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Abstract

The pattern of manual male employment by age across sectors in Japanese industry between the late 1950s and the mid-1980s is analysed in relation to two aspects of pay structure: the level of adult pay and the relative pay of young workers. The results prove similar in key respects to those already obtained for large Western economies, which suggests that similar institutional forces structured youth employment patterns in Japan and the West. There is also evidence that the development of Japan's school-to-work institutions in the 1960s and 1970s reduced somewhat the sectoral dispersion of youth employment. The longitudinal nature of the Japanese data suggests however that the results for Japan are not robust, and that underlying but unmeasured sectoral attributes are stronger influences than pay structures on youth employment patterns.

1. Introduction[i]

This paper concerns institutional aspects of youth employment, including the role of pay structure and school-to-work institutions in shaping patterns of youth employment. The context is post-war Japan, whose institutional attributes were both distinctive and effective in terms of both youth employment and wider economic performance.

Three particular institutional attributes are considered: labour market segmentation, i.e., the differentiation of pay across comparable employees; the relative pay of young and adult workers; and school-to-work recruitment mechanisms.

The first two are attributes of pay structures. Previous research on youth employment suggested that they played an important role in structuring youth employment in the 1960s and 1970s in Europe and the US. Industries in which adult employees were highly paid employed few young workers, as did those in which the gap between the pay of young workers and adults was small. Such patterns corresponded to expectation, according to the economics of institutionalised (non-competitive) pay structures.[ii]

Given that, the question arises: to what extent did the same two attributes of pay structure play similar roles in the Japanese labour market in the same period? Taking them in turn, the differentiation of adult pay across employers and sectors was particularly high in post-war Japan.[iii] The sectoral distribution of youth employment might therefore be expected to have been comparably dispersed. Secondly, the prominence in leading industrial sectors of employer-based 'internal labour markets' might be expected to have meant, as in post-war France, high youth pay (relative to adult pay in the same sector) and no great incentive to firms to employ young people rather than adults.

At the same time, the relevant Japanese institutions may have worked differently than their counterparts in the West. Two aspects are involved. First, the internal labour markets operated by large Japanese employers have been characterised by lifetime employment, high trust relations between employers and employees. These attributes may have given low youth relative pay a legitimacy that was absent in internal labour markets in the West, where employee job security and trust between employers and employees have both been less. The result was arguably more scope for low youth relative pay, as reflected in strong growth of pay with length of service, and correspondingly stronger incentives to firms to employ young workers in Japan than in the West. Thus the youth-penalising attributes of internal markets in the West may have been replaced by youth-favouring ones in Japan.[iv]

Second, post-war Japan developed distinctive school-to-work institutions. Those institutions involved bilateral links between particular large employers and particular secondary schools and the prioritisation of secondary school-leavers in employee recruitment, taking the form of the annual hiring round of the current year's cohort of school-leavers. These institutions, described as a school-to-work 'superhighway', saw the vast majority of (male) secondary leavers travel rapidly and directly to employment, and often to career employment at large firms.[v] They lack any manifest counterpart in Western countries in both content and performance.

The success of Japan's school-to-work system might be expected to have led not only to less youth unemployment than in the West, but also to a less uneven spread of youth employment across sectors. In that case, the role of pay structure in shaping youth employment might be expected to have been weaker in Japan, and possibly even absent altogether.

The picture is complicated by changes in Japan's labour market institutions during the post-war period. The renowned 'Japanese employment system', in which internal labour markets and school-to-work institutions were embedded, emerged only in the 1950s and 1960s, in association with changes in labour markets, technologies and work organisation.[vi] The interest of firms in employing young workers grew rapidly in association with these changes. The role of pay structure in shaping youth employment patterns might therefore be expected to have changed over time.

This paper seeks evidence on these issues. It uses official statistics of pay and employment by age for selected years during 1958-86. The availability of Japanese data for several years contrasts to the single-year cross-sectional evidence to which previous research on other countries was confined. It allows us to assess the robustness of the association between pay structure and youth employment. We investigate in particular the extent to which the effects of pay structure are statistically distinct from sectoral fixed effects, associated with the underlying but unmeasured attributes of technology and product markets.

Section 2 outlines the analytical framework previously applied to European countries and the US in the 1960s and 1970s. The data are described in section 3. Section 4 analyses the Japanese data and compares the results to those previously obtained for other countries. Section 5 uses the longitudinal aspects of the Japanese data to control for sectoral fixed effects, using a time-series cross-section analysis of data pooled across years. The issue of institutional change is taken up in section 6, as suggested by changes over time in pattern and determinants of youth employment. The conclusions follow in section 7.

2. Analytical framework

This section summarises our analysis of the structuring of youth employment in market economies in general. We assume: first, that pay depends on the attributes of the employer rather than the employee; and second, that pay differences across employers and sectors are non-compensating' – i.e., that they reflect differences in the economic rents received by employees rather than in their supply prices (such as those associated with skill requirements, working conditions, etc.).[vii]

The labour market is then segmented, with scarce 'good' jobs alongside non-scarce 'bad' ones. The segmentationist approach, which followed on from post-war institutionalist labour economics in the US, now overlaps with mainstream labour economics. It sees inter-firm and inter-sector pay differentials in terms of variable economic rent -- i.e., some firms pays their employees more than their alternative wage and those who do so vary in the extent to which they do so. The segmentationist perspective has been supported theoretically by models of efficiency wages and insider power and empirically by associations between product markets, production technologies and profitability, on the one hand, and pay, on the other.[viii] The extent to which inter-sectoral pay differences can be explained by such factors, as opposed to unmeasured differences in such employee attributes as motivation and ability, remains however a matter of dispute.[ix]

Adopting the segmentationist interpretation, we follow Thurow in assuming that workers queue for vacancies in high wage firms, waiting either in low wage employment or in ('wait') unemployment.[x] Employers are assumed free to choose from job applicants and, taking the job's pay as given, to maximise profits by picking the most productive applicants.

We assume also that young and adult workers are substitutes in production, but only imperfectly so, and that, given their inexperience, young workers rank below adults in terms of expected productivity.

The result is that high wage employers hire few or no young workers, preferring to fill vacancies with adults. Low wage employers receive few applications from adults and so accept young workers by default. (Similar arguments can be made for female and immigrant employment patterns, though in those cases, anti-discrimination laws may constrain employer choice). A negative relationship is therefore predicted between the pay of adult employees and the employment of young workers across firms or sectors.

The second dimension is the relative pay of young workers. The rules that govern pay structures, whether formally (as in minimum wage laws or collective agreements) or informally (as in non-union firms' wage policies), sometimes permit lower pay for young than for adult workers within specific jobs and occupations. In the case of 'rate for the job' payment systems, explicit discounts on the established pay rate sometimes apply to young workers, trainees or both (notably as apprentices). If the pay discount permitted for a young employee relative to an adult one exceeds the age-related deficit in expected productivity, the young worker will be preferred to the adult – in contrast to the outcome under payment systems that lack any age-related deductions. Given adult pay, therefore, a negative relationship is expected across employers and sectors between youth relative pay and youth employment share.

Previous research on European countries in the 1960s and 1970s suggested that the issue is not so much whether lower youth relative pay encourages higher youth employment as the institutional conditions under which it can be low in the first place. Low youth relative pay was found to be associated with mass apprenticeship (Germany) or a deep youth sub-minimum wage (Netherlands), but not with the predominance of internal labour markets (as in France and Italy).[xi]

The Japanese case suggests a further institutional basis for low youth pay within the potentially unfavourable 'internal labour market' context: lifetime employment, in which the pay profile of an employee is slanted from the earlier towards the later stages of a career within a single firm. Models of the finance of work-based training and of employee motivation predict such life cycle profiles under particular conditions, but those models assume greater job security than most employers in Western economies have been prepared to offer.[xii]

In Japan, by contrast, large firms have offered lifetime employment to most male employees and have systematically hired school-leavers into careers characterised by low starting pay and high pay progression with seniority and age. The guarantee of job security to adult employees that is implicit in lifetime employment neutered the opposition that trade unions would normally be expected to show to such contracts, making low youth pay potentially acceptable to young and adult workers alike, particularly when offered by large firms with a reputation to develop and protect.

The contracts may also, according to how low starting pay is and how strong pay progression is, have increased employers' interest in employing young workers in the first place – although the scope for substituting young for adult workers has intrinsically been curbed by the job security handed to adult employees by lifetime employment itself.[xiii] Japan may therefore have been characterised by low youth relative pay on average, as well as a significant effect across sectors for youth relative pay on youth employment.

Finally, we recognise the possibility that the analytical framework is not suitable for the analysis of youth employment in Japan. One possible reason is the distinctiveness and influence of the national school-to-

work system, which may have weakened, even removed, the generic structuring effects of these two aspects of pay structure.

A second, separate reason concerns the appropriateness of our analytical approach more generally. We treat pay structure as an exogenous determinant of youth employment, rather than as the jointly dependent outcome of other variables. For example, were labour markets perfectly competitive, youth relative pay and employment would be simultaneously determined by the technological and demand conditions that set the position of relative labour demand and supply curves. Our assumptions were arguably appropriate to the post-war labour markets of large European economies through the 1970s, when the coverage of collective bargaining coverage was high, wage structures reflected the goals and power of the parties to collective bargaining, and employer discretion in pay setting was correspondingly limited. The applicability of our assumptions to the more decentralised and employer-dominated pay setting that prevailed in post-war Japan is more questionable.

In sum, we hypothesise the applicability to the post-war Japanese labour market of the analytical framework previously applied to Western economies. The relatively extensive segmentation of the labour market and the particular form taken by internal labour markets suggest similar structuring patterns in Japan. At the same time, some attenuation of the effects of pay structure on youth employment may be anticipated from the country's distinctive school-to-work institutions. There is also the potential endogeneity of pay structure under decentralised, employer-dominated pay setting.

The limitation of the independent variables to two attributes of pay structure means that other potential influences on youth employment are not included. The most notable one is the change in overall employment. To the extent that young workers act as a marginal source of labour supply, their employment share can be expected to rise and fall with total employment.

The analysis is taken to apply primarily to manual workers, as the institutionalisation of pay structures is taken to have been greater, and occupational heterogeneity less, for them than for non-manuals. Male and female employment are taken to be segregated by occupation and sector, and therefore analysed separately, as previously in analyses of the European economies.

3. Data sources and descriptive statistics

Previous analyses of youth employment and pay structures in the European Economic Community (EEC) used Eurostat's *Survey of Earnings in Industry* (SEI), which gave breakdowns of pay and employment by age, occupation (manual, non-manual) and gender for up to 47 industrial sectors (manufacturing, mining and construction) in 1966, 1972 and 1978. The SEI data were drawn randomly from employer records for establishments with at least ten employees. The analysis was confined to manual workers. (As no comparable source existed for the US, household data from the 1980 Census of Population were used instead.)

The data situation for Japan in the same period was similar to that for the EEC. The Ministry of Labour's *Basic Survey of Wage Structure* (BSWS; *Chinguinkozo kihonnchosa*) ¬ has since 1958 published breakdowns of pay and employment by age for up to 35 industrial sectors. The results represented 500,000 employees in 150,000 establishments each year.

The BSWS covered the same industrial domain as did the SEI. It also used a stratified random sample of employees working for employers with at least ten employees, and it too was based upon employer payroll records. Although the focus of both surveys was pay, their use of large random samples made them potentially valuable guides to employment too.

The BSWS was in some ways superior to the SEI. It was available for all years, not just three separate ones. It distinguished two sub-categories of young worker (<17 and 18-19 years), not just one (<21 years) and was correspondingly less prone to compositional distortion within the youth category over time.

The principal limitation of the BSWS was its orientation to permanent full-time employees, to the exclusion of employees on temporary and daily contracts, whose importance has varied substantially across sectors and time. That feature alone limits the survey's usefulness as a guide to employment.

Other limitations include the definition of a young worker, which the SEI defined as less than 21 years, and the BSWS as less than 20 years. The BSWS was also affected by changes in sector groupings, which means that a 21-sector classification is the finest that can be sustained continuously from the survey's inception in 1958. Finally, from 1987 onwards the survey no longer distinguished manual and non-manual employees, consistent with the prior de facto abolition of that distinction in the personnel practices of large employers.

We study here selected years between 1958 and 1986. The limitation of the data to manufacturing, mining and construction cause little difficulty in the early part of the period. In 1958, 58 per cent of young people left school at lower secondary level and more than 71 per cent of the male leavers at that level who found their first job through the Public Employment Service Office went into those sectors (Tables 1, 2). In other words, the great majority of young manual male workers started their working lives in the sectors covered by the BSWS.

Table 3 reports (all-sector) mean values and dispersion indices for the variables used in the analysis that follows. The coefficient of variation of the ratio of youth to adult employment indicates the variability of youth employment across sectors. At 43 per cent in Japan in 1978, it was markedly higher than for three of the four large European economies, but lower than for Italy (55 per cent). The comparison between Japan and Europe is potentially blurred by the difference in the number and content of the sectoral breakdowns in the Japanese and European surveys. The evidence for Japan does not however conform to the low dispersion of youth employment shares across sectors that might have been expected from the conventional interpretation of the effects of national school-to-work institutions. The dispersion of youth employment did however fall moderately in Japan between 1958 and 1978 (from 50 to 44 per cent), and that change may have reflected the inequality-reducing effects of the development of school-to-work institutions during the 1960s and 1970s.

Japan's exceptional degree of labour market segmentation is reflected in the dispersion of adult pay across sectors, which was roughly twice as large in 1978 as those in the large European economies. The indicator had been one-third larger in 1958, reflecting the marked decline in the segmentation of the labour market after the 1950s. Youth relative pay was strikingly low, and its dispersion across sectors high, by Western standards in Japan in 1978. The previous twenty years had seen a halving in this dimension of pay inequality.

Table 3 also reflects the dramatic shrinkage in the teenage labour force between 1958 and 1978, with the ratio of youth to adult manual male employment falling from 20 to 4 per cent. The trend reflected an

extraordinarily rapid rise in educational participation. In 1958 most young people still left school after nine years (junior high school); by 1985 only five per cent left at that level, as compared to 48 per cent left after twelve years (senior high school) and 46 per cent at post-secondary levels (Table 1).

Table 1: Schooling attainments of newly employed school-leavers in Japan

	Share of all school-leavers (%)			Numbers (`000)
Year	Junior high school	Senior high school	Tertiary	
1955	63.6	29.1	7.3	1198
1960	49.7	41.6	8.7	1376
1965	41.7	46.7	11.6	1500
1970	19.8	59.6	20.5	1370
1975	9.0	56.9	34.0	1039
1980	5.5	49.3	45.2	1217
1985	5.7	45.7	48.6	1233
1990	3.8	43.5	52.7	1431

Source: Yoshimoto, K., Kosugi, R., Takabe, H. and Yokoi, T. (1998), 'Transition from initial education to working life in Japan', Report to OECD Thematic Review of Transition from School to Work; unpublished document, OECD, Paris (Table A13).

Table 2: Male leavers from Junior High School finding employment through the Public Employment Service Office by sector (%)

	1954	1958	1962
Manufacturing	69	67	82
Construction	3	4	3
Other	28	29	15
Total	100	100	100
('000)	1263	2012	2031

Source: Kariya, Takehiko, S. Sugiyama and H. Ishida, *Gakkõ, Shokuan to Rõdõ Shijõ: Sengo Shinki Gakusotsu Shijõ no Siekoda Katei (Schools, Public Employment Offices and the Labour Market in the Post-war Period: the Institutionalisation of the Market for New School-Leavers*. Tokyo: University of Tokyo Press, 2000), p. 160.
Note: excludes mining

4. The effects of pay structure on youth employment

The results of estimating a linear relationship between youth employment ratios and the two pay structure variables prove similar in Japan to those already derived for Western economies for 1978-9 (Table 4). In the results for Japan in 1978, the regression coefficients on the adult pay and the youth relative pay variables both show the expected negative sign. The adult pay effect is significantly different from zero, though the youth relative pay coefficient fails marginally to attain the conventional five per cent level of statistical significance.

Table 3. Sectoral distributions of manual male employment and pay by age

		No of sectors	Youth employment ratio[a]		Youth relative pay[b]		Adult pay[c]	
			Mean	cv[d]	mean	cv	mean	cv
Japan	1958	21	20.1	49.6	45.2	13.7	100.0	18.6
	1978	21	4.2	43.9	58.0	6.8	100.0	13.2
France	1978	34	7.1	29.7	75.7	4.5	100.0	8.5
Germany	1978	35	4.8	37.1	76.9	5.4	100.0	6.0
Italy	1978	33	4.8	54.8	84.8	5.0	100.0	7.5
UK	1978	36	9.8	27.4	61.6	7.9	100.0	7.4

Other source: De Freitas, Marsden and Ryan, *EEJ*, 1991, Tables 1, 2 (note 1, above)
Notes: sectoral coverage is manufacturing, mining and construction in all cases
youth category is '<20 years' for Japan and '<21' years for other countries
a. youth employment as a ratio of adult employment (%); apprentices excluded, except in UK
b. average gross hourly earnings (excluding annual bonuses) of young employees as percentage of those of adult employees
c. average gross hourly earnings (excluding annual bonuses) of adult employees as percentage of all-sector weighted average
d. cv: coefficient of variation (standard deviation/mean, %)

Table 4: Regression analysis of youth shares of manual male employment in relation to adult pay and youth relative pay in Japan and large Western economies, 1958 and 1978/79

	Year	Youth age group	Adult pay	Youth relative pay	R^2	N
Japan	1958	<20	-.349*	-1.05*	.38	35
			(.082)	(.305)		
	1966	<20	-.640*	-1.30*	.59	21
			(.139)	(.307)		
	1978	<20	-.072*	-.134	.24	21
			(.031)	(.103)		
France	1978	<21	-3.04*	-1.82*	.60	34
			(.45)	(.93)		
West Germany	1978	<21	-4.52*	-3.12*	.32	35
			(1.10)	(1.32)		
Italy	1978	<21	-6.31*	-3.25*	.57	33
			(1.01)	(1.20)		
UK	1978	<21	-2.65*	-1.68*	.57	36
			(.40)	(.39)		
USA	1979	<21	-1.34*	-0.39	.07	83
			(.46)	(.26)		

Source: DeFreitas, G., D. Marsden and P. Ryan, *EEJ*, 1991, Table 3
Notes: all regressions contain an intercept (not reported here); standard errors are given in parentheses; asterisk indicates significant difference from zero (5% level of significance or lower)
The adult group comprises all employees older than those in the youth group; all pay variables involve gross hourly earnings (excluding annual bonuses, in the case of Japan).

The overall level of explanation of inter-sectoral variation in youth employment ratios, as indicated by the R^2 statistic, proves lower for Japan in 1978 than for the European countries, but higher than for the US (for which the use of population survey data is likely to have meant greater measurement error). The lower explanatory power of our approach for Japan and the US than for the European countries is consistent with the lesser plausibility of treating pay structures as exogenous with respect to employment structure (above).

The Japanese data provide only a 21 sector breakdown for 1978, and only a little more for any year after 1960. Precise results cannot be expected from such small samples. We therefore pool the sectoral cross-sections across years, partly to increase sample size, partly to look for evidence of institutional change, and partly to assess the effects on our interpretation of allowing for sectoral fixed effects. For this preliminary investigation we do not include all years but rather a scattering of years, with a bias to the earliest and latest parts of the period of interest. Our goal was to analyse jointly the years 1958-61, 1966-68, 1974-6, 1978-9 and 1984-6. Missing data led us to exclude the years 1959, 1960 and 1974, resulting in a balanced panel of 21 sectors and 231 observations across the remaining ten years.

The results of a pooled cross-section time-series analysis are initially encouraging. The use of a larger sample results in both well defined coefficients and the expected signs for both pay variables, and the explanation of almost two-fifths of the variability of youth employment ratios across sectors and time (Table 5, column 1). The analysis cannot however be left there.

Table 5: Regressions of youth share of manual male employment on adult pay and youth relative pay in pooled cross-section time-series data, Japan, selected years, 1958-86

	(1)	(2)	(3)
Intercept	88.5*	69.7*	25.6
	(6.6)	(5.7)	(13.1)
Adult pay	-.259*	-.207*	-.012
	(.036)	(.028)	(.079)
Youth relative pay	-.935*	-.652*	-.239
	(.082)	(.085)	(.127)
Fixed effects: year	X	√	√
Fixed effects: sector	X	X	√
R^2	0.39	.69	.83

Notes: n=231 (21 sectors, 10 years: 1958, 1961, 1966-68, 1975, 1978-9, 1984-6)

As the ratio of youth to adult employment fell strongly during the period, in association with the rise in post-compulsory educational participation (Table 1), a formulation in which the youth employment ratio remained the same across time as long as neither pay variable changed is implausible. A simple, albeit restrictive, way of responding is to include fixed effects in the time dimension, on the assumption that they capture the effects of exogenous, demographically-induced shifts in relative youth labour supply. The youth employment ratio is allowed to change over time but is constrained to do so by the same absolute percentage in all sectors between any two years. The inclusion of fixed effects by year reduces the size of the coefficients on the two pay structure variables, but both remain significantly different from zero, and the statistical performance of the relationship improves greatly, 'explaining' more than two-thirds of the variance of youth employment ratios across sectors and time explaining (R^2=.69).

A final option that panel data makes possible is the inclusion of sectoral effects as a test of the robustness of relationships derived from cross-sectional evidence alone – as has been the case for all previous empirical applications of our approach. Cross-sectional relationships between pay structures and youth employment may be economically spurious, created by the joint determination of both by underlying and uncontrolled sectoral heterogeneity. In this context, such a situation could arise were differences in, e.g., technology and product markets to cause both pay structures and youth employment to differ simultaneously across sectors. Such might be the case were technologies that involve particularly dangerous or responsible working conditions to lead both to high pay for adult employees (e.g., in order to ensure an adequate supply of their labour) and a low substitutability of youth for adult labour, so that few young workers are employed however low their relative pay. Allowing for such sectoral fixed effects can then cancel the statistical relationship between pay structure and youth employment.

Sectoral effects, assumed invariant over time, can be included as non-random or random variables. As the number of years in the data is reasonably large and any sectoral effects are likely to be correlated with adult pay, non-random effects are assumed here. Their introduction into the pooled regression (Table 5, column 3) increases the level of explanation still further (R^2=.83), but that comes at the expense of the pay structure variables. Both coefficients remain negative, but neither variable remains statistically significant.

Table 6. Coefficients on fixed effect indicator variables, Japan

		Coefficient
Year	1961	1.6
	1968	-4.7
	1975	-14.1
	1979	-16.1
	1986	-15.5
Sector	Food and tobacco	9.7
	Textiles	9.9
	Clothing	13.7
	Wood products	4.5
	Furniture	14.4
	Paper	8.1
	Printing	9.3

Chemicals	4.8
Petroleum products	4.5
Rubber goods	14.0
Leather	12.2
Stone and ceramics	5.2
Iron and steel	3.9
Non-ferrous metals	7.2
Metal goods	15.2
Machinery	12.2
Electrical goods	17.4
Transportation equipment	11.5
Precision goods	16.8
Construction	4.0

Notes: excluded categories are 1958 (time) and mining (sector);
estimates for other years not reported here
Standard errors on time effects are 1.3 and on sectoral ones 1.8;
all coefficients significantly different from zero (p=0.5) except that for 1961

The coefficients on the fixed effects when the pay variables are removed (i.e., using a simple 'least squares dummy variable' model) are shown in Table 6. The decline in the relative scale of youth employment over time is reflected in coefficients that are at least 14 percentage points lower for years starting with 1975. All sectors show systematically higher youth employment ratios than the excluded sector (mining), with particularly high ratios for the metalworking, clothing and furniture sectors, and relatively low ones for chemicals, petroleum and iron and steel.

Table 7. Pooled regression results by sub-period, manual male permanent employment in Japanese industry

Years	Adult pay	Youth relative pay	R^2	N
1958, 1961, 1966,	-.402*	-1.24*	.50	105
1967, 1968	(.052)	(.15)		
1975, 1978, 1979,	-.058*	-.13*	.24	126
1984, 1985, 1986	(.013)	(.04)		

Note: regressions contain fixed effects for time but not for sector

The high level of explanation of youth employment ratios attained with fixed effects for year and sector does not of course indicate success. The non-performance of the pay variables in the presence of sectoral fixed effects might reflect several factors. One might be an inappropriate dependent variable. In post-war Japan, pay involved a significant and increasing bonus component, paid annually. These bonuses (converted to an hourly equivalent in the following year) can be included in the pay variables for Japan from 1966 onwards. As doing so has little effect on the results, beyond a small decrease in overall explanatory power when sectoral fixed effects are not included, the relevant results are not reported. Similarly, the exclusion of non-permanent

employees, who were particularly numerous among young workers until the 1960s, may distort the results in ways are picked up by sectoral effects.

A second line of explanation might involve a low intra-sectoral variability of the pay variables across time, making their influence difficult to distinguish from the fixed effects alternative. This may play a part for the adult pay effect, as the intra-sectoral (i.e., across years) standard deviations of that variable are typically only one third as large its intra-year (across sectors) ones. For the relative pay effects, however, variability across years within sectors is comparable to that across sectors within years.

A third explanation concerns dynamics. Changes in pay variables over time may affect youth employment only in lagged fashion, and in the absence of a dynamic formulation, sectoral fixed effects may capture their longer-term effects on youth employment.

Finally, the analytical framework may be misspecified, particularly as it applies to Japan, with its lower levels of collective and public regulation. The same might apply in the case of the Western economies, in that had similar panel data been available for them, the effects of pay structure on youth employment would not have survived the introduction of sectoral fixed effects there either.

5. Institutional change

The labour market facing Japanese youth changed greatly during the period covered by the BSWS data. Mainstream accounts of these changes start with the youth labour market of the 1950s, as resembling closely its Western counterparts – notably the difficulty for many young people of finding permanent work, particularly in large firms, in the face of continuing unemployment, industrial restructuring, limited educational attainments, and relatively rates of youth labour market entry. At the same time, the effects on young workers had been palliated by the development from 1947 of a national hiring network, involving trilateral administrative co-ordination between national government, employers and junior high schools, and extensive movement of young workers from rural agricultural origins to urban industrial destinations.

The obstacles to youth employment changed swiftly at the end of the 1950s. The already high rate of economic growth intensified, putting an end to the post-war labour surplus. The educational attainments of young people shifted rapidly from junior high school to senior high school completion (Table 1). Large firms rejuvenated employment by recruiting young people in larger numbers, increasingly direct from school. The youth labour market moved from near-balance in the second half of the decade to marked excess demand by 1961. The 1960s saw the emergence in large firms of the distinctive Japanese production system, characterised by flexible working and continuing skill development – conditions for which senior high school leavers, characterised by high attainment and high malleability, rapidly became the preferred source of production labour. The government devolved to senior high schools the responsibility for finding work for their graduates, leading to the development of the relationships between particular schools and large employers for which Japan has since become well known.[xiv]

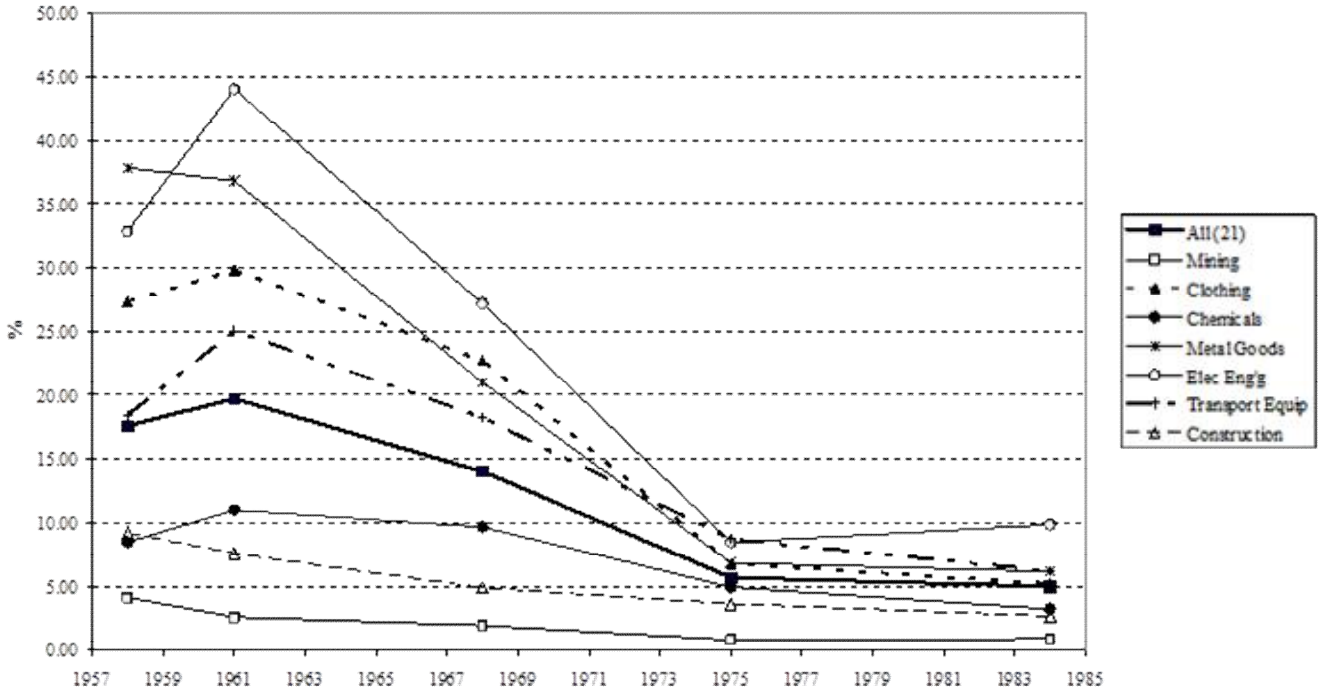
The institutional complementarities between the internal labour markets of large firms and school-employer linkages resulted in a powerful source of large-scale and direct movement from school to work, and

correspondingly high rates of career employment for young people. The system came under some pressure from the early 1980s, as slower growth led large firms to reduce youth recruitment, but serious difficulties emerged only in the 1990s.[xv]

These developments might be expected to show up in patterns of youth employment and pay over time in the BSWS data. In particular, the differentiation of youth employment across employers and sectors might be expected to have declined as young people for the first time gained large-scale access to career employment in large firms in high paying industrial sectors. The similarity between the structuring of youth employment by attributes of pay structure in Japan and the Western economies might similarly be expected to have declined over time[xvi].

There evidence from the BSWS is broadly compatible with these propositions. The dispersion of youth relative employment across 21 industrial sectors fell strongly from the high levels of 1958 and 1961 to a low point around the mid-1970s, after which it changed little through the mid-1980s. Figure 1 indicates the broad pattern of change, illustrated by seven sectors in five years. Standardised for the fall in the all-sector mean, the coefficient of variation falls less dramatically but still moderately strongly, from 50 to 44 per cent between 1975 and 1978 (Table 3). Setting aside the problem of uncontrolled fixed effects, the explanatory power of pay structure for youth relative employment falls markedly – as visible in the contrast between 1966 and 1978 in Table 4, above, and in the weakening of the relationship between the 1950s and 1960s and the 1970s and 1980s (Table 7). If our analytical framework is set aside as inapplicable to Japan,

Figure 1: Ratio of youth (<20) to adult full-time regular employees, manual males, manufacturing, mining and construction sectors, Japan, 1958-84



A clearer sense of the timing of these changes might be obtained by analysing data for the years missing from this analysis. The limited scope of the BSWS (notably the exclusion of non-permanent employees) suggests a need for alternative sources of information. The status of our analytical framework is also problematic. Nevertheless, the BSWS evidence does suggest particular timing-related attributes of institutional change. First, the sectoral structure of industrial employment changed little between 1958 and 1961, despite the shift in the youth labour market from broad balance to strong excess demand. Second, the weakening of what was had in 1958 and 1961 been a moderately strong association between sectoral identity and youth employment continued throughout the 1960s, and probably until the first energy crisis in the mid-1970s, as the cross-sectional dispersion (CV) of youth relative employment was lower, and the association between youth relative employment and pay structure weaker, in 1975 than in any of the other years analysed here.

6. Conclusions

The data analysed here allow us to compare from a segmentationist perspective the structuring of the youth labour market in Japan and Western economies during the post-war 'golden age', marked by strong economic growth and full employment, and to seek evidence concerning the evolution of Japan's distinctive school-to-work institutions during the period.

We find more similarities between Japan and the West than might be expected in the associations between inter-industry wage structure and youth relative pay, on the one hand, and youth relative employment, on the other. High wage sectors employ relatively few young workers in both cases; sectors in which the pay of young employees is low relative to that of adults employ a higher proportion of young workers as a result. In these respects, youth labour markets appear to have been governed by similar forces in Japan and the West.

There is also evidence, albeit only indirect and partial, of youth-related institutional development in Japan during the period. The dispersion of youth employment across sectors, and the role of the pay variables in promoting that dispersion, had by the mid-70s become moderately weaker than it had been at the end of the 1950s – a development consistent with the celebrated success of Japanese institutions at opening up to young people the career employment opportunities in large firms that have been scarce (apprenticeship apart) in the West. Further work on these issues should focus on developments in large firms, making use of the breakdowns by firm size that the BSWS provides.

The downside arises from another advantage of the Japanese data: the scope it gives for exploiting time-series as well as cross-sectional variation in general, and for testing the robustness of results based only on cross-sectional evidence in particular. Neither pay variable survives the encounter with longitudinal evidence. The pay effects not only overlap with underlying unmeasured sectoral attributes but prove inferior to them in the statistical 'explanation' of youth relative employment across time and sector, in that their otherwise striking statistical significance vanishes when sectoral fixed effects are included.

That finding raises in turn the possibility that the same result would hold for the West as well, were longitudinal data available for those countries as well. An alternative interpretation might be that our analytical framework is more relevant to the more institutionalised labour markets of Europe in the 1960s and 1970s, to which it was first applied, than to the less institutionalised ones of post-war Japan, in which employers may

have enjoyed more autonomy, and youth relative pay and employment were more likely to have been jointly determined by such underlying factors as technology and preferences.

A competitive interpretation of labour market functioning would treat the relative pay and employment variables in such terms. It might interpret any inverse association between adult pay and youth employment in terms of technological factors – such as a combination of (i) variable experience requirements in employment across sectors and (ii) low substitutability between inexperienced and experienced labour in production in sectors with high experience requirements. Put more simply, in sectors with high adult pay, experienced adults are more productive and young workers poorer substitutes than in low wage sectors. These results cannot inform the difference between the two lines of interpretation, but they do suggest a need for further investigation.

[i] We would like to thank Mari Sako ¬ for comments on an earlier draft of this work.
[ii] See De Freitas, Gregory, David W. Marsden and Paul Ryan, 'Youth employment patterns in segmented labour markets in the US and Europe', *Eastern Economic Journal*, vol. 17 (April 1991): 223-36, and references therein to previous work.
[iii] Rowthorn, Robert, 'Corporatism and labour market performance', in Pekkarinen *et al*., *Social Corporatism: a Superior Economic System?* Oxford: Clarendon Press, 1992.
[iv] Sako, Mari, 'Institutional aspects of youth employment and training: a comment on Marsden and Ryan,' *British Journal of Industrial Relations*, 29(3) (September 1991): 485-90.
[v] Kariya, Takehiko and James E.Rosenbaum, 'Institutional linkages between education and work as quasi-internal labour markets', *Research in Social Stratification and Mobility* vol 14 (1995): 99-134; Paul Ryan, 'The school-to-work transition: a cross-national perspective', *Journal of Economic Literature*, vol. 39 (March 2001): 34-92.
[vi] Koike (19¬).
[vii] McNabb, Robert and Paul Ryan, 'Segmented labour markets', in David Sapsford and Zafiris Tzannatos (eds), *Current Issues in Labour Economics*. London, Macmillan, 1991.
[viii] Bulow, J.I. and L.Summers, 'A theory of dual labour markets', *Journal of Labour Economics*, vol 4 (July 1986): 376-414; Lindbeck, Assar. and Dennis Snower (1990), Interindustry wage structure and the power of incumbent workers', in R.Brunetta and C.Dell'Arringa (eds), *Labour Relations and Economic Performance*. London, Macmillan; Blanchflower, David, Andrew Oswald and ¬ Sanfey, 'Wages, rents and profit sharing', *Quarterly Journal of Economics*, vol ¬ (Feb 1996): ¬.
[ix] The employer and sectoral components of pay structures may however be caused by unmeasured differences in labour quality, over and above the attributes that are typically available for empirical analysis, which are often limited to years of schooling and work experienceAbowd, John, Francis Kramarz and David Margolis, 'High wage workers and high wage firms', *Econometrica*, 67(2) (March, 1999): 251-335 concluded that inter-sectoral pay differentials reflected primarily unmeasured aspects of employee quality. The restrictive assumptions involved in such studies and conflicting evidence, based on the fortunes of laid off employees who change sector on reemployment, means that the extent to which sectoral pay differentials reflect the unmeasured attributes of employees as opposed to employers remains unresolved.
[x] Thurow, Lester, *Generating Inequality*. New York: Basic Books, 1975.
[xi] Marsden, David W. and Paul Ryan, 'The structuring of youth pay and employment in six European economies', in Paul Ryan, Paolo Garonna and Richard C. Edwards (eds), *The Problem of Youth: the Regulation of Youth Employment and Training in Advanced Economies*. (London: Macmillan, 1991).
[xii] Becker, Gary, *Human Capital*. (NBER: New York, 1964); Edward Lazear, ¬
[xiii] Nohara, Hiroatsu, 'Formes d'insertion professionnelle des jeunes: le cas du Japon', in Ministère du Marché du Travail et Commisariat Général du Plan (eds*), Structures du Marché du Travail et Politiques d'Emploi*. Paris: Syros-Alternatives, 1988.
[xiv] Kariya, Takehiko, S.Sugiyama and H.Ishida, Gakkõ, Shokuan to Rõdõ Shijõ: Sengo Shinki Gakusotsu Shijõ no Siekoda Katei (Schools, Public Employment Offices and the Labour Market in the Postwar Period: the Institutionalisation of the Market for New School-Leavers). Tokyo: University of Tokyo Press, 2000; Kariya, Takehiko, 'From high school and college to work in Japan: meritocracy through institutional and semi-institutional linkages', in Yossi Shavit and Walter Müller (eds), From School to Work, Oxford University Press, 1998: 311-36; Koike 1997¬.
[xv] Mitani, N., 'The Japanese employment system and youth labour market', in OECD, *Preparing Youth for the 21st Century: the Transition from Education to the Labour Market*. OECD: Paris, 1999.

[xvi] Nohara, Hiroatsu (1995) 'Les salaires en France et au Japon : comparaison des structures de salaires dans l'industrie manufacturière des deux pays de 1978 à 1986' *Travail et Emploi, N°62, (01/1995)*