royal Commission for Report no. 6, Lower Incomes*, London, HMSO, pp. 310–29. The data are derived from social security records. Retrospective questions from the General Household Survey in 1975, 1976, and 1977 suggest fewer repeated spells for men aged 18–64 but the retrospective nature of the question casts doubt on the replies. For the record the results were (for men aged 18–64)

	1	2	3+	All	Av. cumulated weeks
1975	85	10	5	100	19
1976	87	9	3	100	24
1977	83	13	3	100	23

See Office of Population Censuses and Surveys, *General Household Survey, 1977*, London, HMSO, p. 57.

U.S.: Bureau of Labor Statistics, *Work Experience of the Population*, Special Tabulations. Data exclude students. The average figure is based on the assumption that average spells in the 3+ category are 3.5, as normally assumed by the Bureau of Labor Statistics.

durations of youths in the U.S. are definitely higher relative to adults than they are in Britain. And indeed, for people aged 20–24 differences of duration alone seem to explain the higher relative unemployment rate.[37] For teenagers there is in addition a disproportionately high inflow into unemployment in the U.S., but this must be largely due to the high proportion of teenagers who have recently left school.[38]

15.3 British Time-series and Cross-section Analysis of Youth Unemployment[39]

In Britian youth unemployment has risen much more sharply relative to adult unemployment than in the U.S. Present ratios of youth to adult unemployment are totally without postwar precedent. But so is the level of adult unemployment (see table 15.4 and figure 15.1).[40] By contrast, in the U.S. recent high levels of unemployment are less without precedent and have proved shorter-lived. However, it seems that similar mechanisms explain the time series (and cross-sectional) variation of youth

unemployment in the two countries. Other things being equal, one would expect the youth unemployment rates to reflect (1) disequilibrium forces and (2) equilibrium forces, of the kinds discussed in section 15.1. Disequilibrium corresponds to the difference between effective supply and demand. One would expect that the demand for each type of labor would depend on output and on relative wages. Short-run changes in labor demand would not necessarily be proportional to changes in output. In fact, one would expect the demand for youths to be more responsive to the business cycle than the demand for adults, for two reasons. First, the simplest adjustment to a change in labor demand is to stop hiring, and hirings include a disproportionate number of youths. Second, the wages of youths include a higher fraction of capital expenditure than the wages of adults, and firms are averse to capital expenditure during slumps. Thus one could write the demand for youths relative to adults as

$$\frac{DY}{DA} = f(CYC,\ WY/WA)$$

where CYC indicates the cycle and WY/WA the wage of youths relative to adults. Building on this, one could approximate the unemployment rate of teenagers relative to adults (nonteenagers) by

Table 15.10 **Age Specific Indices (Male, Nonstudents; All Ages = 1.0)**

Britain (Jan. 1978)	Average completed duration (weeks) 1	Probability of entering unemployment (% per week) 2	Unemployment rate (%) 3
16–17	0.53	3.38	1.79
18–19	0.70	2.11	1.48
20–24	0.80	1.71	1.37
All ages	1.00	1.00	1.00
U.S. (1976)			
16–17	0.75*	5.41	4.06
18–19	0.75*	3.29	2.47
20–24	1.06	1.48	1.57
All ages	1.00	1.00	1.00

SOURCE: U.S.: Col. 1: K. Clark and L. Summers, "Labor Force Transitions and Unemployment," table 3. They get very similar results for 1974—and also for 1968–76 in chapter 7 of this volume, table 7.3.

Col. 3: *Employment and Training Report of the President, 1977.*

Col. 2: col 3 divided by col. 1.

Britain: Col. 1: col. 3 divided by col. 2.

Col. 2: Department of Employment *Gazette*, February 1978, p. 205.

Col 3: Department of Employment *Gazette*, March 1979, p. 262.

NOTE: *Separate figures not available.

Table 15.11 **Uncompleted Duration of Unemployment (Weeks)**

	Mean duration				Percentage unemployed over 13 weeks (Britain) 15 weeks (U.S.)			
	Britain		U.S.		Britain		U.S.	
	Jan. 1976	July 1976	Jan. 1976	July 1976	Jan. 1976	July 1976	Jan. 1976	July 1976
Males								
Under 18	13.6	6.9	10.3	6.0	41	11	21	11
18–19	16.6	18.0			44	42		11
20–24	19.5	22.5	14.9	10.0	48	51	30	29
All ages	25.4	26.5	15.9	12.3	56	54	32	29
Females								
Under 18	13.1	7.1	9.5	6.1	41	12	20	10
18–19	15.2	16.1			40	40		10
20–24	16.1	18.1	10.9	8.1	42	45	20	16
All ages	18.0	16.7	12.6	9.5	45	38	25	21
Aggregate unemployment rate								
Males	6.7		6.2					
Females	3.0		8.2					

SOURCE: Department of Employment, *British Labour Statistics Year Book*, 1976, table 113. Bureau of Labor Statistics, *Employment and Earnings*, July 1978, p. 32, and *Handbook of Labor Statistics*, 1977.

NOTES: 1. The British data relate to period registered at exchange; U.S. data relate to reported period looking for work.

2. U.S. data include students but other data suggest that, holding age constant, duration of students and nonstudents are similar.

$$(3) \qquad \ln\left(\frac{UY}{UA}\right) = a_0 + a_1\, CYC + a_2 \ln\left(\frac{WY}{WA}\right) + a_3 \ln\left(\frac{SY}{SA}\right)$$

where SY/SA are the relative labor supplies.[41]

In addition, equilibrium forces should be at work. Relative income support levels for the two groups should be important, but the Supplementary Benefit for a youth relative to an adult rarely had a t-value above unity. Equation (3) is therefore our estimating equation. The analysis is confined to males, since the rate of registered unemployment of adult females is particularly difficult to interpret.

Before presenting the results, we discuss briefly the explanatory variables and their movement over time.

15.3.1 The Cycle (VAC or UA)

This is probably best measured by the number of vacancies registered at employment offices (VAC). Alternatively, it can be measured by the

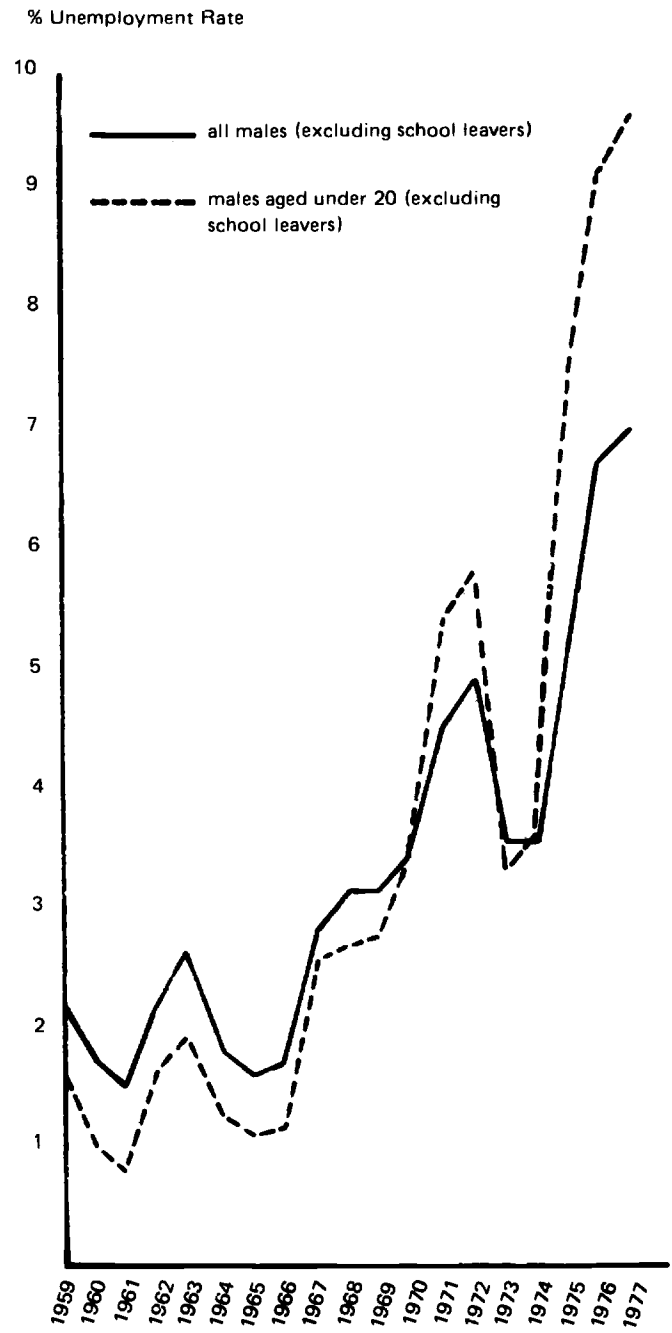

Fig. 15.1 Unemployment Rates of Males Aged under 20 (Excluding School Leavers) and All Males, 1959–76, July, Britain (Source: *Department of Employment Gazette*, August 1978)

adult male unemployment rate (UA), but we are then explaining youth unemployment by adult unemployment, which is a highly trended variable whose significance has probably altered over time. Vacancies are relatively untrended but have almost indentical turning points to adult unemployment (up to 1976).

15.3.2 Relative Wage Rates (RY/RA)

The hourly earnings of men under 21 relative to those over 21 are shown in figure 15.2. Relative youth earnings rose steadily up until 1972. Then in 1973 they shot up and have continued shooting up since. The main explanation seems fairly clear. The compulsory minimum school-leaving age was raised from 15 to 16 for everyone becoming 15 after September 1972. About a half of all children were forced to stay an extra year at school. This had an immediate effect on the quality of the teenage

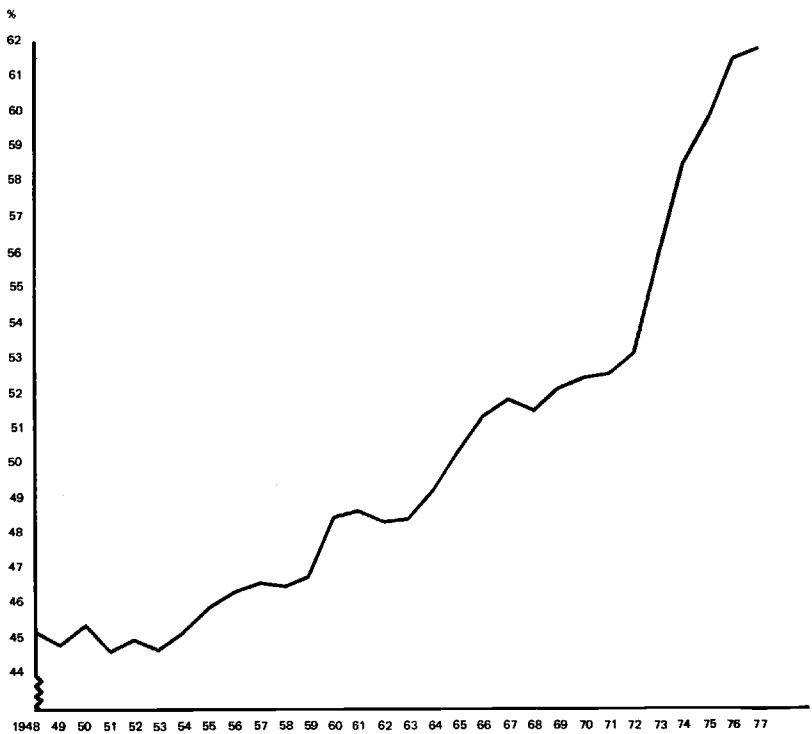

Fig. 15.2 Average Hourly Earnings of Youths and Boys Aged Under 21 as a Percentage of Adult Male Hourly Earnings 1948–76, Manual Workers, All Industries, Britain (Source: *Department of Employment Gazette*, October Earnings Survey)

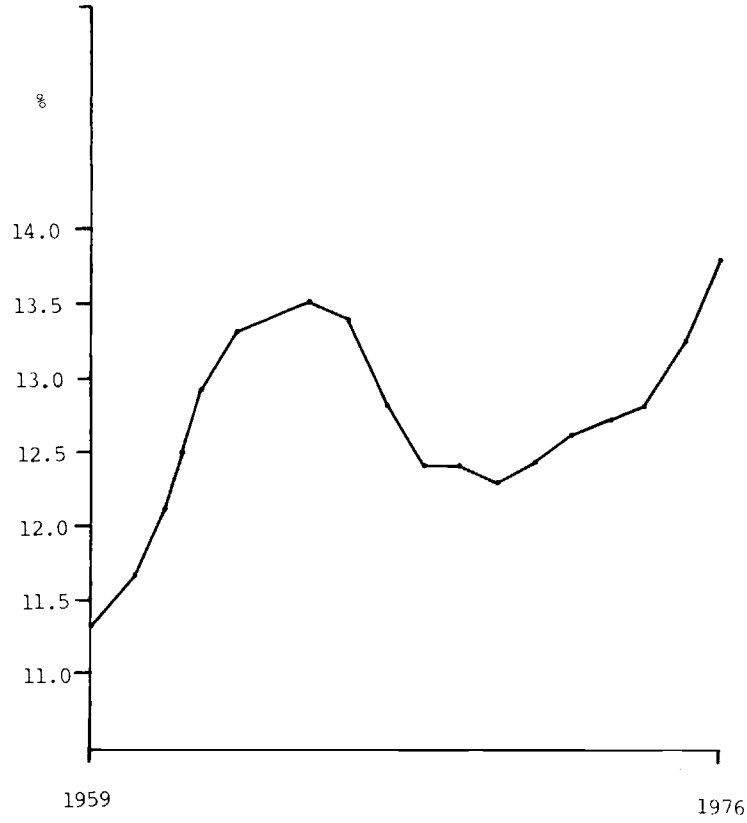

Fig. 15.3 Males Aged 15–19 as a Percentage of Males Aged 15–60, Britain (Source: Estimates Supplied by the Department of Employment)

workforce, but is unlikely to have raised its quality by more than 5% compared with the 16% wage increase that occured after 1972.[42]

So it is unclear why teenage earnings rose. If the earnings rise was due to changes in the balance of supply and demand, then one could hardly use it to explain movements in unemployment. This, however, does not seem to be the case. Let us begin with the period since 1972. Because of the raising of the school-leaving age there would of course have been a reduction in the number of teenage ergs at work (relative to adults) of perhaps 10%. However, as figure 15.3 shows, the teenage population rose between 1972 and 1976 by 10%—just enough by that date to offset the effect of the raised school-leaving age. And in any case a raised school-leaving age would not create much marked shortage of youths at existing wages if people in their early twenties were good substitutes for teenagers. So I am willing to accept the conventional view that youth

wages have risen because of an unexplained tendency in collectively bargained wage agreements to start paying adult rates at ever younger ages.[43]

There is also the puzzle of the rise in relative youth earnings before 1972. Could this be due to quality improvement? During the period, the proportion of youngsters who stayed on rose continuously. This staying-on, if independent of ability levels, would raise quality whether the extra staying-on was voluntary or compulsory. However, the voluntary staying-on was in fact selective. So the average "natural ability" of the teenage work force declined as the abler people reduced the fraction of their teenage years spent in the labor force more rapidly than the less able people did. One cannot quantify this effect, but there seems no obvious reason to reject the null hypothesis that the quality of the teenage work force remained constant relative to the adult work force (which was itself improving in quality). Thus one would expect the series in figure 15.2 (including the dotted section) to help to explain relative teenage unemployment. Further confirmation of the power of this series to explain teenage employment is provided in section 15.4.

15.3.3 Relative Labor Supply (*POPY/POPA*)

There are two possible ways of measuring demographic movements: (1) the fraction of the total population aged 15–60 who are aged 15–19 (*POPY/POPA*), shown in figure 15.3; (2) the fraction of the total labor force aged 15–19.[44] The second of these appears to reflect more accurately the labor supply of teenagers, but is subject to two drawbacks. First, if teenage labor supply is reduced (for example by the raising of the school-leaving age) one would not necessarily expect less teenage unemployment if people in their early twenties are close substitutes for teenagers. In fact the youth labor market may be better considered as a market for people in their first five years of work experience. In such a case variable (1) is more relevant.[45] Second, labor supply may respond to unemployment, whereas population is exogenous. I therefore use variable (1).

One must of course remember that over time the teenage labor force (whose unemployment we are studying) has got increasingly close to the time when it left school. This means that its members have had less time for a successful job-search and job-matching. One might suppose this would have produced an upward trend in relative youth unemployment, but no such trend appears in the regressions. However, as table 15.3 shows, the youth unemployment problem is not primarily one of initial absorption, so this may not be an especially important aspect of the situation.

Turning to the results, these are estimated on annual data (males only). As table 15.12 shows, the effect of the cycle is transparent. The youth unemployment rate goes up relative to the adult unemployment rate

Table 15.12 Time-series Regressions (All Variables in Logarithms), Britain

Dep. Var.	Period	*VAC*	*UA*	*WY/WA*	*POPY/POPA*	Const.	R^2	*DW*	*SE*
UY/UA	59–72	−.54		4.62	1.29	−18.7	.96	2.63	.048
		(.06)		(.52)	(.40)				
UY/UA	59–74	−.50		5.01	1.43	−20.7	.96	2.55	.046
		(.05)		(.43)	(.40)				
UY/UA	59–76	−.38		4.07	.42	−15.1	.93	1.49	.071
		(.06)		(.41)	(.43)				
UY/UA	59–72		.40	1.52	1.64	−10.1	.94	2.11	.060
			(.06)	(.88)	(.52)				
UY/UA	59–74		.43	.60	1.46	− 6.5	.91	1.88	.066
			(.06)	(.70)	(.53)				
UY/UA	59–76		.38	.71	.96	− 5.7	.93	1.90	.073
			(.07)	(.69)	(.40)				

NOTE: Standard errors in brackets. All regressions estimated by Cochrane-Orcutt procedure; the Hildreth-Liu procedure gave very similar results.

during a slump. In fact, it rises 40% faster than the adult unemployment. Given that the youth unemployment rate is on average over the period close to the adult rate, it follows that youth employment falls in a slump faster than adult employment falls. The estimated effect is robust with respect to the other included variables, but falls as the sample period is extended forwards. This is because youth unemployment in 1976 was much lower than predicted by any equation. Since all our exploratory variables have high values in 1976, their estimated coefficients all fall when that year is included.

The estimated effect of relative wages seems to vary in addition according to how demand is specified, though it is always positive and reasonably significant. If, as I prefer, demand is measured by vacancies, the effect of relative wages is very large—with an elasticity of 4–5. In this case, relative wages are being made to explain most of the time trend in *UY/UA*. If, instead, adult unemployment is the explanatory variable, then it itself picks up a part of the time trend in *UY/UA*. By contrast, the effect of population size is unaffected by which demand variable is included.

One can therefore conclude that there is nothing surprising about recent high levels of youth unemployment. The world is still the same, except that we are in a protracted slump.

15.3.4 Cross-section of Towns

It is interesting to compare the time-series relation between youth and adult unemployment with the cross-sectional relation. In a cross-section of towns, one would expect the youth unemployment rate to vary posi-

tively with the adult unemployment rate. But one would also expect the elasticity of the youth rate with respect to the adult rate to be lower in the cross-section than in the time-series. For over time youths are not hired in a downturn, whereas in a "steady state" it is not obvious that a bad economic climate would affect youths more than adults. Indeed, since youths can more readily migrate, one might expect the youth rates (for the current work force) to vary less than the adult rate. One cannot of course claim that the 1971 data for 78 county boroughs (towns) represented a completely "steady state," however defined. Even so, the cross-sectional structure of unemployment rates has been fairly stable.

The data support our prediction: the cross-section elasticity of the youth rate with respect to the adult rate is only .6, compared with 1.4 for the time-series. The exact estimate is (s.e. in parentheses)

$$\ln UY = 1.19 + \underset{(.06)}{.61} \ln UA \qquad R^2 = 0.61$$

where youths are teenage men as before and adults are men aged 25–59. Adding as a variable the relative supply of youths does not appear to add significantly to the explanatory power of the equation.

15.4 Time-series Analysis of the Demand for Labor by Age in British Manufacturing

Finally, we can examine whether wage movements are a plausible explanation of relative unemployment rates by looking at the effect of relative wages on the age composition of employment (rather than unemployment). The only available data on labor demand by age in Britain relate to manual workers in manufacturing, which I take to be a price-taking sector. I use data for April and October in the years 1949–69, on the man-hours of youths (males under 21), girls (females under 18), men, full-time women, and part-time women, together with associated hourly earnings.

The series are worth a brief description. Taking youths first, there was an increase in employment (relative to men) lasting into the 1960s, followed by a relative decline that began well before the raising of the school-leaving age in 1972. By contrast, the relative wage rose more or less continuously relative to men, as we have already seen. The number of girls employed (again relative to men) fell more or less continuously, indicating that the rise in the number of boys in the mid-sixties cannot be simply explained by the rise in the number of young people in the labor force resulting from the postwar baby boom. The relative wage of girls was more or less flat until it surged in the 1970s because of the forces already mentioned plus equal pay legislation for females. The relative employment of women has fallen more or less continuously, with the rise

in part-time women-hours insufficient to compensate for the fall in full-time women-hours. Relative wages of women were more or less flat until a recent spurt, which was due partly to equal pay legislation.

To assess the effect of wages on labor demand requires a fully specified demand system. The most tractable general system is that derived from the translog cost function. In using this I shall not attempt to explain the pattern of investment and will therefore take the capital stock as a predetermined variable (K) affecting labour costs (C). If P_i is the price of the i^{th} type of labour, T is time, and Y is output, the cost function is then

$$\begin{aligned}\ln C = {} & a_0 + \Sigma g_i \ln P_i + g_K \ln K + g_T T + g_Y \ln Y \\ & + \tfrac{1}{2}\Sigma\Sigma d_{ij} \ln P_i \ln P_j + \tfrac{1}{2} d_{KK} (\ln K)^2 \\ & + \tfrac{1}{2} d_{TT} T^2 + \tfrac{1}{2} d_{YY} (\ln Y)^2 + \Sigma d_{iK} \ln P_i \ln K \\ & + \Sigma d_{iT} \ln P_i . T + \Sigma d_{iY} \ln P_i \ln Y \\ & + d_{KT} \ln K . T + d_{KY} \ln K \ln Y + d_{TY} T \ln Y\end{aligned}$$

where $d_{ij} = d_{ji}$ (assuming the function is thought of as a Taylor's series expansion of a general log-cost function).

If x_i is the quantity of the i^{th} type of labor,

$$\frac{\partial C}{\partial P_i} = x_i, \qquad \text{so that} \qquad \frac{\partial \ln C}{\partial \ln P_i} = \frac{x_i P_i}{C}$$

or the share of the i^{th} factor in total labour cost (C). Hence differentiating $\ln C$ by $\ln P_i$ we find that

$$\frac{x_i P_i}{C} = g_i + \sum_j d_{ij} \ln P_j + d_{iK} \ln K + d_{iT} T + d_{iY} \ln Y \qquad \ldots (i = 1, \ldots, n) \tag{4}$$

Since shares do not vary when all prices change by a common multiple,

$$\sum_j d_{ij} = 0 \qquad \text{(all } i\text{)} \tag{5}$$

Hence[46, 47]

$$\frac{x_i P_i}{C} = g_i + \sum_{j=1}^{n-1} d_{ij} (\ln P_j - \ln P_n) + d_{iK} \ln K + d_{iT} T + d_{iY} \ln Y \qquad (i = 1, \ldots, n) \tag{4'}$$

where n is some factor taken as numeraire. Moreover, since shares add to a constant (unity),

$$\sum_i d_{iK} = \sum_i d_{iT} = \sum_i d_{iY} = 0 \tag{6}$$

Hence one need only estimate $(n - 1)$ equations for $(n - 1)$ shares. This is our estimating system, with the requirement that $d_{ij} = d_{ji}$ imposed upon it. The Allen elasticities of substitution are then evaluated as[48]

$$S_{ii} = \frac{d_{ii}}{A_i^2} + 1 - \frac{1}{A_i}$$

$$S_{ij} = \frac{d_{ij}}{A_i A_j} + 1 \qquad (i \neq j)$$

where $A_i = x_i P_i / C$ evaluated at the mean. The price elasticities of demand (with output and capital constant) are

$$e_{ij} = S_{ij} A_j$$

15.4.1 Estimates

System (4′) was estimated using the TSPs iterative version of Zellner's minimum distance estimator (LSQ) (see table 15.13).[49] The variables are defined in appendix C. Unfortunately, we have no data on nonmanual workers, so the assumption is that the relative demand for manual workers of different age and sex is independent of the number of nonmanual workers. Part-time women were amalgamated with full-timers in order to reduce the number of parameters.[50]

The results suggest a quite high short-run elasticity of demand for youths (1.25), and a smaller elasticity of demand for girls. There is quite high substitutability between categories of labor (except, rather oddly, between girls and women). Girls are very good substitutes for youths, and women are less good substitutes. As one would expect, youths and

Table 15.13 **Demand Elasticities and Elasticities of Substitution, Britain**

		Youths	Girls	Women	Men
e_{ij}	Youths	−1.25	.29	.50	.47
	Girls	.82	−.31	−.85	.34
	Women	.12	−.07	−1.59	1.55
	Men	.02	.01	.32	−.35
S_{ij}	Youths	−33.6	22.1	3.1	.6
	Girls	22.1	−23.5	−5.3	.4
	Women	3.1	−5.3	−9.9	2.0
	Men	.6	.4	2.0	−.4
t-ratio	Youths	5.8	2.5	1.8	1.3
	Girls	2.5	.9	2.0	.7
	Women	1.8	2.0	10.5	9.5
	Men	1.3	.7	9.5	9.2

NOTE: 1. The elasticities are for given capital and output. The *t*-ratios apply equally to e_{ij} and s_{ij}.

2. In the equations for A_Y, A_G and A_W the implied values of DW and R^2 were as follows:

	A_Y	A_G	A_W
R^2	.96	.92	.92
DW	1.11	1.87	.90

girls are not good substitutes for men, women being rather better substitutes. None of the effects of capital, output, or time were well-determined.

It is interesting to compare these findings with results obtained in the U.S. by Anderson and by Freeman.[51] Anderson used four factors in a translog production function for manufacturing: capital, and workers aged under 25 (Y), 25–55 (M), and over 55 (O). The implied price elasticities (with capital variable) were

	Y	M	O
Y	−2.5	1.9	.6
M	.3	−1.0	.4
O	.3	1.7	−2.7

Freeman used four factors in a translog production function for the whole economy: capital, men 20–34 (Y), men 35–64 (M) and women 20–64 (W). The implied price elasticities (with capital variable) were

	Y	M	W
Y	−2.1	1.6	.2
M	.8	−1.2	.3
W	.3	.9	−1.3

Though the U.S. elasticities seem somewhat higher, any difference is probably due mainly to the fact that capital is variable and that definitions differ. Given the weight of evidence on price effects, one has some confidence in supposing that youth wages are highly relevant to the problem of youth unemployment.[52]

Appendix A

Sources to Tables 15.1 and 15.2

SOURCE: Britain: 1971 Census, Economic Activity, table 3.
U.S.: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Detailed Characteristics, Final Report, PC(1)-D1, U.S. Summary, table 217.

NOTES: 1. Britain relates to 24 April 1971; U.S. relates to 1 April 1970. U.S. (W) relates to whites and U.S. (B) to blacks.
2. Nonstudents in Britain include part-time students; in the U.S. they do not. In Britain a student is someone who will be studying in the following April/May term; in the U.S. a student is someone who has studied at all since 1 February.

3. The labor force is the employed (defined identically) plus the unemployed. The employed labor force includes those who worked at any time for pay or profit during the week (including unpaid family work) plus those temporarily away from their job because of holiday, sickness, or industrial dispute. In Britain, unlike the U.S., temporary layoffs are treated as employed, but the maximum number of such people since 1973 has been 34,000 and the usual number is under 10,000.
4. In Britain, the unemployed include those persons currently "seeking work or waiting to take up a job." In the U.S., the unemployed include all who have looked for work in the last 4 weeks *or* due to take up a job within a month, *or* on temporary layoff. The unemployed include those looking for part-time work, in both countries.

Appendix B

Income Maintenance for Young People

Income if unemployed as a fraction of income in full-time work is probably higher for youths relative to adults in Britain than in the U.S. A registered unemployed British youth, even if he or she has never worked and is living at home, can claim Supplementary Benefit. This is currently paid to someone living at home and aged 16 to 17 at a rate equal to about 30% of gross male weekly earnings at that age (and a higher percentage of net earnings). With a minimal work record an 18 or 19 year old can claim unemployment benefit equal to about 30% of the equivalent gross male earnings. About two-thirds of unemployed youths under 18 in Britain personally receive social security payments.[53]

In the U.S. it is more difficult for a youth to obtain benefit in his own right. Only 11% of those unemployed under twenty (out of school and looking for full-time work) were on U.I. in May 1976. In some states other youths would be receiving personal welfare payments, but there is no comprehensive information on the numbers.

Appendix C

Definitions of Variables in Section 15.4

P Hourly earnings: from survey of Earnings and Hours of Manual Workers in Manufacturing in April and October (to 1969) and October (1970 onwards).

X Manual manhours: from the same source.
K Fixed assets in manufacturing. Gross value at constant prices (replacement cost). The series is rebased a number of times over the period and I have grafted one series onto the next.
T Time (1 unit = 6 months; April 1948 = 1).
Y Index of manufacturing production (this is a value-added measure).

Notes

1. See Richard B. Freeman in this volume, table 5.6.

2. The General Household Survey is too small for disaggregated comparisons with the Current Population Survey; the EEC Labour Force Survey only occurs every two or three years.

3. The Census excludes full-time students in Britain, so students (including part-time students) have been excluded in the U.S. However, the age-specific unemployment rates of students in the U.S. are broadly similar to those of nonstudents.

4. A commonly used statistic in international comparisons is the percentage of the unemployed aged under 25. This is, however, very difficult to interpret since it reflects both the age pattern of leaving school and the demographic structure of the population, as well as the unemployment rates specific to given years since leaving school. The figures are:

	Men		Women	
	Britain (1971)	U.S.A. (1970)	Britain (1971)	U.S.A. (1970)
% of unemployed aged under 25*	31	30	34	31
% of labor force aged under 25*	20	11	25	19
% of population aged 16–64 who are aged under 25	22	27	21	26

*Excluding students

5. One should ignore the figure for unemployed 15 year olds in Britain, since nearly all 15 year olds in the labor force had left school a month before the Census.

6. See U.S., Department of Labor, Bureau of Labor Statistics, *International Comparisons of Unemployment*, Bulletin 1979, 1978, p. 19.

7. A formula which would adjust the British aggregate rate so that in 1976 British aggregate adjusted rate − U.S. aggregate rate = British prime male rate − U.S. prime male rate would be to multiply the British aggregate rate by 1.5. The multiple would of course differ between years.

8. It is also "boosted" by the inclusion of unemployed students (some 14% of U.S. unemployed). Such people cannot be included when other countries are adjusted to U.S. concepts because of lack of data (and the absence of any large number of such people). Including them raises the U.S. rate by a multiple of between 1.05 and 1.10.

9. At any rate this is the broad effect of family income on *employment* reported in table 5.8 of Freeman's chapter in this volume and table 13.1 of the chapter by Rees and Gray. (Rees and Gray also report no effect of father's occupation holding constant family income.)

10. In addition in 1970/1 of *employed* males under 20 not in school 21% in the U.S. worked part-time (under 35 hours) compared with under 7% in Britain. (There were few differences here for women.) However some of the part-timers may have been looking for full-time jobs. (Source: Britain, 1971 Census Economic Activity table 23; U.S., as for table 15.2).

11. *Employment and Training Report of the President, 1978*, pp. 242 and 186–88.

12. C.P.S. analyses by D. Ellwood and M. Feldstein show that of males under 20 out of school and out of the labor force, only 37% say they would definitely like a job, and of these only 37% are not looking because they do not think they could find one. Of the whole group (males under 20 out of school and out of labor force) 28% say they will not look for work in the next 12 months (or their intentions are so reported).

13. See Freeman's paper in this volume, table 5.6.

14. I would explain the fact that individual youth unemployment is negatively correlated with income by the same type of expression as used to explain individual youth participation in the labor force.

15. Not all differences found in cross-sectional data for individuals are found repeated in a comparison of U.S. and Britain.

(a) The hours of work of full-time workers are not lower in the U.S. (1977): for men 43 hours in Britain and 45 in the U.S., and for women 38 hours in Britain and 40 in the U.S. (see Department of Employment, *New Earnings Survey*, 1977, p.A18–19 and Bureau of Labor Statistics, *Employment and Earnings*, July 1978, vol. 25, no. 7, p.39).

(b) Female participation is higher in Britain than the U.S.

16. R. Layard, D. Piachaud and M. Stewart, *The Causes of Poverty*, Royal Commission on the Distribution of Income and Wealth, Background Paper no. 5, London, HMSO, 1978, and S. J. Nickell, "The Effect of Unemployment and Related Benefits on the Duration of Unemployment," *Economic Journal*, March 1979.

17. M. Feldstein, "The Effect of Unemployment Insurance on Temporary Layoff Unemployment," *American Economic Review*, December 1978.

18. The previous comparison is complicated by two factors. First, Feldstein's figures include women but he also shows a figure of .54 for the subsample of (predominantly male) union members. Second, his figures are individual income replacement ratios and ours are family income replacement ratios. On average, women's earnings account for under one-fifth of family income so the British individual income replacement ratios for all males could not be as low as the U.S. ratios for "privileged" males. (Most international comparative statistics on unemployment relief fail to mention the British Supplementary Benefit system which determines the income maintenance levels of 50% of the unemployed, compared with 30% whose income maintenance is determined by National Insurance).

19. A youth in a family characterized by an altruistic head does not face the full cost of his actions. If he decides his own labor force behavior, he may make choices which do not maximize family income.

20. She is unlikely to say this if the youth is under 18, for if the youth is under 18, the AFDC entitlement includes a child allowance only payable (for a nonstudent) if the child is working or registered unemployed. This constitutes a strong pressure to participate (though not to take a job). But under a quarter of unemployed teenagers out of school are under 18.

21. 1975 Survey of Income and Education analysis by R. Freeman. Data relate to 18–19 year old males.

22. Seventy-five percent of men are covered.

23. Another approach is to look at the shape of estimated experience-earning profiles. If male annual earnings are regressed on schooling, experience and experience squared, earnings at the peak are 280% higher than starting earnings in Britain and 288% higher in the U.S. (G. Psacharopoulos and R. Layard, "Human Capital and Earnings: British Evidence and a Critique," *Review of Economic Studies*, 3 (1979):485–508; J. Mincer, *Schooling, Experience and Earnings*, 1974.)

24. O. Ashenfelter and R. Smith, "Compliance with the Minimum Wage Law," *Journal of Political Economy* 2 (1979):333–50.

25. Department of Employment, *New Earnings Survey*, 1977, table 126. For U.S., as in table 15.5.

26. See, for example, J. Mincer, "Unemployment Effects of Minimum Wages," *Journal of Political Economy* 4 (1976):S87–S104.

27. Formerly known as the Youth Employment Service, this is run by local education authorities and has primary responsibility for the placement of school leavers. Twenty-two percent of a random sample of 3,000 16 to 19 year olds interviewed in November 1976 said they got their first job through the Careers Service (Manpower Services Commission, *Young People and Work*, Manpower Studies no. 19781, 1978). Even for those who have already worked, the Careers Service remains the main public employment agency up to the age of 18. Even though they are entitled to use the Employment Services Agency, only 20% of the registered unemployed under 18 who had worked were registered with the E.S.A. (House of Commons Expenditure Committee: Social Services and Employment Sub-Committee Enquiry into Employment and Unemployment in the New Unemployment Situation. Second Memorandum Submitted by the Department of Employment, 1978. par. 27.)

28. For a useful comparison of placement services in Britain, U.S., and some other countries, see U.S. Department of Labor, Employment and Training Administration, *From Learning to Earning: A Transnational Comparison of Transition Services*, R and D. Monograph 63 (abridged version of a report by Beatrice G. Reubens).

29. Department of Employment, *Gazette*, regular statistics. Relate to number of school-leavers registered as unemployed. A "school-leaver" is anyone under 18 who has never had a full-time job. From January 1961 to January 1975 the number of unemployed people under 18 who had not yet found a first job by January never rose above 10,000 in any year. In January 1976 it was 38,000.

30. I am assuming unemployment always lasts a whole number of weeks.

31. Expressions (1) and (2) are of course equivalent in a steady state since

$$\begin{aligned}\sum_{d-1}^{\infty} F_d T_d &= \sum_{d-1}^{\infty} \left(F_d \sum_{t=1}^{d} C_t\right)\\ &= (F_1C_1 + F_2(C_1 + C_2) + F_3(C_1 + C_2 + C_3) + \ldots\\ &= C_1(F_1 + F_2 + F_3 + \ldots) + C_2(F_2 + F_3 + \ldots)\\ &\quad + C_3(F_3 + \ldots) + \ldots\\ &= \Sigma C_t N_t\end{aligned}$$

$$\text{since } N_t = \sum_{d=t}^{\infty} F_d$$

32. This assumes no repeated spells in a year. If a worker's annual weeks are held to $|\Delta H|$ below their equilibrium level, the compensated supply price falls from W to V where

$$W - V = \frac{dW}{dH}\,|\Delta H|$$

Hence

$$W - V = \frac{dW \cdot H}{dH \cdot W} \cdot \frac{|\Delta H| W}{H} = \frac{1}{\varepsilon}\,\frac{|\Delta H| W}{H}$$

The procedure also ignores the existence of income and product taxes (which means that the cost of unemployment is higher than we have measured it).

33. Since replacement ratios are higher in Britain than the U.S., ε may also be higher. See R. Jackman and R. Layard, "The Efficiency Case for Long-Run Labour Market Policies," *Economica* 47 (1980):331–50.

34. See S. Salant, "Search Theory and Duration Data: A Theory of Sorts," *Quarterly Journal of Economics* 91 (1977):39–57.

35. The U.S. duration figures are taken from Akerlof and Main since Clark and Summers's figures do not reflect short spells beginning and ending between CPS interviews. (The Clark and Summers's figures are 9.4 for 1974, and 11.3 for 1976, see K. Clark and L.

Summers, "Labor Force Transitions and Unemployment," NBER., mimeo, April 1978). However, I rely on the Clark and Summers's finding of almost identical durations for men and women in assuming that Akerlof and Main's figures for both sexes also apply to men.

36. *Employment and Training Report of the President*, 1978, p. 275 and *Department of Employment Gazette*, May 1978, p. 577. It would be interesting to compare the distribution of establishments by their annual changes in employment, in order to see to what extent the labor turnover reflects demand-side as opposed to supply-side forces.

37. There is some evidence that in the U.S. and Britain the number of repeated spells is similar at all ages. For Britain the evidence comes from the Department of Health and Social Security Pilot Study on New Methods of Collecting Unemployment Statistics, 1971–72, unpublished. (See also, S. Owen, "Do the Faces in the Dole Queue Change?" University College, Cardiff, mimeo, summer 1978.) U.S. data are special tabulations relating to nonstudents and show average numbers of spells in 1971 of 1.83 for men aged 16–19 and 1.72 for men aged 20–24.

38. In both countries, of course, the inflow of youths into unemployment is much higher than of adults, though, perhaps interestingly, the difference in Britain seems rather less than the differential turnover rate. The percentage of employees who have been with their current employer for less than 12 months is (April 1976)

	Under 18	18–20	21–24	25–29	30–39	40–49	50–59	All
Males	57	21	20	14	10	6	4	11
Females	60	25	21	16	15	9	5	16

(New Earnings Survey)

39. This whole section is based on data generously supplied by Peter Makeham of the Department of Employment from his forthcoming study of youth unemployment, summarized in Department of Employment Gazette, August 1978. Full details of the time-series sources are available in the Technical Annex to his article in the Department of Employment Gazette, August 1978, obtainable from the Department of Employment. The following definition is important. Unemployment rates are measured in July but exclude school-leavers in order to avoid problems to do with changes in school-leaving dates. Adult students are also excluded. The cross-section data are based on the 1971 Census table 18, unemployed rates being measured by total out of employment as percentage of all economically active.

40. The same has happened in France and Germany (see H. Gallis, "Youth Unemployment: A Statistical Analysis," EMP 47–1/WP 2, I.L.O. Oct. 1977).

41. Since UY and UA are small

$$\frac{UY}{UA} \simeq \ln\left(\frac{SY}{DY}\right) / \ln\left(\frac{SA}{DA}\right)$$

But in addition, since UY/UA is not far from unity

$$\ln\left(\frac{UY}{UA}\right) \simeq \frac{UY}{UA} \simeq \ln\left(\frac{DA}{DY}\right) + \ln\left(\frac{SY}{SA}\right) = f\left(\frac{WY}{WA}\right) + \ln\left(\frac{SY}{SA}\right)$$

with $f' > 0$.

42. The estimate of 5% is based on a simple calculation in which all teenage workers are assumed to have left at the minimum age but to experience a 10% increase in earnings for each year of work experience. An extra year of schooling is also assumed to add 10% to wages. Hence in a steady state the initial teenage work force has five age groups earning 1, 1.1, 1.2, 1.3, and 1.4 units respectively and the new teenage workforce has four age groups earning 1.1, 1.2, 1.3, and 1.4 respectively. This gives a 5% rise in earnings, which is too high since only a half a cohort were forced to stay on. Unfortunately, no more subtle exercise is worthwhile since there is no fine breakdown of teenage wages by age, let alone by age and education. The best data are in the source to table 15.5.

43. Insofar as unemployment affected pay, I assume the relationship has a lag so that current pay is predetermined.

44. See for example Department of Employment *Gazette*, April 1978, p. 427.

45. It might be better still to measure the fraction aged $(15 + D)$ to $(19 + D)$ where D is unity from 1973 onwards and 0 before.

46. If there were no other factors of production, constant returns would require

$$d_{iK} + d_{iY} = 0$$

But, as we are omitting nonmanual workers from the demand system (for lack of information) there is no virtue in imposing this constraint.

47. A more complete system would include equations for $\partial \ln C/\partial T$, $\partial \ln C/\partial \ln K$ and $\partial \ln C/\partial \ln Y$ but there are no measures of these variables that do not require making very strong assumptions.

48. See H. Binswanger, "A Cost Function Approach to the Measurement of Elasticities of Factor Demand and Elasticities of Substitution," *American Journal of Agricultural Economics*, May 1974.

49. To reduce the autocorrelation of residuals, the system was estimated as follows:

$$\begin{aligned} A_i = {} & g_i + \Sigma d_{ij}(\ln P_j - \ln Pn) + d_{iK} \ln K + d_{iT} \cdot T \\ & - \rho(g_i + \Sigma d_{ij}(\ln P_{j,-1} - \ln P_{n,-1}) + d_{iK} \ln K_{-1} \\ & + d_{iT} \ln T_{-1} + \rho A_{i,-1} \end{aligned}$$

Here ρ is the autocorrelation coefficient in the equation

$$u_i = \rho u_{i,-1} + e_i$$

It has to be constrained to be the same for all i in order to ensure that the factor shares add up to unity.

50. Up to 1956 I have to assume part-time woman-hours to be proportional to full-time, and part-time hourly earnings to be proportional to full-time.

51. J. M. Anderson, "Substitution among Age Groups in the U.S. Labor Force," Williams College, mimeo, December 1978; R. Freeman, "The Effect of Demographic Factors on Age-earnings Profiles," *Journal of Human Resources*, Fall 1979. For a full discussion of these and other related studies, see D. Hamermesh and J. Grant, "Econometric Studies of Labor-Labor Substitution and their Implications for Policy," Michigan State University, mimeo.

52. The model reported here includes no adjustment mechanism. But I have also estimated the model with $\ln P$ replaced by $.5 \ln P + .33 \ln P_{-1} + .17 \ln P_{-2}$. The estimated price elasticities were very similar. However, I am currently, with John Abowd and Stephen Nickell, estimating a fuller model which includes a fully specified adjustment mechanism and distinguishes between people and people-hours.

53. Department of Employment, *British Labour Statistics Year Book, 1976* table 119.

Comment

Daniel S. Hamermesh

Clearly, the high points of Layard's chapter are the simple comparisons of the *outcomes* in the youth labor markets of the U.S. and Great Britain. He presents evidence corroborating the now familiar point that youth unemployment is relatively higher in the U.S. He then goes on, though,

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to present new material bolstering this simple empirical fact. We learn, for example, that spells of unemployment among American youths, though shorter than those in the U.K., are longer relative to adult spells of unemployment. Thus part of the explanation of the higher relative youth unemployment rate in the U.S. is the relatively greater length of spells experienced by young people. He points out, too, using both cross-section and time-series data, that the relative youth unemployment rate in Britain rises as aggregate unemployment increases (or job vacancy rates decrease). Similarly, he shows convincingly that the demand for young workers is quite elastic.

The presentation of these facts alone more than justifies the chapter and makes it an important catalyst to our thinking about the nature of the labor market for youths. However, we should be careful attributing the causes Layard identifies to the outcomes he observes. There are two related areas where this is especially important. Layard stresses the role of demand forces far too much in his explanations, ignoring the induced effects on unemployment through discouraged worker and other supply phenomena. Simultaneously, and in part related, he underestimates the importance of the minimum wage's effect on the youth labor market. Let us consider each of these in its turn.

Layard's calculation of the relative welfare cost of unemployment in the two countries (section 15.2) understates his case, because it assumes that supply elasticities are equal. (Indeed, the footnote even suggests that the elasticity is greater in the U.K.) This is hardly likely to be correct, for (1) we have observed, as Layard notes, much greater secular changes in the participation patterns of adult males in the U.S. than in the U.K.; (2) the role of adult women, a group with a demonstrated high elasticity of supply, is greater in the U.S. labor force; and (3) the American youth labor force consists much more than its British counterpart of students interested in part-time employment. For all these reasons ε is likely to be higher here, implying that the welfare cost of unemployment in the U.S. is even lower compared to the U.K. than Layard suggests.

This emphasis on demand underlies the rationale for the time-series equation (3) and the interpretation of the parameter estimates. There is no reason why relative youth unemployment must necessarily vary negatively with the business cycle. Indeed, if the elasticity of youth labor supply is sufficiently high relative to that of adults, the relative decline in youth employment in a downturn, as employers reduce the hiring of youths disproportionately, will be outweighed by a reduction in participation among youths relative to adults. The net effect is unclear, but we should expect relative youth unemployment to be less countercyclical in the U.S. than in the U.K., given greater youth labor supply elasticities here. Thus the coefficient on adult male unemployment in a regression like (3) for the U.S. should be less positive, or perhaps even negative.

The minimum wage affects the youth labor market through the supply as well as the demand side. Surely Mincer's (1976) work stresses this, and the same is implied by a Harris-Todaro (1970) model of equlilibrium search unemployment. If the elasticity of supply of young labor is sufficiently high, the effect of the minimum wage is likely to be reflected mainly in changes in unemployment and labor-force participation, with relatively little effect on employment. This supply-side effect may help explain Layard's observation that the duration of unemployment is relatively high for American youths, reflecting, we can argue, added search unemployment in response to the potentially high rewards if the youth can find a job paying the minimum wage.

In the case of some U.S. labor market policies, supply-side inducements can be beneficial, as they offset the bias of the income tax system against market work.[1] This is not likely to be a valid justification of the minimum wage, for (1) induced labor-force entry reduces time available for investment in schooling, and (2) youths in the U.S. can earn a substantial amount through part-time or summer work without incurring any income-tax liability or adding to that of their parents—there is less of a problem with tax-induced biases against market work by youths. Without any offsetting beneficial supply-side effect, and with the demand-induced reductions in employment noted by Layard, there is no efficiency or equity basis for arguing against a youth subminimum wage.

To explore these ideas in the context of the labor market for youths in the United States, I will estimate a time-series equation modeled after Layard's equation (3). The logarithm of male youth unemployment compared to that of all males, *UY/UTOT*, is regressed on (1) the unemployment rate for men 35–44, in percent, a measure of cyclical activity (vacancy data are not available for the U.S. for a sufficiently long period); (2) the log of full-time earnings of youths relative to all male workers (*WY/WTOT*); (3) the log of the relative populations of young and all males (*POPY/POPTOT*); and (4) the effective minimum wage, computed by interpolating and deflating the series in Welch (1978, p. 29).[2] The regressions are on annual data, 1959–76, and are done separately for all youths 16–24 and for out-of-school youths 14–24.

The parameter estimates are presented in table C15.1. The importance of supply behavior in the youth labor market is underscored by the differences in the responses to adult male unemployment in the two equations. For all youths, whose labor supply is likely to be highly sensitive to the business cycle, I find that higher unemployment lowers their relative unemployment rate, in contradiction to Layard's findings for the U.K. However, when the sample is restricted to out-of-school youths, I observe the same positive relation that Layard found. This suggests that the problem of youth unemployment cannot be analyzed as a totality. Instead, we should distinguish between students and young

Table C15.1 **Estimates of Equations for Log (*UY/UTOT*), Males, 1959–76**[a]

	All youths 16–24	Out-of-school youths 14–24
Constant	.683	−.115
	(2.74)	(−.10)
Unemployment rate, men 35–44	−.051	.043
	(−5.11)	(1.36)
Log (*WY/WTOT*)	.117	.142
	(.56)	(.16)
Log (*POPY/POPTOT*)	−.028	.018
	(−.32)	(.05)
Effective minimum wage (100 = 1938–76 average)	.00222	.00531
	(4.07)	(3.50)
R^2	.92	.53
DW	1.98	1.83

[a]*t*-statistics in parentheses.

people not in school, and recognize that comparisons to the U.K. are most relevant for the latter group.

The results on the minimum wage variable are in the expected direction and dwarf the coefficients on the relative wage variable, though these latter have the expected signs. That this occurs suggests the importance of the induced disemployment and search effects, and indicates too that noncompliance with minimum wage regulations may not be important enough to mitigate the program's detrimental effects on the labor market. Not only is this effect significant—the range of the minimum wage variable during this period is large enough to induce a 46% change in the unemployment rate of out-of-school youths and a 17% change for all youths. The rise in the minimum wage variable from 1959 to 1976, due mostly to extensions of coverage, is alone responsible for a 14% increase in the relative unemployment rate of out-of-school youths and a 6% increase in that of all youths. Finally, that the effects are greater for out-of-school youths is consistent with the observation that in-school youths have a more elastic labor supply and will leave the labor force as the increases in the level and coverage of the minimum wage restrict job opportunities.

Layard's translog cost function estimates of the elasticity of demand for youths are worthy of comment, as there are a number of reasons to suspect they are biased, most probably downward. The only possible reason for an upward bias is Layard's use of time-series data: one finds that cross-section translog estimates of multifactor production or cost functions generally produce lower values of the substitution parameters than do time-series estimates (see Hamermesh and Grant 1979). However, there are two reasons to expect the e_{ij} for youths to be biased down

(1) because the capital stock is held constant, a rise in the wage rate of youths is constrained by Layard to have no effect on the capital stock. Assuming, as seems reasonable, and as is shown in three other studies, that youths and capital are substitutes, the gross elasticity presented by Layard is likely to be below the net elasticity that is relevant for policy.[3] (2) Hamermesh and Grant (1979) have shown that estimates of substitution parameters based on cost functions are generally below those based on production functions specified over the same time period and factor inputs. Which is correct depends of course on the factor markets under consideration, but there is good reason to expect that estimates of production functions, which treat factor quantities are exogenous, will produce better estimates than those of cost functions when the labor force is disaggregated by age and sex. This is especially likely to be true for data on the U.K., where supply elasticities are quite low and thus factor quantities still more likely to be exogenous than in the U.S. In sum, these criticisms suggest that the elasticity of demand for youths is higher than Layard's estimate of -1.25 and is probably closer to the estimates obtained in recent studies using the translog production function for the U.S. This underscores the importance of avoiding inducing wage rigidities in the labor market for youths.

Both one's priors and a comparison of my regression to Layard's suggest that great care must be taken in using explanations of British labor-market pathologies to explain those of our labor market. Most important, effects on labor supply among youths are far more important here. Aside from inducing substantial international differences in the cyclical responses of relative unemployment, and in our views of the seriousness of the welfare losses from unemployment, they also imply that fairly low earnings replacement rates in American transfer programs can have larger disincentive effects on effort than will foreign programs offering higher replacement. The international comparison of outcomes is essential, but the causes of those outcomes differ substantially.

Notes

1. In my 1979 study I have demonstrated how the unemployment insurance system can, by reducing risk, induce increased labor force participation, and have shown that this entitlement effect increases employment and partly offsets the disincentive effect UI produces on the duration of unemployment spells.

2. *WY* and *WTOT* are earnings of year-round full-time male workers, from *Current Population Reports*, P-60 Series, various issues; the data on *POPY*, *POPTOT*, *UY*, and *UTOT* are from *Employment and Training Report of the President*, 1977; and the minimum wage variable is computed from Welch (1978, p. 29) by deflating using changes in the average manufacturing wage rate between the years for which Welch presents data on this measure. This series is available on request from the author.

3. Berndt and Wood (1977) discuss the distinction between gross and net elasticities and present conditions under which they will differ.

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Comment

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In keeping with the purpose of the conference which this volume records, Richard Layard discusses American youth unemployment in light of British experience. He also draws some policy implications for the U.S., but not for Britain. Although Layard approaches some comparative issues with great depth and skill, on several subjects he deals only with Britain, thereby contributing new and valuable research and analysis, but omitting the necessary American data for comparison. On other issues, he ultiizes a limited selection from the body of American research.

As a special contribution to a volume on American youth unemployment, Layard's chapter is interesting and useful. But as an independent effort at comparative analysis, it is flawed not only by the imbalances noted above and the usual limitations of two-case studies, but also by an overly restricted choice of phenomena and explanatory factors, questionable choices in the basic data, and problems in the methods and content of the policy suggestions for the U.S.

The four points of comparison Layard selects as the main phenomena to be explained omit some important issues. Layard chooses intercountry differences in relative youth unemployment, that is, the youth to adult ratio rather than the level and trend in youth rates as the phenomenon. Within this framework, he does not discuss at least one relationship in

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Britain which not only differs from American experience, but which American analysts usually reject as inherently unlikely to occur. As Layard's figure 15.1 indicates, British male teenagers had lower unemployment rates that all males through the 1960s, a time when the British postwar baby boom generation entered the labor market and, as figure 15.2 shows, hourly earnings of males under 21 rose rapidly in relation to those of adult males. A discussion of these relative phenomena in Britain and the contrast with the U.S., allowing for differences in data sources, would have dealt with an important comparative subject.

At least two other significant subjects for comparative purposes are not treated because the emphasis on relative youth to adult unemployment is not supplemented by consideration of comparative youth unemployment in the two countries. In section 15.1.6 Layard refers to the relatively successful initial absorption into the labor market of British school-leavers, but he does not present the relevant U.S. data, which show slower rates. Nor does he examine all of the factors that explain the British experience, which is most assuredly not the consequence solely of the differential placement rates in the two countries of such official sources as the Careers Service (Reubens 1977, ch. 7, 8, 9).

The second undiscussed subject is touched on in appendix B where Layard presents information indicating that unemployed British youths, including those who have never worked before, are entitled to welfare payments from age 16 in their own right. Since some U.S. analysts are persuaded that American youths are deterred from participating in the labor force or from holding jobs because of less direct and smaller transfer payments (some to the family rather than the individual), it would have been a prime interest to discover how the British youth benefits (running well over 30% of net weeky earnings for the age group) affect the desire to work. Layard's treatment of alternative income for unemployed youths entirely in relative age group terms neglects some of the issues which most closely affect U.S. policy decisions, especially because these tend to be made in terms of individual groups rather than as relationships between age groups. From many viewpoints, the direct comparison of British and American youths is of prime interest.

Turning from the choice of issues to the choice of explanatory factors, Layard's analytic framework of equilibrium and disequilibrium factors is sufficiently broad and well defined, but the specific elements discussed under each of these main readings is highly selective. Layard seems to have chosen single institutions as explanatory factors simply because the institution is not present in the other country. Thus apprenticeship, income transfers, the legal minimum wage, and the Careers Service are discussed without consideration of all the other relevant institutions and circumstances that might affect outcomes. These single institutions carry too heavy a weight in the discussion and conclusion.

The treatment of the British Careers Service offers an example of some of the shortcomings of the entire chapter. In his summary, Layard states, without documentation, that in the U.S. the government "plays little more role in the placement of youths than in the placement of adults." His discussion of Britain at that point, however, entirely concerns activities for youths. In section 15.1.6 of the text he makes no mention of the U.S. at all, but asserts that in Britain "the state apparatus makes much more effort to find jobs for school leavers than for adults." This statement is supported only by information on British youths (that 22% of a sample of school-leavers said in November 1976 that they obtained their first jobs through the Careers Service). However, the British adult employment service claimed a 23% placement rate in April-July 1977 (*Employment Gazette* June 1979, p. 560). Thus Layard's claim about relative placements in Britain is not documented or supported; no information is provided on the comparable situation in the U.S.; nothing is cited to prove that placements in the U.S. were lower than British for either age group; and no rationale is given for according such importance to this factor, especially to the relative ratio of youth to adult placements. As a conclusion to this unsatisfactory empirical presentation, Layard admits that he cannot say how important this factor is nor can he estimate its influence. Nevertheless, in another unrelated section of the summary, he declares that "the British experience does suggest that a good case can be made for a Careers Service for youths." He does not make clear whether he is recommending to the U.S. an organizational replica of the Careers Service, to which many objections might be raised, or whether he is simply urging better informational, guidance and job placement serivces for school-leavers in the U.S., an acceptable suggestion, but one requiring no comparative analysis and equally applicable to Britain.

Some factors are omitted from the comparative discussion that might have been expected to appear. The narrowing of British earnings differentials between youths and adults (figure 15.2) contrasts with the findings of a widening of differentials for the U.S. (Freeman 1979; Wachter 1977). The causes of this difference would be of high interest. Furthermore, although Layard takes account of the demographic changes in Britain in order to explan time-series changes in the level and ratios of British youth unemployment rates, he does not consider the influence on youth/adult unemployment rates of the differential demographic experience of Britain and the United States. In fact, the American baby boom was more intense and prolonged than the British. The proportion of American 15–19 year olds as a share of the 15–64 year-old population was 4 percentage points higher than the corresponding measure for Britain from the 1960s on; earlier the gap had been smaller. Moreover, teenage full-time educational enrollments, which remove young people from the labor market, grew at a much more rapid rate in

Britain than in the U.S. The growth of British educational enrollments was so rapid that the absolute size of the British teenage labor force actually declined from 1950 to 1975, but in the same period even the American nonenrolled teenage labor force grew and the enrolled teenage labor force grew enormously (Reubens, Harrisson, and Rupp 1981, ch. 2, 3, 4). Some effects on youth unemployment rates might be expected from such differences.

One of the persistent challenges to comparative research is the need for disaggregated data, the paucity of such information in many countries, and the noncomparability of available categories. Some of Layard's controversial explanations may arise from inadequate disaggregation. This may be the reason that Layard's job-rationing hypothesis is not upheld by the Rees-Gray chapter in this volume. Another result of inadequate dissegregation appears in the discussion of those who are neither in school nor in the labor force. Layard attributes this to general affluence and the indulgence of American parents, implying that the dropouts are mainly middle class when in fact the category is disproportionately composed of poor and minority youths (Wachter 1980; Freeman 1980). Our study of youths who are out of school and out of the labor force in the industrialized countries shows that in the countries with a large proportion of youths in this category (namely, Italy, Canada and the United States) the chief common factor is persistently high youth unemployment rates (Reubens, Harrisson, and Rupp 1981).

Some of Layard's choices in regard to basic data are debatable. He completely excludes from his U.S. data, although not necessarily from American studies he cites, the sizable American in-school labor force on the ground that Britain does not count this category in its census. While this is true, it also should be borne in mind that the category is comparatively small in Britain, partly because of differences in educational enrollment rates. For example, in 1960, 68.7% of teenage American boys (15–19 years) were in school against 18.5% in Britain, a difference of over 50 percentage points which has been falling over time but remains substantial today.

It is questionable to exclude the U.S. student labor force, given the long average weekly work hours of older students during the school year, the relatively light demands of U.S. educational institutions on the time of young people, the reshaping of the youth labor market to accommodate the student labor force, and the competition for jobs with out-of-school teenagers. Moreover, the relative size, labor force participation rates, skill composition, and unemployment rates of the American enrolled and nonenrolled have varied considerably over time. Although current unemployment rates for enrolled and nonenrolled are similar, it has not always been the case, especially when statistics are separated by age and sex. Admittedly, it is unsatisfactory to count each in-school labor

force participant as a full unit regardless of how few hours are worked, especially for cross-national comparisons. The adoption of a system of full-time equivalents might meet this problem. It would have been preferable to use U.S. data for each enrollment status separately, adjusted if necessary, rather than to exclude them entirely, as Layard did.

In focusing on teenagers, Layard has slighted comparisons for the 20–24 year old group which is likely increasingly to occupy the U.S. policy spotlight (Wachter, 1980; Winship 1979). Layard also excludes females from the analysis. Since this omission occurs frequently in cross-national studies, it may be timely to suggest that the use of adjusted and qualified data is preferable to exclusion of this significant part of the youth labor force. One specific effect of this omission is that Layard draws conclusions about income levels of the two societies in relation to participation rates based entirely on male rates and leaving out the offsetting influence of the faster-rising and higher U.S. female labor force participation rates.

Layard draws three policy implications for the U.S., of which the one on the Careers Service has already been discussed. Another concerns the minimum wage. He concludes that "if there must be minimum wages, the case for a separate youth rate seems overwhelming." As Layard himself suggests, his evidence for Britain, which has no legal minimum, and comparisons with U.S. age-wage information do not in themselves lead to his conclusion. He finds the age-wage profiles of youths in the two countries similar and does not find the expected truncation in the U.S. at the lower end as a result of the minimum wage. It may be that this subject cannot be decided by comparing countries which have and do not have a minimum wage law. In that case, should a conclusion be offered for U.S. policy as if it came from the comparative experience when in fact it appears to be mainly based on Layard's acceptance of an American analyst's findings?

The third conclusion for the U.S. is that "it is not obvious in the U.S. that there is any greater equity case for measures to relieve youth unemployment than adult unemployment." His discussion is not entirely about equity, however. He states immediately afterward, and without documentation, that there has been a "relative absence of measures to combat youth unemployment in the U.S. compared with Europe." While it is difficult to obtain precisely comparable records, it is likely that the number of youths on U.S. programs, relative to the youth population, and the amount spent per participant exceed the corresponding number and per participant expenditures in European countries (Anderson and Sawhill, eds. 1980, ch. 6, table 1; Reubens 1980, table 3). And there can be no doubt that American programs have been in effect for more years than European.

But leaving aside these facts, the argumentation by which Layard reaches his conclusion for U.S. policy seems complex and questionable. Layard acknowledges two ways in which American youths carry greater

burdens of unemployment than adults compared to the British situation. First, Layard states in the summary that the share of youth unemployment in the total efficiency cost of unemployment may be higher in the U.S. than in Britain. Second, in appendix B, he states that income while unemployed as a percent of income in full-time work is probably lower for youths relative to adults in the U.S. than in Britain. These appear to be two strong grounds for U.S. policy to *favor* unemployed youths, on the dubious assumption that this type of national policy would be drawn from such comparative experience. But Layard introduces a third element (section 15.2). Overall, income out of work (mainly from unemployment compensation) is said to be lower relative to income in work in the U.S. than in Britain (unemployment insurance buttressed by means-tested Supplementary Benefits). Without discussing further the fine points of extended U.C. benefits in the U.S., which prolong it far beyond the 26 weeks offered in Britain, and the differences and similarities between welfare and Supplementary Benefits, it can be accepted that a lower income replacement ratio in the U.S. than in Britain would fall more heavily on adults with family responsibilities than on youths. But does it follow from this that the only course is to abandon the concern about reducing U.S. youth unemployment absolutely and relative to the adult rate? While continuing to give the reduction of youth unemployment a high priority, is it not possible to increase the adult income replacement ratio? Beyond the equity and efficiency issues, there are other reasons for a society to be concerned about high absolute or relative youth unemployment rates, especially if particular subgroups of youths with intensified employment problems are identified (American Assembly 1979).

If these comments have stressed the observed gaps or deficiencies in Layard's paper, it is because one hopes that his analytical skills will soon again address a comparative subject, preferably on a multicountry basis.

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