Youth Employment Patterns in Segmented Labor Markets in the US and Europe[1]

Gregory DeFreitas, David Marsden, and Paul Ryan*

Both the United States and Europe have recently seen rising concern over the quality of youth economic activity. To some extent this reflects a refocusing of interest within the area of youth employment as the baby boom cohort moved out of the youth labor market and the problem of youth joblessness came once again to be viewed primarily in terms of race [Welch 1979; Rees 1986, OECD 1988, ch. 1]. To some extent it reflects increased awareness of the implications of new technology and intensified international competition—in particular, the view that a broadening of the vocational preparation of young people is increasingly important for both enterprise productivity and individual adjustment to economic change [Steedman and Wagner 1989; OECD 1989; Garonna and Ryan 1991a; Finegold 1991].

In such a context, casual employment and narrow training appear increasingly unacceptable. According to a well-established interpretation, young Americans who do not pursue higher education experience a "moratorium period" between adolescence and adulthood in which they are excluded from good jobs (in terms of pay, training and promotion prospects) and pass their time instead in the relatively unrewarding conditions of casual or secondary employment. This description of the fate of youth has been supported during the last two decades by a variety of authors associated with dualist interpretations of the labor market [Piore 1972; Osterman 1980; Wial 1988]. It has been amplified and adjusted by economists not wedded to the dualist paradigm [Brown 1982; Freeman and Wise 1982; Reubens 1983].

The evidence supporting the dualist picture of youth employment and training in the US has however remained nonstatistical, relying on case studies of uncertain generalisability.[2] Statistical assessment has however been attempted for Europe. Patterns of youth employment in European industry have been analysed statistically in a framework suggested by dualist descriptions of the US youth market [Marsden and Ryan 1986, 1989]. The question therefore arises: can the analysis be applied successfully to the youth labor market which inspired it in the first place, i.e., the United States?

Our analysis of youth employment patterns in the US is driven also by a comparative interest in the possibility that youth employment is structured differently in Europe and the US. The greater importance of delayed and part-time labor market entry in the US may mean quite different youth employment patterns from those in Britain and Germany, where entry is relatively early and mostly full-time and where significant numbers go into apprenticeship [OECD 1988, ch. 1; Garonna and Ryan 1991a]. The results of comparative research into such issues have become increasingly important for policy towards youth employment and training policy in Europe and the US [Ryan 1991; Finegold and McFarland 1991].

In section one we develop the analysis of youth employment patterns in segmented labor markets. The data and variables used to evaluate this model are described in section two. Our results are presented in section three, followed by conclusions in section four.

*Hofstra University, Hempstead NY 11550, London School of Economics and King's College, Cambridge respectively.

Analytical Framework

Drawing primarily upon the approach to youth employment in the US dualist literature, we start with two assumptions. The first is that pay is an attribute of the job rather than of the worker, in that for any job there exists a well-defined pay rate which is largely or wholly independent of the attributes of its incumbent. Such "rate for the job" payment systems commonly characterise manual employment in medium-sized and large organizations, in that individually-based variation in pay, through bonuses, merit rates, etc., if present, is limited in importance. In casual or secondary employment, including most small organisations, however, employers may be more free to vary pay in accordance with the attributes of individual workers.

Secondly, we assume that the substantial pay differentials which prevail across employers and sectors contain a significant 'noncompensating' component: i.e., one reflecting rent-capture by incumbent employees rather than compensation for disutilities associated with training costs, working conditions, etc. In other words, the difference between better and worse jobs, as ranked by workers, reflects the characteristics of the employer rather than the requirements of labor supply.

The segmentationist interpretation of inter-firm and inter-sectoral wage structure, long dominant in the institutionalist literature, today features prominently in orthodox interpretations as well. Interpretations of interindustry wage differentials as the market-clearing outcome of competitive forces in the labor market are rare nowadays. Efficiency wage and insider-outsider theories seek to explain how non-clearing wage structures may persist [Bulow and Summers 1986; Krueger and Summers 1987; Dickens and Katz 1987; Lindbeck and Snower 1990]. Recent evidence for the UK supports such interpretations [McNabb and Ryan 1989; Gross 1990].

Following Thurow [1975], in such a segmented labor market workers then rank jobs according to their rewards and queue for vacancies in the better ones, either in lower wage jobs or in 'wait unemployment' [Summers 1986]. Profit-maximizing employers offering vacancies with given wage characteristics rank applicants inversely by expected unit labor costs. Employers are assumed free to choose among applicants in filling vacancies. If filling a vacancy with a young rather than an adult worker increases profits, the employer is free to do so; conversely, nothing requires a firm to take on a young worker against its wishes.[3]

We also assume (i) significant youth-adult substitutability in production, (ii) lower average labor quality amongst youth than amongst adult workers, even if the distributions of labor quality for the two age categories overlap and (iii) costless screening of job applicants for labor quality. The former assumption is consistent with the results of a wide range of empirical research on both the US and the UK labor markets [Costrell, Duguay and Treyz 1986; Layard 1982; Wells 1983].

The second assumption summarises the expected position of young people relative to adults along the main dimensions of labor quality *on average*—lower on skill, experience and responsibility, higher on education, motivation and malleability—and assumes that for most jobs youth are at a disadvantage [Ryan 1987]. The third assumption simplifies the discussion but does not affect key outcomes.

The implications for youth employment follow directly. Employers who offer high wages will not hire young workers, given their lower productivity and higher unit labor costs. Only the minority of young applicants which can match the expected productivity of marginal adult candidates will secure employment. In low-wage firms, by contrast, adult applicants will be scarcer, at least among males. Adult males generally enjoy higher alternative incomes, either from wages in similar jobs or from unemployment benefits and welfare—reflecting the fact that adults with family responsibilities have higher entitlements than do young single people. Low-wage employers are then left to fill vacancies from the ranks of a secondary labor force whose members include most young workers.[4]

A negative relationship is therefore expected between an employer's position in the hierarchy of pay (net of compensating components) and youth employment shares. The high-wage firm is not generally interested in young workers; the low-wage firm cannot attract enough of the adult workers it would prefer and settles at the margin for youth, amongst others.

Were the pay of youth and adults comparable, the analysis could stop here. Indeed, as young workers typically require at least some further training to bring them up to adult skill levels, a "rate for the job" pay structure would see particularly low youth access to jobs in skilled occupations—again, particularly in high-wage firms.

Payment systems may however exempt particular workers from rate for the job rules and permit their employment at lower pay rates. Since wage discrimination by race and sex is nowadays illegal, such exemptions are limited largely to age, trainee or entrant status. Thus "wage for age" rules characterise the employment of young workers under collective agreements and statutory minimum wages in several European countries, most notably in the Netherlands and Britain. Similarly, apprenticeship provides in Germany and Britain for reduced pay or allowances as a function of either age or time spent in training. In both countries, the great majority of covered individuals are teenagers [Marsden and Ryan 1991a, 1991b].

The disinclination of firms to hire and train young people, particularly in high-wage segments, is reduced by "wage for age" schedules vis-a-vis that under an undiluted "rate for the job" regime. The effect of any wage discount related to age increases with its magnitude; with the substitutability of youth and adult labor; and, in skilled jobs, with the firm's willingness to invest in training. Youth relative pay (in the given job) acts, therefore, as a second prospective influence upon youth shares of employment, including training at the workplace.

In the US, payment systems had until the 1990 introduction of the youth subminimum wage largely avoided determining pay in terms of age. Young workers might still benefit, however, if wage reductions by trainee or entrant status induced employers to prefer them to adults as trainees or entrants. Differentiation of pay by stage of training is the norm in apprenticeship in the US, as in Europe [Briggs and Foltman 1981], and it crops up in collective agreements in mainstream industrial employment as well [Ryan 1984]. Although these two instances of payment by trainee status affect only a small fraction of employment in the US, their meaning has been altered and their scope widened by the rapid extension during the 1980s of the reduced entrant rates favored by concession bargaining [Mitchell 1982; Jacoby and Mitchell 1986].

Whether extensively applied or not, low entrant and trainee rates are not generally effective at stimulating youth access to employment. As the reduction in labor costs which they permit is not tied to age, adult competition for vacancies remains unrestricted and youth access depends on the appeal of the vacancy to adults. Hence, in what remains of apprenticeship in the US, the scarcity of vacancies, the limited duration and depth of the wage discount and the associated ticket to well paid skilled employment result in intense adult competition and virtual youth exclusion, as reflected in an average age of apprentices well into adulthood. By contrast, apprentices in Western Europe are overwhelmingly teenagers [Reubens 1981].[5]

Payment according to age and trainee status has recently been encouraged in the US with the inception in 1990 of the subminimum wage, under which employers may pay newly hired teenagers (aged less than 20) 15 percent less than the federal minimum wage during their first six months of employment. The principle is novel by US standards but its practical importance is limited. The wage discount is limited, it affects low-wage employers only, it lasts only six months and it is tied during the second three months to trainee status as well as age, in the shape of enrollment in an approved training programme. In sharp contrast, the youth subminimum wage adopted in the Netherlands in 1974 started at 40 per cent of the full rate at age 15 and moved in annual increments of 7.5 points to 100 per cent at age 23; it was not tied to training requirements [Crone.1986].

The near-absence of age-wage scales in the US does not imply that young workers earn as much as adults, either in particular firms or in general. The point is that, were a young worker hired for a job, in the absence of "wage for age" scales he or she would have to be paid the same as any adult taken on for the same job.

Does the analysis apply to young people as a whole or to each sex taken separately? Under strict sex-based occupational segregation young people compete only with adults of their own sex and the analysis applies to each sex separately. At the other extreme, were there free competition for jobs between age-sex groups, employment should be analysed for both sexes taken together. A large body of

evidence indicates entrenched occupational segregation by sex in the US and other advanced economies, particularly for manual work in industry [Reubens and Harrison 1983; OECD 1988, ch.5]. We therefore conduct the analysis separately for males and females.

Youth employment shares may also be influenced by other factors, notably employment change and recruitment. To the extent that employers place young workers low down the queue of job applicants and layoffs are based on seniority, youth employment shares vary positively with changes in employment at the sectoral level. Contrary influences may however be present, as when youth quit rates rise alongside aggregate employment.

We therefore investigate the following relationship:

$$S_{ijk} = f_{jk}\left(W_{ijk'}^a, \quad \frac{W_{ijk}^y}{W_{ijk}^a}, \quad dE_{ijk}\right) \text{(I)}$$

$$(-) \qquad (-) \qquad (+)$$

where: S is the share of young workers (aged less than 20 years) in total employment (with or without employer-provided training),

   W^a is the hourly cost of adult labor,

   W^y is the hourly cost at which youth labor can be employed, where different from that of adults,

and   dE is recent change in employment,

for industry i, gender j and country k.

The preceding analysis is a moderate formalization of the approach to youth employment associated with dual labor market theory. It differs from strict dualism in that there is no sharp separation between youth and adult labor markets [Hills and Reubens 1983]: the integration of youth and adult employment is seen as a matter of degree, dependent upon the two key attributes of labor cost structures outlined above. In that sense, our discussion reflects a 'job queue' formulation of segmented labor markets rather than dualist theory proper.[6]

Although our analysis shares with competitive orthodoxy the assumptions of maximising behaviour and a view of labor costs as the key to youth employment patterns, it differs in treating both of the labor cost variables as the exogenous product of institutional factors in a demand-constrained labor market, rather than as the endogenous vehicle for the clearing of youth and adult labor markets.

The assumption of market-clearing has remained central to orthodox studies of the demand for youth labor in the US, despite its incompatibility with evidence on wage determination.[7] We have noted increasing interest in non-clearing theories of interindustry wage structure. The same may be appropriate for youth relative pay within particular sectors, notwithstanding evidence that youth relative pay responds to excess supply in the wider US labor market [Welch 1979, Freeman 1979].[8] Such adjustments may have been confined to low-wage industries, in the absence from high-wage sectors of any youth-favoring alterations of "rate for the job" payment structures.[9] Thus, while wage flexibility may well be higher in general in the US than in Europe [Blanchard and Summers 1988], the inter- and intra-sectoral pay structures upon which we focus in relation to youth employment may also be rigid in the US.

Data and Methods

Ideally we would estimate (I) with data on hours worked by youth and adult workers, hourly labor costs of adult workers in particular jobs, hourly labor costs at which young workers would work were they hired for those jobs, and changes in employment at that job level during the recent period, using a large sample of jobs in the economy in question.

In practice such data are unavailable. Aggegation is required in order to find relevant data, normally to sectoral level. Labor costs must be proxied by hourly earnings. Sectoral data on pay and employment by age are estimated for the European Community by national surveys of wage structure in industrial establishments with at least ten manual employees [Eurostat 1980]. Six leading early Community members—Belgium, France, West Germany, Italy, the Netherlands and the UK—are analysed for 1978, the year of the most recent EEC-wide survey, using a 47-sector breakdown covering all of manufacturing, mining and construction. Only manual workers are included in view of the greater heterogeneity of occupations and pay in the nonmanual category; data are available only for full-timers. Young workers are defined as those aged less than 21 years at the time of the survey.

The youth share of hours worked is approximated by its employment share; the hourly cost of adult labor, by average gross hourly earnings of adult employees; and the relative hourly cost of youth labor, by the ratio of average hourly earnings for young and adult employees. The latter proxy causes concern on grounds of occupational heterogeneity. Young workers may be present in large numbers in low paid secondary jobs within a sector, and youth relative pay lie therefore well below unity, without any implication that employers can pay young people less than adults when hiring them into particular jobs. Consequently, youth relative pay is expected to lie below unity as a result of occupational heterogeneity. However, as it will be lower still when age-wage scales operate, the level and dispersion of youth relative earnings should capture some of the influences which we seek to identify.

Unfortunately, as the EEC surveys were conducted at six yearly intervals, there are no readily comparable data on changes in employment and the final variable in (I) is discarded. The implication for the pay coefficients depends on the extent of collinearity between the pay variables and employment change: the higher it is, the greater is the specification bias. There are grounds for optimism, at least in terms of the adult pay coefficient: employment change has been found to be only weakly associated, if at all, with pay levels and changes across sectors [OECD 1966; Marsden 1988].[10]

A dataset directly comparable to the EEC one is not available for the US, since the Bureau of Labor Statistics surveys of establishment records are not broken down by age. We therefore have to use household data. Our datafile from the 1-in-1000 Public Use Sample of the 1980 Census of Population contained observations for the 79 Standard Metropolitan Statistical Areas (SMSAs) which had populations of at least 500,000 in 1980. The 12,900 full-time employees (10,669 males and 2,205 females) who reported their occupations as manual (here, nonsupervisory craftsmen, operatives and laborers) were extracted and grouped into sectors according to the reported line of business of their principal employer. No attempt was made to match sectoral definitions to the European ones. Only those industries with total estimated employment of at least 5,000 (i.e., a minimum of five employees of all ages in the original sample) were included. The resulting US dataset has roughly twice as many observations (83 sectors) as does its European counterpart.

The US dataset differs from the European one in several respects: a household versus an employer-based sampling frame, exclusion of small towns and rural areas, inclusion of employees in plants employing less than ten manual workers, and estimation of hourly earnings as the ratio of annual earnings to annual hours worked (estimated as weeks worked multiplied by usual hours worked per week) rather than from payroll records of weekly hours and earnings. Both exclude part-time workers, though this matters less for European than for US youth.[11]

The need to estimate hourly pay indirectly from annual figures and its basis in household recall and self-reporting rather than payroll records undoubtedly means higher measurement error for the US than for the EEC, particularly for the youth relative pay variable (as the ratio of two variables each subject to independent measurement errors). The dispersion of the two pay variables is much higher in the US than in Europe (Table 1), consistent with other evidence of greater labor market segmentation in the US [Freeman 1988; Rowthorn 1989]. The trans-Atlantic difference is however so great as to suggest much greater measurement error in the US data.[12]

Mean youth employment shares in industry in 1978–79 are presented for the seven countries in Table 2. Around one in every 12 male workers in these industries is under 21 in the US, a share similar to those in Belgium, France, the Netherlands and the UK but well above the German and Italian ones.

TABLE 1
Attributes of Sectoral Pay Variables by Country and Sex, Full-time Manual Employees,
Manufacturing, Mining and Construction, 1978–79

| | Adult Pay | Youth (<21) Relative Pay | | |
| | | | | Correlation with Adult Pay |
Coverage	CV	Mean	CV	
Males				
USA	19.8	59.3	37.9	−0.44
Belgium	7.6	77.4	4.7	0.22
France	8.5	75.7	4.5	−0.60
West Germany	6.0	76.9	5.4	0.25
Italy	7.5	84.8	5.0	−0.71
Netherlands	8.0	59.7	6.7	−0.18
United Kingdom	7.4	61.6	7.9	−0.41
Females				
USA	25.0	72.6	28.9	−0.40
Belgium	10.2	83.3	4.8	0.14
France	6.9	86.1	3.1	−0.63
West Germany	9.4	83.3	4.0	0.36
Italy	7.8	89.9	3.2	−0.68
Netherlands	3.9	66.8	3.3	−0.37
United Kingdom	11.0	65.8	7.7	−0.28

Note: Samples restricted to manual occupations; part-time employees excluded. Apprentices are excluded in all the European countries except the UK.

Sources: 1980 US Census Public Use Microdata, 1/1000 samples of SMSAs with populations of 500,000 or more (=79 SMSAs); Eurostat, SEI (1980).

Among female workers the American youth share is, at 6.2 percent, the lowest of any of these economies, consistent with high adult female participation rates.[13]

The dispersion of youth shares, as measured by the coefficient of variation, is much higher for both sexes in the US than in Europe. In other words, the tendency for young workers to be excluded from particular sectors and concentrated into others appears much more pronounced in the US than even in Italy, the EEC country with the widest variation in this regard. Although the disparity between the US and Europe may result partly from errors in self-classification and differences in sectoral groupings in the US data, its sheer size suggests that patterns of youth exclusion are indeed particularly pronounced in the US.[14]

In order to estimate (I) a further adjustment is required to deal with missing observations for the youth relative pay variable. Sectors may show up as having no youth employees either because they do not in fact employ young people or because they do but are small enough for a 1-in-1000 sample not to capture any. The latter difficulty is curbed to some extent by excluding sectors with an estimated employment of less than 5,000, but it still affects medium-sized sectors to some extent. The former difficulty is to be expected in high-wage sectors in general if there is no provision for paying lower wages to young than to adult employees.

These problems cause difficulty only in the US dataset. In Europe, young manual workers were employed in, and estimates of youth pay therefore available for, all sectors, even high-wage ones, but in the US 14.4 per cent of industrial sectors showed no young male full-time employees, 43.8 per cent no young females. As exclusion of those sectors would create truncation bias, relative pay estimates are interpolated for them. The most appropriate econometric technique is a first-order correction procedure, replacing the missing values with proxy 'observations' generated by a regression of relative youth

TABLE 2
Youth Shares of Manual Employment In Manufacturing, Mining & Construction Industries By
Country & Sex, 1978–79

| | | Youth Employment Share | | | |
| | | Arithmetic Mean | | Dispersion | |
Country	Year	Males	Females	Males	Females
USA	1979	8.0%	6.2%	75.9%	121.6%
Belgium	1978	9.1	19.3	30.7	25.3
France	1978	7.1	15.5	29.7	35.1
West Germany	1978	4.8	14.4	37.1	41.1
Italy	1978	4.8	11.9	54.8	45.1
Netherlands	1979	11.4	27.1	27.0	27.1
United Kingdom	1978	9.8	9.9	27.4	37.8

Note: Youth shares = employees aged 16–20 as a percentage of all employees of same sex (in plants with 10 or more employees for EEC only). Samples restricted to manual occupations; part-time employees excluded. Apprentices are excluded in all the European countries except the UK.

Source: 1980 US Census Public Use Microdata, 1/1000 samples of SMSAs with populations of 500,000 or more (=79 SMSAs); Eurostat, SEI (1979).

pay on a set of instrumental variables. Although the need to interpolate missing observations results in larger error variances, a correct choice of instruments does produce consistent estimates [Haitovsky 1968; Dagenais 1973].[15]

The difficult part is to choose an appropriate set of instruments. We use union membership density and the share of part-timers in employment.[16] The competitive threat to adult workers posed by cheaper, substitutable youth labor creates an expectation that youth relative pay will be higher in more highly organized sectors [Ryan 1987]. Moreover, at any level of union density, the wage-setting power of unions may be constrained by management strategies to weaken the bargaining power of employees by increased employment of part-timers, as well as other types of "contingent labor" [Harrison and Bluestone 1988, ch.2; Marshall 1989].

The results of the auxiliary regressions are only partly satisfactory. Signs are as expected in all cases and statistically significant for males, but the level of explanation remains low for both sexes.[17] As a fuller analysis of the determinants of youth relative pay cannot however be undertaken here, the estimated values of youth relative pay are used to replace missing observations, recognising that the low explanatory power of the regressions means increased measurement error for relative pay in the US dataset.

Empirical Results

The results of estimating (I) by OLS, without an employment change variable, are reported in Tables 3 and 4 for males and females respectively. As all three variables are standardized by their national means, the regression coefficients are elasticities evaluated at sample means and comparable across countries.[18]

Taking males first, the relationship of youth employment shares to adult pay proves uniformly negative, indicating a strong and general tendency for high-wage sectors to hire few young people. In all seven economies the estimated elasticity is unity or higher and statistically significant. The US elasticity joins the Dutch one at the low end of the spectrum of national results.

An inverse relationship also emerges between male youth employment and relative pay in all countries. The US estimate is however, at −0.39, by far the lowest and the only one to fail to achieve statistical significance, despite a low standard error.

TABLE 3
Regressions of Youth Employment Intensity On Adult Pay & Youth Relative Pay, Manual Males in Manf., Mining & Constn., By Country 1978–79

		Regression Coefficients				
Country	Year	Intercept	Adult Pay	Youth/Adult Rel. Pay	R^2	N
USA	1979	2.74** (.64)	-1.34** (.46)	-.39 (.26)	.07	83
Belgium	1978	4.64** (.79)	-2.10** (.46)	-1.73* (.74)	.47	36
France	1978	5.74** (1.25)	-3.04** (.45)	-1.82* (.93)	.60	34
West Germany	1978	8.57** (1.47)	-4.52** (1.10)	-3.12** (1.32)	.44	35
Italy	1978	10.24** (2.01)	-6.31** (1.01)	-3.25** (1.20)	.57	33
Netherlands	1979	3.45** (.93)	-1.36* (.63)	-1.37* (.57)	.18	32
United Kingdom	1978	5.30** (.67)	-2.65** (.40)	-1.68** (.39)	.57	36

Note: Standard errors in parentheses. Significance at 5% (*) and 1% (**) levels. All variables standardized to a mean of 1.

Samples restricted to manual occupations: part-time employees excluded. Apprentices are excluded in all the European countries except the UK.

Sources: Same as Table 1.

TABLE 4
Regressions of Youth Employment Intensity On Adult Pay & Youth Relative Pay, Manual Females in Manf., Mining & Constn., By Country 1978–79

		Regression Coefficients				
Country	Year	Intercept	Adult Pay	Youth/Adult Rel. Pay	R^2	N
USA	1979	4.66** (1.18)	-1.73** (.72)	-1.93** (.63)	.12	64
Belgium	1978	3.20** (1.21)	-1.76* (.77)	-.56 (.80)	.13	23
France	1978	2.64 (2.50)	-2.06* (.96)	-.12 (1.70)	.24	30
West Germany	1978	4.64** (.82)	-1.92** (.58)	-1.94* (.98)	.44	35
Italy	1978	6.15** (1.94)	-4.80** (.83)	-.55** (1.29)	.68	26
Netherlands	1979	2.48 (2.00)	-2.78* (1.07)	1.18 (1.31)	.36	23
United Kingdom	1978	2.42** (.92)	-1.36** (.46)	.34 (.64)	.26	21

Note: Standard errors in parentheses. Significance at 5% (*) and 1% (**) levels. All variables standardized to a mean of 1.

Samples restricted to manual occupations: part-time employees excluded. Apprentices are excluded in all the European countries except the UK.

Sources: Same as Table 1.

For females, the US coefficients are larger than for males, statistically significant, and closer to typical European results. International similarities are most marked for the adult pay coefficient, where the US estimate lies only a little below the EEC average. The relative pay effect is for the European countries invariably weaker for females than for males, and even wrongly signed in two cases. The US is exceptional in that the coefficient on female youth relative pay is not only much greater than its male counterpart but also joint largest across all countries.

In both the male and female samples, the explanatory power of the model, as gauged by the adjusted R^2, is weaker for US than for Europe, though the difference is greater for males than females. The gap in explanatory success may indicate that a wider range of other factors influences youth employment patterns in the US, but it undoubtedly results at least in part from greater measurement error in the US pay variables, which biases slope coefficients and levels of explanation towards zero. The fact that measurement errors are particularly high for relative pay is consistent with the exceptionally low coefficient on relative pay in the results for US males. The strong coefficient for females however sits uneasily with such an interpretation.

The results may be compared to previous empirical work on both European and US youth employment. The adult pay effect is often implicit in dualist descriptions but it has not been given an explicit statistical role before. The youth relative pay effect is more familiar and a specification in disequilibrium terms has become common in British, though not US, studies [Wells 1983; Rice 1986]. The unevenness of our results for relative pay contrast with its generally reliable performance in other research.

The analysis has been limited thus far to industry in order to permit comparisons to the European results. As large numbers of youth work in services, the effects of their inclusion are of interest—though there is nothing in our analysis to suggest that youth employment will be structured differently in the services per se. The least that would be expected would be that an increase in sample size, oriented to

low wage youth intensive employment, would improve the statistical precision of the results by reducing standard errors on the independent variables—although restriction to manual workers limits the informational value of including the service sector.

The inclusion of a substantial number of service subsectors has little effect on the adult pay coefficients or their standard errors. The relative pay variable is affected strongly but without any systematic pattern: it becomes significant for males but does the opposite for females. There is no evidence of systematic differences between the patterning of youth employment in the services and in industry. It is reassuring to find that the more reliable of our variables, adult pay, has similar effects whether the services are included or not.[19]

Conclusions

Our statistical evidence suggests that youth employment is structured in both US and European industry along the lines suggested by dualist writers. Youth employment shares are in all countries and for both sexes inversely related to the position of a sector in the national pay hierarchy. The relationship may be somewhat weaker in the US, where a higher intersectoral pay dispersion proved less capable of explaining a still higher dispersion of youth employment shares than was the case for Europe. However, adult pay remains a significant factor in the patterning of youth employment in the US. Higher measurement errors for the US undoubtedly bias the US coefficients downward relative to the European ones.

It proved more difficult to corroborate for the US the tendency for an age dimension in payment schedules to increase youth employment shares in Europe. Although the relative youth pay effect was always correctly signed in the US results, it performed unevenly for both males and females, proving sensitive (in opposing ways) for both sexes to the inclusion of the service sector. The fact that youth

TABLE 5

Regressions of Youth Employment Intensity On Adult Pay & Youth Relative Pay Across All Sectors, Manual Males & Females, US, 1979

Coverage		Regression Coefficients				
		Intercept	Adult Pay	Youth/Adult Rel. Pay	R^2	N
Males	Manf., Mining, Constrctn.	2.74**	−1.34**	−.39	.07	83
		(.64)	(.46)	(.26)		
	All Sectors	3.35**	−1.59**	−.75**	.10	178
		(.53)	(.36)	(.25)		
Females	Manf., Mining, Constrctn.	4.66**	−1.73**	−1.93**	.12	64
		(1.18)	(.72)	(.63)		
	All Sectors	2.74**	−1.31*	−.42	.02	101
		(1.06)	(.67)	(.52)		

Note: Standard errors in parentheses. Significance at 5% (*) and 1% (**) levels. All variables standardized to a mean of 1.

Samples restricted to manual occupations: part-time employees excluded.

Source: 1980 US Census Public Use Microdata 1/1000 samples.

relative pay is low in the US by European standards (Table 1, above) despite the greater importance of wage-age schedules in Europe suggests that occupational heterogeneity and intra-sectoral segmentation may be more important in the US.[20] The moderately strong inverse association between youth relative pay and adult pay points in the same direction. The absence of a direct measure of the relative price of youth labor within given jobs appears therefore a more serious problem in the US than in the European context.[21]

Differences between the US and European regression results are therefore neither sufficiently systematic nor based on sufficiently strong US data to warrant speculation about any contribution which may be made to them by trans-Atlantic institutional differences.

The compatibility of the results with orthodox analyses of youth employment may be of more interest to an American readership. Given the uneven findings for youth relative pay, attention focuses on the adult pay variable. A relationship between the pay of adult workers and the youth employment share across sectors might be interpreted by a competitive theorist in terms of compensating benefits. If high-wage sectors have high requirements for skills, responsibility, adverse working conditions, etc., then, to the extent that such attributes are associated with low youth-adult substitutability in production, low youth employment shares are expected.

A competitive interpretation of the adult pay effect was rejected for the EEC countries in view of (i) the weak correlation between pay and skill requirements across sectors and (ii) the robustness of the adult pay effect with respect to the inclusion in (I) of a skill mix variable [Marsden and Ryan 1989, Table 8].[22]

The policy implications of these results begin with an emphasis on the quality of youth employment. It is not so difficult to generate low-paid, casual youth jobs in the secondary segment of the labor market, where attenuated adult competition can be backed up by policy measures—such as the subminimum wage in the US and wage subsidies to youth employment and training in several European countries [Garonna and Ryan 1991b].

What is more difficult is to spread youth employment around more widely and in particular to generate career openings for young people in the more stable high-wage segment. Although the strength of the youth pay effect cannot be established for the US from these results, it is unlikely to be any weaker in the US than in Europe. Youth entry to high-wage segments depends on significant age-related reductions in the price which employers must pay in such jobs—i.e., an application of the

principles embodied in the subminimum wage to sectors which statutory minima themselves cannot influence.

The problem is that union and employee resistance to such alterations to payment systems is likely to prove intense, as illustrated by political controversy over the youth subminimum wage itself [Starobin, 1989]. Perhaps the only promising route to such a goal is to link it to an issue whose urgency is growing rapidly in the US: improved youth vocational preparation. Just as the second phase of youth eligibility for the subminimum wage has been made contingent on participation in a recognised training program, so any revision of payment systems to encourage high-wage employers to hire young workers would require the legitimatory cover of approved and externally regulated training. The German apprenticeship systems has developed such guarantees and witnesses nowadays extensive youth entry to a wide range of sectors [Marsden and Ryan 1991b].

The youth labor market in the US stands at the opposite pole from the German one, with the exclusion of youth from a wide range of sectors, but movement towards youth inclusion is a clear economic possibility which would require some complex institutional development.

Finally, our results imply a little noticed casualty of the widespread generation of low quality jobs in the US economy in recent years: intensified youth crowding into low-wage sectors. The narrower segmentation of labor markets which results in continental Europe from greater centralisation and public regulation of pay determination means a more equitable and efficient labor market in general. It also means a less uneven distribution of youth activity around the economy than has been the case in the US.

NOTES

1. We thank the editor and referees for helpful comments and suggestions, and the Joseph Rowntree Memorial Fund for financial assistance.
2. The analytical interpretation of such patterns also remains uncertain, as even dualist writers have suggested that the concentration of youth in casual work reflects in part the preferences of young people themselves [Osterman 1982].
3. The assumption would hardly be defensible nowadays for the other leading categories of secondary worker—females and nonwhites—for whom antidiscriminatory legislation and administrative enforcement constrain employer hiring. In the case of youth, however, public restriction of employer choice is unusual and limited or vague in scope—as in the statutory exclusion of 16–17-year-olds from work in "hazardous industries" in the US [Hills and Reubens 1983]. Restriction by unions has traditionally taken the form of apprentice-journeyman ratios, but they became obsolete long ago and the confinement of US apprenticeship to adults does not reflect any rules requiring such an outcome.
4. "Primary employers normally seek to hire advantaged workers and have adapted wage scales and other labor market adjustment instruments which permit them the privilege of selectivity" [Doeringer and Piore, 1971, p. 203]. Dropping the assumption of costless screening for labor quality introduces the possibility of statistical discrimination which, in the presence of wages tied to the job, leads to zero-one hiring rules [Thurow, 1975]: youths are assessed at mean group quality and, in the extreme, no young people are hired by high-wage employers. The neglect of prejudicial discrimination in our analysis reflects an assessment that not only is it much less important for youth than for females and nonwhites, it may even work in favour of youth [Ryan, 1987].
5. A study of US and Canadian machinist apprentices found that, in 1979, a mere 1.3% were teenagers and only 25.3% were aged 20–24 years [Reubens 1981]. A similar tendency towards the selection of adults rather than teenagers for apprenticeships might be expected in Europe as well, given that apprentice pay is set by stage of training rather than age in the UK and Germany as well. Although some movement in that direction can be seen in both countries in recent years, teenage entry continues to predominate. The source of the US-European difference may involve the recency with which 'age-wage' pay scales have been converted to 'stage-wage' ones in Britain, the low allowances paid to apprentices in Germany, which few adults find attractive, and the tradition in each country that apprenticeship be oriented towards the training of early school-leavers rather than adults.
6. Dualist and job queue theories differ primarily in terms of (i) discontinuity in the structure of pay and (ii) the upward mobility of low income workers when labor markets are tight, which are absent in the job queue and dualist models respectively. Both differences are relevant here, as the dualist theory suggests discontinuities in youth employment patterns and the absence of any relationship between youth employment shares and employment change in high-wage jobs [Doeringer and Piore 1971, ch.8; Thurow 1975; Berger and Piore, 1980; McNabb and Ryan 1989]

7. Orthodox econometric studies of employment by age and sex are weakened by the need for extreme assumptions—in particular, zero or infinite supply elasticities—in order to identify the demand curve [Hamermesh 1985]. Our assumption of exogenous wage structure and demand-determined youth shares averts such difficulties.

8. In Britain youth pay and unemployment are not even closely related at the aggregate level. The relative earnings of young workers continued to rise strongly during the 1970s notwithstanding a rapidly rising youth share of unemployment and, though they fell back somewhat in the 1980s when youth unemployment was at its peak, the decline was limited and concentrated in the secondary segment [Garonna and Ryan 1991b].

9. Osterman [1988, ch.3] notes that the adjustment of relative pay in response to increased labor supply did not occur for young females; and that pay is set in the US not by age but by job, occupation and sector.

10. We investigated the cross-sectoral association between youth employment shares and changes in employment during the previous six years for the six EEC countries and found it generally insignificant [Marsden and Ryan 1986, note 9].

11. The proportion of out-of-school teenagers who work part-time lies above 10 per cent in the Netherlands, France and Belgium, but is nowhere as high as the 32 per cent recorded for the US [OECD 1988, Table 2.3].

12. Much research on US labor markets uses similarly derived estimates of hourly earnings. We can at least avoid one common problem: as we measure employment by numbers employed rather than hours worked, we avoid the severe bias associated with the latter in earnings analyses based on census data [Borjas 1980; Killingsworth 1983]. The analysis of (I) in terms of youth shares of hours worked, which is formally possible—and of particular interest—for the US is therefore avoided here.

13. The low youth share for males in Germany reflects the exclusion of apprentices, who are numerous only in German industry; that in Italy, the concentration of youth employment in artisan workshops and the service sector. The female shares are heavily influenced by international differences in participation amongst adult females, which were notably higher in the UK and the US than in the other five economies [OECD 1988, Chart 5.1].

14. Were extreme observations for all countries split into a greater number of subsectors in the US, an unweighted CV would be higher for the US even if underlying dispersion were no greater.

15. The leading alternative is zero-order correction: replacing the missing youth pay values with sample means, on the assumption that the missing observations are random—an implausible assumption here as we expect the problem to be present primarily in high wage sectors with high youth relative pay.

16. Part-time workers are defined as those reporting that their "usual hours worked per week" in 1979 were less than thirty-five. The part-time share of employment was calculated from the Census of Population dataset used to derive the US sectoral data. Membership density, taken from Kokkelenberg and Sockell [1985], is the 1979 value of a three year moving average of self-reported union membership amongst all employees, derived from the Current Population Survey data tapes.

17. The auxiliary regression results for youth relative pay were:

$$\text{males:} \quad W^y/W^a = \quad 3.84 \quad + 0.021 \text{ UNION} - 0.026 \text{ PTTIME}$$
$$R^2 = .16 \qquad (0.27) \quad (.006) \qquad (.011)$$

$$\text{females:} \quad W^y/W^a = \quad 3.19 \quad + 0.015 \text{ UNION} - 0.005 \text{ PTTIME}$$
$$R^2 = .14 \qquad (0.45) \quad (.011) \qquad (.012)$$

(standard errors in parentheses).

18. Results for the EEC countries in 1966 and 1972 are broadly similar to those for 1978 [Marsden and Ryan [1986, 1989]. The results were little affected by use of a logarithmic (constant elasticity) formulation of (I). Truncation of the domain of the dependent variable at zero may cause biases associated with negative predicted values but such values were rare.

19. We also experimented with cross-sex price effects in the regressions (for example, testing for a link between the pay of adult females and youth employment shares). Our analysis does not predict such effects, in high wage sectors at least, and no systematic patterns emerged when such variables were inserted into the regressions.

20. Differences in mean youth relative pay between the European countries (Table 1) correspond to the importance of wage-age schedules, which have traditionally been much greater in the Netherlands and Britain than in France, Belgium and Italy [Marsden and Ryan 1991a]. Low youth relative pay in US industry clearly cannot be understood in such terms—nor indeed compositionally in terms of a low average age, given later school-leaving in the US.

21. In the strict dualist interpretation, youths are confined in all sectors to a subset of menial jobs which are paid at similar levels across sectors. Under such conditions, relative pay and adult pay will be inversely associated, as is the case in the US, France and Italy (Table 1). Such intrasectoral segmentation reduces the value of sectoral data for the study of segmentation in general and youth employment in particular.

22. An alternative interpretation might look to disequilibrium adjustment, in which rising employment both requires higher pay in order to call forth increased labor supply and, due to the importance of youth labor at the margin, involves higher youth shares. Such an interpretation of our results founders not simply because of the weakness of the association between pay and employment at the sectoral level but also because it predicts a positive relationship between adult pay and youth shares, whereas we find a uniformly negative one.

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