BARGAINING STRUCTURE, WAGE DETERMINATION, AND WAGE DISPERSION IN 6 OECD-COUNTRIES

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Abstract.

The paper examines the role of collective bargaining systems as a determinant of the inter-industry wage structure. It compares wage patterns of six countries: Austria, Canada, Germany, Norway, Sweden and the U.S.. We use comparable wage regressions from micro cross-sections data to calculate inequality in pay across sectors. Our findings suggest the following: First, high (low) wage sectors in one country tend to be high (low) wage sectors in others, irrespective of the (dis)similarity in labor market institutions. Second, differences in the amount of pay inequality are likely to be the result of differences in collective bargaining: more centralized bargaining structures tend to narrow pay differentials across industries.

1. Introduction

Persistent inter-industry wage differentials are a common phenomenon in almost all countries. Despite this undisputed fact, however, the nature of these differentials is still not clearly understood.

The evidence has been interpreted in support of non-competitive theories of wage determination. Workers who move from one industry to another face wage changes which are comparable in size to average differentials among stayers. (Krueger and Summers, 1988). In addition, industry pay gaps remain, even within narrowly defined occupational groups. (Dickens and Katz, 1987). The former observation is inconsistent with a theory relying on unobserved productivity as the driving force behind wage differences; the latter rules out that (unobserved) job attributes account for observed differentials.

Apart from efficiency wage mechanisms, alternative approaches focus on workers' ability to extract profits from the firm. Although these theories do not necessarily rely on the presence of organized labor[1], unionism - or, more generally, labor market institutions - should play an important role. If the institutional environment had sufficient explanatory power as a variable determining the inter-industry wage structure, wage patterns should vary systematically with differences in the systems of wage determination.

Among the first multi-country studies of sectoral pay variation is the paper by Lebergott (1947)[2]. He concludes that rank correlations in industry wages in the 1940's were

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1 Dickens (1986) puts emphasis on union threat: in order to prevent workers form unionizing, employers pay above market clearing wages even in non-unionized industries. The power of incumbent workers in the Lindbeck and Snower (1988) model comes from their ability to refuse cooperation with (or to harrass) outsiders.

2 His set of countries includes Canada, the Soviet Union, Sweden, Switzerland, the U.K., and the U.S..

rather high across six different countries. More recent evidence comes, among others, from Krueger and Summers (1987). They find high correlations even if capitalist are compared with communist economies, or developing are compared with developed countries. Thus, given this evidence, it is unlikely that institutional factors are the underlying mechanism behind the industry wage structure.

These results, however, are based on aggregate industry wage data, and the usual objection applies: the failure of correcting for individual, especially labor quality characteristics, might lead to spourious correlations. This is because the relevant control variables are likely to be correlated across industries as well.

In addition, the evidence, is not unambigous. Wagner (1990) e.g. finds, that there is no case for a similarity in the wage structure across 5 industrialized countries. He uses standard human-capital wage equations based on micro cross-sections data from the ISSP (International Social Survey Programme). This is a unique multi-country data set, based on identical questionnaires in the participating nations, so that data between countries are quite well comparable. The main problem of this study is the rather small number of observations within each country, so that the results may well be subject to sampling errors.

Another comparative study by Arai et al (1992) finds rather high cross-national correlations. However, they focus on the very homogeneous group of the Nordic countries, so that it is difficult to draw general conclusions about the role of specific institutions on the industry wage structure.

Even if the wage structure happens to be very similar across countries with very different structures of collective bargaining, we might not conclude that institutions do not matter. This is because in many European countries unions are organized along industry lines. They might not determine the ranking of high versus low wage

industries, but very well the size of the pay gaps. The role of wage negotiations is even more important since in many European countries the outcome of wage negotiations is extended by law to all workers[3]. This is quite different from the U.S. or Canada, where union density is low, especially in the private sector; and union coverage and union membership are basically the same thing.

Within countries with strong unions, there is an additional dimension, which received quite a bit attention in the literature: the degree of centralization in wage bargaining. In a recent paper, Rowthorne (1992) showed evidence that wage inequality decreases with the degree of coordination among national unions. Again, this evidence is drawn from aggregate statistics and refers to wage disperson within the manufacturing sector only.

In the following, we will analyze empirically the questions mentioned above: (i) the similarity of the wage structure across countries with rather different systems of wage determination, (ii) the effect of unionism on the degree of wage dispersion, and (iii) the role of bargaining centralization for distributional outcomes across industries.

For this purpose, we present evidence from human-capital wage equations estimated from micro cross-sections data. We compare the inter-industry wage structure of six countries: Austria, Canada, Germany, Norway, Sweden, and the U.S.. It is obvious, that this set of economies is useful to address the question of institutional influences. Austria, Norway and Sweden are outstanding examples of corporatist economies. German unions, although less coordinated, negotiate labor contracts which are extended by law also to non-union workers in the industry. The U.S. and Canada are

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3 For a compact overview of institutional aspect of wage determination in OECD-countries see Layard, Nickell and Jackman (1991), for an extensive discussion of European systems see Flanagan, Soskice and Ulmann (1983).

on the opposite side of the scale; neither is unionism very important[4], nor is there any coordination: unions are operating mainly on the firm or on the plant level.

We begin by describing the data sources in the next section. Section 3 present the results, and section 4 concludes.

2. Data and Specifications

Table 1 displays the data sets underlying our subsequent estimates. All surveys were collected at a roughly similar period: the beginning of the 1980s. This is important since wage inequality is not constant over longer periods of time.[5] In addition, all samples are of sufficient size in order to avoid small sample errors. With the exception of the German data set, the number of observations in Table 1 refers to male and female employees in the private, non-agricultural sector, for which complete information on all variables used in the subsequent regressions were available.[6]

Table 1

There are, however, important differences in data sets which limit their comparability. First, data from Germany are for males only, and there is no information on hours of work. Second, Austrian data report net rather than gross earnings. Because of the progressivity of the tax system we will underestimate true wage inequality. Third, results from

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4 This is especially true for the private sector in the U.S.. Troy (1992) shows that unionism in the Canadian private sector follows the U.S. developments very closely.
5 Davidson and Reich (1987) find that the U.S. industry structure varies considerably over time, Pollan (1990) shows similar evidence for Austria.
6 Non-response is considerable in the Austrian sample, but unlikely to have a large effect on the estimated coefficients, see Zweimüller (1992).

Canada do not allow us to disaggregate within the manufacturing sector. Fourth, we dispose of results from only one specification in the case of Germany, Canada and Sweden. Due to different sample restrictions, different wage measures and different sets of control variables these regressions are not directly comparable.

According to these limitations we use three specifications for the wage regressions to assess inter-industry wage differentials:

Specification I:
dependent variable:log hourly wage rate;
controls: years of schooling, experience, experience squared, dummies for sex, race, non-manual worker, urban area (SMSA), and industry dummies (single dummy for manufacturing).

Specification II:
dependent variable: log earnings;
controls: years of schooling, experience, experience squared, and industry dummies (manufacturing disaggregated).
(sample restricted to males only).

Specification III:
dependent variable: log hourly wage rate;
controls: years of schooling, experience, experience squared, dummies for sex and industries (manufacturing disaggregated).

3. Results

We first present the estimates of the industry coefficients.[7] In all regressions the inclusion of industry dummies significantly improved the explanatory power of the regression. Table 2 shows the industry coefficients' deviation from the employment weighted mean. Thus, the numbers in Table 2 have a simple interpretation: a negative sign indicates that the respective industry pays below average and vice versa. The underlying results are based on

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7 Full regression results are available on request from the authors.

specification III for Austria, Norway, Sweden and the U.S., specification I for Canada, and specification II for Germany. Despite the limited comparability of the data, Table 2 gives some indication certain industries (like Mining, Insurance-Banking) pay above average in all countries. Retail Trade, Hotels-Restaurants and Personal/Household Services are low-wage industries. This is a first hint, that wage patterns are similar across countries.

Table 2

There is considerable variation in the range of pay differentials. E.g., the hotels and restaurants sector in the U.S. pays 29.0 % (=1-exp(-.342)) below average, whereas workers in the mining industry earn 37.7 % (=1-exp(.320)) more than average. This is quite different from Sweden, where the gap ranges from - 14.0 % (=1-exp(-.151)) for personal/household services to + 16.4 % (=1-exp(.152)) in the insurance sector.

The get a more compact picture on the similarity in wage patterns we calculated correlations in industry pay gaps across the six countries (Table 3). Figures of limited comparability, due to different underlying specifications, are shown in parantheses. All correlations involving Austria, Norway, and/or the U.S. were calculated from regressions with an identical set of covariates, sample restrictions, and earnings measure.

Table 3

Table 3 supplies two correlation measures: within each entry in the matrix the upper figure is obtained from the finer industry classification (manufacturing disaggregated), the lower figure from the coarser classification. Where necessary, industry coefficients were aggregated to the

finest common classification, using relative employment shares as weights.

The results in Table 3 make a clear statement: the industry wage structure is very similar across countries. From the 25 numbers displayed in the matrix 13 are higher than .70, and only three are lower than .50. It is also worth noting, that the results do not change very much with the underlying specification. Both findings suggest, that biases from correlating aggregate industry wages are likely to be small.

Next, we turn to the size of wage differentials (Table 4). We calculated the standard deviation of the coefficients based on the different specifications, weighted by employment share and adjusted for randomness of the estimates.[8] Weighting by employment shares turns out to be not very important[9]. This means that the differences in the figures reflect differentials in pay rather than differences in the employment structure across countries.

Table 4

Table 4 shows that there is a hugh difference in standard deviations of industry wage differentials between the U.S. and Canada, on the one hand, and Austria, Germany, Norway, and Sweden on the other. Where available, the figures turn out not to be very sensible to the choice of specification.[10] Canada and the U.S. have a very similar

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8 Note that the estimated coefficient for industry j can be written as $b_j = \beta_j + e_j$, where β_j denotes the 'true' and b_j the estimated coefficient; and e_j is an error term with mean zero. Ignoring covariance terms, the variance of the 'true' industry coefficients is given by $var(\beta) = var(b) - var(e)$.

9 Taking simply unweighted figures generally increases the standard deviations slightly: this stems from the fact that in the samples very high and very low paying industries also have small employment shares.

10 It is worth noting, that the results in Table 3 are similar to the findings obtained in other studies. See e.g. Winter-Ebmer (1992) for Austria, Barth and Zweimüller (1992)

degree of wage dispersion. This reproduces the evidence available from aggregate data (e.g. Krueger and Summers, 1987). The same holds for Germany,Norway and Sweden. With respect to Austria, however, the evidence contradicts aggregate statistics. The results of Freeman (1988) as well as Rowthorne (1992) suggest an industry wage dispersion in Austria as high as in Canada or the U.S.. In the Austrian sample aggregate industry dispersion (i.e. the standard deviation of coefficients obtained from a regression including industry dummies only) is high (.17).[11] The inclusion of human capital variables and the sex-dummy, however, decreases wage dispersion strongly.

4. Conclusions

Three conclusions arise from the analysis above: First, rather homogenous wage patterns persist across countries, even after controlling for labor quality. This casts doubt that labor market institutions are the underlying force behind the inter-industry wage structure. Not only are the estimated correlations high, when countries with very different systems of wage determination are compared. There is also no evidence that the size of the correlations varies according to the degree of similarity in the institutional environment: according to our estimates, the correlation between the Norwegian and Swedish wage structure is about as high as the correlations between Sweden and the U.S..

Second, unionism and collective agreements influence the size of wage differentials. As far as the Scandinavian countries are concerned, this result is not surprising:

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for Austria and Norway, Bellmann (1992) and Zancchi (1991) for Germany, Arai (1990) and Edin and Zetterberg (1992) for Sweden, and Krueger and Summers (1988) for the U.S..

11 Recall, that Austrian figures are calculated from net rather that gross figures, so that this measure is likely to be somewhat underestimated.

here, wage solidarity has always been an important argument in the unions' objective. In countries where basically all workers are covered by collective labor contracts, where unions are organized along industry lines, a strong emphasis on wage equality in unions' demands is likely to lead to small industry pay gaps. However, the cases of Austria and Germany show, that this is not a necessary condition. In Austria and Germany unions are much less concerned with distributional issues.[12]

Table 5

Third, coordination of wage bargaining, seems to be an important determinant of industry wage dispersion. Table 5 shows the ranking various authors gave the six countries investigated in this paper with respect to the degree of cooperation in wage bargaining. The U.S. and Canada are commonly ranked as the most decentralized systems, as opposed to Austria, Norway, and Sweden which are exemplar corporatist economies. But also in Germany, coordinated union strategies are very common: pattern bargaining (with the IG Metall as the leader and the remaining unions as followers) is an important feature of the German system of wage determination. This ranking more or less coincides with the ranking we obtain from Table 4 with respect to the size of industry wage differentials.

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12 Small industry differentials do, of course, not mean that wage inequality is low in general. In Austria, e.g. occupational wage differences, the gender pay gap, as well as the dispersion in the returns to human capital is much higher than e.g. in Norway. (Barth and Zweimüller, 1992).

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Table 1 Description of Data Sets

	Data Set	# observations
Austria	Micro Census 1983	10,184
Canada	Canada Census Individual File Tape 1982 (10 % random sample)	16,435
Germany	Employment Survey, Institute for Employment Research, Nuremberg, 1982-1985	48,983
Norway	Norwegian Survey of the Level of Living, 1983	1,287
Sweden	Swedish Level of Living Survey, 1981	1,736
U.S.	Current Population Survey, 1983	134,928

Note: # of observations refers to non-agricultural, private sector employees, men and women, with complete information on all variables used in the regressions; the German data set is based on males only.

Table 2 Industry Premia
(Deviations from employment weighted mean)

	AU	CAN	GER	NOR	SWE	US
ELECTRICITY,GAS,WATER	.091	.228	.087	-.021	.060	.289
MINING	.024	.262	.056	.127	.123	.320
MANUFACTURING		.059				
- food,beverages	-.033		-.051	.002	.050	.051
- text,clothes,leather	-.108		-.095	-.125	.010	-.122
- wood,furniture	-.091		-.054	-.059	-.115	-.039
- paper,printing,publ.	.076		.034	.083	.036	.078
- chemical,oil,rubber	.047		.048	.140	.005	.192
- mineral products	.004		-.018	-.049	-.036	.081
- basic metal	.004		.046	.125	-.085	.129
- machinery,equipment	a)		a)	.052	.020	.177
CONSTRUCTION	.010	.142	-.057	.086	.070	.162
TRADE	-.014					
- wholesale		-.037	-.009	.079	-.037	.035
- retail		-.217	-.080	-.122	-.047	-.171
HOTELS, RESTAURANTS	-.054	-.394	-.364	-.101	-.133	-.342
TRANSPORTATION	-.005	.062	-.031	-.061	-.014	.163
COMMUNICATION	b)	.096	b)	.057	b)	.297
BANKING	.107	.036	.122	.034	.037	.097
INSURANCE	c)	c)	c)	.274	.152	.122
BUSINESS SERVICES	.090	.053	.018	.170	.069	-.018
SANITARY AND SIMILAR	-.111	-.140	-.124	-.153	-.072	-.168
RECREATION AND CULTURE	.080	-.203	.0003	-.066	-.020	-.155
HEALTH AND WELFARE	.084	-.009	-.016	-.010	d)	-.002
RESEARCH AND EDUCATION	-.027	.236	e)	e)	d)	e)
OTHER SERVICES	-.011	d)	-.013	.010	d)	-.064
PERSONAL,HOUSEHOLD SERV.	-.113	-.506	-.092	-.152	-.151	-.262

Note: numbers are regression coefficients minus the employment weighted mean.

a) classified under basic metal
b) classified under transportation
c) classified under banking
d) classified under recreation and culture
e) classified under health and welfare

Table 3 The Similarity of the Industry Wage Structure: Correlation coefficients of industry dummies

	Austria	Canada	Germany	Norway	Sweden	U.S.
Austria	1.000	na	.500	.695	.684	.453
		.761	.492	.858	.766	.523
Canada		1.000	na	na	na	na
			(.715)	.763	(.896)	.812
Germany			1.000	.219	(.689)	.747
				.598	(.765)	.743
Norway				1.000	.690	.636
					.826	.726
Sweden					1.000	.696
						.833
US						1.000

Note: Upper and lower figures refer to the finer (i.e. manufacturing disaggregated) and the coarser industry classification, respecitively.
The calculation of correlations in ()'s involved regression coefficients obtained from different specifications.

Table 4 Standard Deviation of Industry Coefficients (weighted adjusted)

	Specification		
	I	II	III
Austria	.037	.033	.054
Canada	.171	na	na
Germany	na	.066	na
Norway	.063	.045	.059
Sweden	na	na	.041
US	.163	.194	.172

Table 5 Centralization in Wage Bargaining

	# of countries analyzed	RANKING					
		AU	CAN	GER	NOR	SWE	US
Blyth	16	1	16	8	2	3	15
Bruno and Sachs	17	1	16	2	4	4	17
Calmfors and Driffil	17	1	17	6	2	3	16
Cameron	16	3	13	8	3	2	10
Schmitter	14	1	11	8	3	2	10

Source: Calmfors and Driffil (1988)