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REFLECTIONS ON THE INTER-INDUSTRY WAGE STRUCTURE

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ABSTRACT

This paper reviews available evidence on the inter-industry wage structure. The inter-industry wage structure is remarkably similar in different eras, in different countries, and among different types of workers. Industries with high capital-to-labor ratios, monopoly power and high profits pay relatively high wages. We conclude that the competitive model cannot without substantial modification provide an adequate explanation of the inter-industry wage structure. The implications of this finding for micro and macro economic theory and policy are examined.

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The pattern of inter-industry wage differentials appears to be one of the most pervasive regularities generated by capitalist economies. Consistently, the differentials are substantial with manufacturing industries paying on the order of 20 percent more than service industries for comparable workers. The wage structure is amazingly parallel in looking at data for different countries or different eras. And it appears very similar for workers of different ages, sex, degrees of skill, and in different occupations. An important objective of economic research should be the explanation of these patterns. Their pervasiveness suggests that they result from factors fundamental to the workings of capitalist economies which transcend the institutional setting in any particular time or place.

Our goal in this paper is to summarize the available evidence on the inter-industry wage structure, drawing on our own research and that of others, and to suggest some of the necessary elements in any explanation of the wage structure. We begin in Section I by discussing issues of measurement. Data on the inter-industry wage structure are inevitably of varying quality. While recent data are available which permit researchers to control for a wide variety of individual attributes in assessing the wage structure, and even to look at the wages of individual workers who move between industries, similar data are not available historically for the United States, or even currently for many other countries. It is therefore important to ask whether or not these quality controls make a significant difference in assessments of the inter-industry wage structure. If so, the broad array of evidence available on the wage structure in different times and places

must be viewed skeptically. If not, it can be used to formulate and test alternative explanations for inter-industry wage variations. Fortunately, it appears that controlling for measurable quality does not have an important impact on estimates of the inter-industry wage structure so that historical and international data appear to be usable.

Section II takes up the question of the robustness of the wage structure. We first show that the wage structure has been remarkably stable in the United States over the past century. Second, we show that the wage structure in different mature capitalist economies is quite similar, but that the wage structure in these nations is different from that of Communist or less developed economies. Third, we show that the wage structure is very similar for different types of workers. Certain industries pay all types of workers high wages and others paying all types of workers relatively low wages. The limited evidence that is available suggests a similar pattern is followed by firms with some paying high wages within all occupational groups while others pay low wages within all groups. We conclude our description of the wage structure by briefly attempting to distinguish the characteristics of high and low wage industries.

Section III considers alternative explanations for the wage structure. We begin by asking how far the competitive labor market model can be extended to account for observed wage patterns. The competitive model, unlike many of the ideas that have been advanced in discussions of wage patterns, is coherent in the sense that the motivations of workers and firms are clearly articulated and their

behavior is derived as a function of the constraints they face. The competitive model has also shown its ability to explain an enormous variety of phenomena and to make an abundance of empirically verifiable predictions. Where it can be made plausible, it is far preferable as an explanation for labor market behavior on the grounds of its past success as well as Occam's Razor. Unfortunately, we are led to conclude that the competitive model cannot without substantial modification provide a plausible explanation of inter-industry wage variations.

The principal question that any non-competitive explanation of the wage structure must face is why firms paying high wages do not cut their wages. There are only two logical answers to this question. First, firms may find that cutting wages is unprofitable because it affects worker performance in some way. This idea forms the basis for efficiency wage theories. Second, it is possible that firms do not try always act so as to maximize profits at least when paying high wages is an alternative. We conclude that industry wage differentials reflect in large part rent sharing between firms and workers,and endure because the payment of high wages is not very costly for firms for efficiency wage reasons.

Section IV concludes the paper by discussing the significance of inter-industry wage variations for micro and macro economic theory. The close analogy between the problems of involuntary unemployment and inter-industry wage variations is developed in some detail and the challenge that wage differentials pose to common conviction that markets work well determining the composition of output is stressed.

I. Labor Quality Controls and the Industry Wage Structure

An obvious issue in considering the inter-industry wage structure is labor quality. To the extent that different industries employ workers with different skill levels, there is little reason to expect that average wages will be equalized. This problem makes the interpretation of data on average wages in different industries somewhat problematic. This is unfortunate since a wealth of such data are available for different historical periods and different countries. In this section we examine the extent to which naive calculations of average wages are misleading as to the payment practices of different industries.

Our approach is to compare the inter-industry wage structure that would be estimated from looking only at average industry wages, with the estimated wage structure that results from the estimation of econometric wage equations which control for a variety of worker characteristics including age, sex, marital status, race, education, location, and job tenure. A finding that the wage structure estimated without controls parallelled the wage structure estimated with controls would suggest that crude average wages may not be too misleading as indicators of the wage structure, while a finding that controlling had a large impact on the estimated inter-industry wage structure would suggest the opposite conclusion.

Our comparison draws on data from the 1984 Current Population Survey (CPS) and follows the procedures described in Krueger and

Summers (1986). Column (1) of Table 1 reports the proportionate difference in wages between the average worker in an industry and the weighted average worker in all industries. For comparison column (2) reports proportionate industry wage differences after controlling for education, age, occupation, gender, race, union status, marital status, region, and SMSA, and allowing several of the coefficients to differ for men and women.[1] It is clear that the addition of these controls barely alters the ranking of industry wage differences. Indeed the correlation of the industry wage differentials estimated with and without controls is .95.

While controlling for worker characteristics has relatively little impact on the rankings of different industries, it does reduce significantly the estimated inter-industry dispersion of wages. The standard deviation of the estimated industry wage premia falls from 24% when no controls are present to 15% when they are included. In large part this decline results from controlling for occupation and sex. The general conclusion seems to be that observed differences in average wages between industries do result partially from differences in labor quality with higher wage industries tending to attract higher quality workers.

The finding that controlling for observed productivity characteristics of workers in micro data does not change the pattern of wage differences allows for the comparison of industry wages over time and across countries with aggregate industry wage data since it is

[1] Results reported here are based on a sample that includes full and part-time privately employed nonagricultural workers. Results were qualitatively similar when the sample was narrowed to nonunion workers and full-time workers.

Table 1: Estimated Industry Wage Differentials With and Without Labor Quality Controls

May 1984 CPS
(Standard Errors in Parentheses)

Industry	Without Labor Quality Controls		With Labor Quality Controls	
Mining	.404	(.043)	.262	(.036)
Construction	.216	(.024)	.153	(.022)
Ordnance	.344	(.144)	.114	(.118)
Lumber	-.027	(.053)	-.048	(.045)
Furniture	-.098	(.063)	-.033	(.052)
Stone and Clay	.357	(.061)	.082	(.051)
Primary Metals	.357	(.048)	.179	(.041)
Machinery Excl. Elec.	.335	(.028)	.187	(.025)
Electrical Mach.	.185	(.030)	.105	(.027)
Transport Equipment	.370	(.030)	.189	(.027)
Instruments	.232	(.051)	.131	(.042)
Misc. Manufacturing	.004	(.066)	.001	(.054)
Food	.085	(.036)	.072	(.031)
Tobacco	.356	(.213)	.294	(.173)
Textile	-.114	(.048)	-.022	(.041)
Apparel	-.327	(.037)	-.156	(.033)
Paper	.241	(.050)	.126	(.042)
Printing	.119	(.035)	.083	(.029)
Chemical	.362	(.041)	.238	(.034)
Petroleum	.594	(.094)	.382	(.077)
Rubber	.038	(.051)	.035	(.043)
Leather	-.245	(.075)	-.126	(.062)
Other Transport	.266	(.033)	.161	(.028)
Communications	.353	(.035)	.194	(.030)
Public Utilities	.527	(.039)	.287	(.033)
Wholesale Trade	.171	(.026)	.065	(.022)
Eating and Drinking	-.504	(.022)	-.188	(.022)
Other Retail	-.241	(.013)	-.156	(.081)
Banking	.084	(.026)	.077	(.023)
Insurance	.105	(.026)	.080	(.022)
Private Household	-.776	(.038)	-.367	(.101)
Business Services	.027	(.027)	.013	(.024)
Repair Services	.004	(.042)	-.007	(.036)
Personal Services	-.329	(.030)	-.163	(.026)
Entertainment	-.181	(.043)	-.143	(.036)
Medical Services	-.183	(.026)	-.073	(.024)
Hospitals	.143	(.025)	.064	(.023)
Welfare Services	-.194	(.032)	-.254	(.028)
Education Services	-.052	(.032)	-.189	(.029)
Professional Services	.225	(.031)	.071	(.027)
Weighted Standard Deviation of Differentials b	.240		.146	

Notes: a) Controls include education and its square, 6 age dummies, 8 occupation dummies, sex dummy, race dummy, central city dummy, union member dummy, ever married dummy, veteran status, marriage * sex, education * sex, education squared * sexd, and 6 age * sex interactions. Sample size is 10,289.
b) Weights are employment shares for each year.

unlikely that controls would change the pattern of industry wages in these data. The next section relies on this finding to draw conclusions based on aggregate data on the wage structure over time and across countries. It is of course conceivable that differences in average wages across industries reflect differences in unmeasurable rather than measurable aspects of labor quality. At this stage, we remain agnostic regarding this issue to which we will return in Section III, and claim only that the crude average data we examine are representative of the results that would be obtained if it were possible to control for measurable aspects of workers' productivity such as schooling and experience.

II. Regularities in the Inter-industry Wage Structure

This section examines evidence on the inter-industry wage structure and documents its extreme stability across time and space. It then goes on to show that wage differentials are similar for different types of workers and to relate wage patterns to industry characteristics. We defer interpretation of the observed patterns to the next section.

Wage Differentials Over Time

The stability of relative wages within the manufacturing sector of the economy has been noted many times. Slichter's (1950) classic work on the topic illustrates the constancy of the industry wage structure.

Slichter examined hourly wage data for unskilled males from the National Industrial Conference Board establishment surveys of twenty manufacturing industries in the U.S. from 1923 to 1946. He found a rank correlation of industry wages over this time period of .73. From this Slichter concluded that "the inter-industry structure of wages has considerable stability during short or moderately short periods of time."[2]

Although comparisons over long periods of time are difficult because of changes in industry definitions, we have extended Slichter's analysis of manufacturing data by matching the 1923 Conference Board data that Slichter analyzed to industry wage differentials estimated from the May 1984 CPS reported in column (2) of Table 1. A plot of the 1923 wage differentials against the 1984 industry wage differentials is presented in Figure 1. The plot shows that relatively high wage industries in 1923 such as auto manufacturing continued to be high wage industries in 1984, and low wage industries such as boot and shoe manufacturing continued to be low wage industries in 1984 The correlation of industry wages in 1984 and 1923 is .56. Since this correlation is probably an underestimate due to changes in industry definitions and sampling error, we consider this evidence that the wage structure has remained relatively stable for a very long time.

Data on manufacturing wages refer only to a relatively small and dwindling part of the economy. In 1985, less than 20 percent of the labor force was working in the manufacturing sector. One of the often claimed regularities in the wage structure is the tendency for

[2]Cullen (1956) reaches a similar conclusion from analyzing data on annual earnings for 76 manufacturing industries between 1899 and 1950.

manufacturing firms to pay high wages generally, while service sector firms tend to pay relatively low wages. For these reasons, it is useful even at the cost of some sacrifice in data quality to examine information on the economy-wide wage structure.

In Table 2 we present correlations of log annual earnings of full time equivalent employees in 9 major industries for selected years between 1984 and 1900 and the standard deviation of industry wages in these years.[3] The industry wage structure for all industries has remained remarkably constant since 1915, with correlations with the wage structure in 1984 ranging from .76 to .98. Prior to 1920 the pattern of industry wages was less similar to the current industry wage structure, but the correlation is still greater than .60 between relative wages in 1900 and 1984. Overall, it appears that the structure of relative industry wages hardly changes over a decade, and that it changes only moderately over much longer intervals.

Researchers have noted the stationarity of the industry in other countries as well. Tarling and Wilkinson (1982) and Lawson (1982) remark on the stability of the industry wage structure in the United Kingdom in years after World War II. Papola and Bharadwaj (1970) study the rank correlation of industry earnings in 17 countries. They find a stable ranking of industry wages in developed countries but a less stable pattern of industry wages in less developed countries. The limited evidence suggests that stability in the industry wage structure is a universal phenomenon in industrialized capitalist countries.

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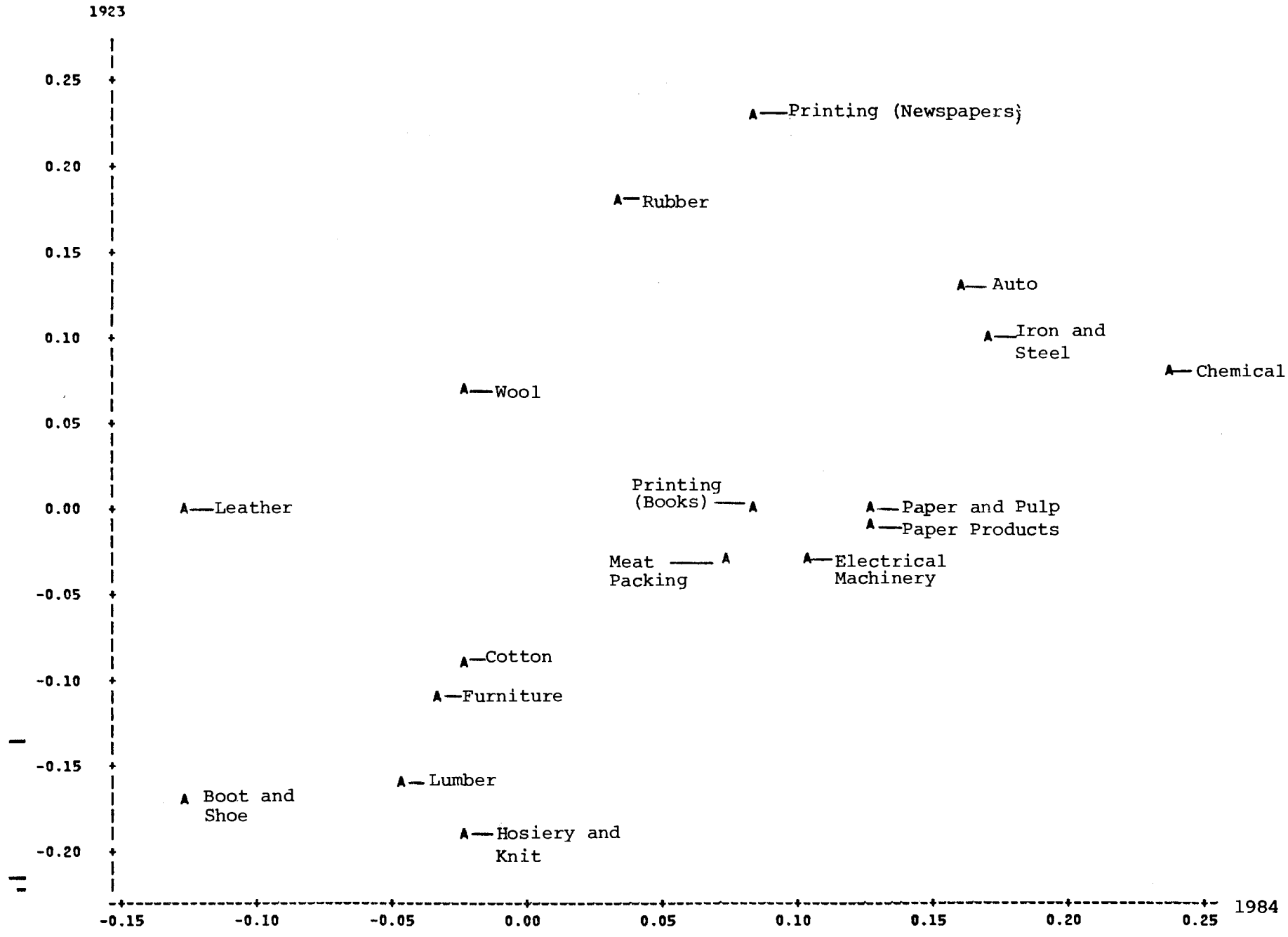
[3]The nine industries include agriculture, manufacturing, mining, construction, transportation, communications, wholesale and retail trade, finance, insurance, and real estate, and services.

GRAPH 1: WAGE DIFFERENTIALS OVER TIME (Percentage Difference From Mean Wage)



Turning to the dispersion in industry wages, the data in Table 2 suggest that the industry wage dispersion fluctuates somewhat over time. However, there is not a tendency for the industry wage structure to increase or decrease over time. This is consistent with previous research such as that of H.G. Lewis (1963) demonstrating that over the very long run the dispersion in relative industry wage differences in the U.S. displays no trend but that in the short run, dispersion tends to be counter-cylical, increasing in economic downturns and decreasing during upturns. Lewis found that the greatest dispersion in annual compensation of full-time workers among industries occurred in 1932 during the height of the Great Depression, while the lowest standard deviation was during the post-World War II recovery period. Over the thirty year span that he studied, however, Lewis concluded there was no secular trend in the dispersion of industry wages.[4]

Overall, the available information suggests that industry wage structure is very stable with the extent of variation but <u>not</u> the ranking of individual industries changing through time.

International Wage Structure Comparisons

The U.S. has unique institutions and history. If the wage differentials discussed above are due to the particular institutions of the U.S. economy we would not expect to find a similar pattern of wage

[4] Wachter's (1970) analysis of the cyclical nature of the industry wage structure also finds evidence of a counter-cyclical dispersion in industry wages. Bell and Freeman (1985), however, find evidence of a noncyclical upturn in the dispersion of wages in manufacturing industries in the 1970's.

Table 2: Industry Wage Structure Through Time
Comparison of Log Annual Earnings of Full-Time
Equivalent Employees in Nine Major Industries

Year	Correlation with 1984	Standard Deviation
1984	1.000	.322
1980	.984	.296
1975	.961	.298
1970	.909	.366
1965	.898	.401
1960	.893	.410
1955	.893	.399
1950	.866	.338
1945	.891	.287
1940	.836	.460
1935	.793	.526
1930	.761	.478
1925	.801	.487
1920	.807	.396
1915	.627	.472
1910	.604	.473
1905	.636	.461
1900	.616	.467

Notes: Data are reported in Historical Statistics of the US and various issues of Survey of Current Business. Industries include agriculture, manufacturing, mining, construction, transportation, communications, wholesale and retail trade, FIRE, and services.

differences in other countries. On the other hand, if diverse countries have similar wage structures we have evidence that a common thread across all countries, such as technology or market structure, is responsible for these wage differences. In this section we address the issue of whether the structure of wages is the same in all countries.

There have been several comparative studies of the industry wage structure in different countries. In the first of these studies, Lebergott (1947), compared industry wage rankings in six countries. Only annual income data for manufacturing industries in a few countries were available at the time of his study. Furthermore, he could only speculate about the effect of labor quality on the industry wage structure.

Nonetheless, Lebergott found a high rank correlation in industry wages in the 1940's between the U.S. and Canada, the United Kingdom, Sweden and Switzerland. The U.S. and Soviet Union did not have a high correlation among industries when all industries were considered, but elimination of two industries dramatically increased the rank correlation. He concluded that the industry wage structure is as similar between the U.S. and other nations as it is among separate regions within the U.S. Conclusions similar to Lebergott's have been obtained by Dunlop and Rothbaum (1955) and Papola and Bharadwaj (1970).

Improved data collection in several countries in recent years permits more detailed and comprehensive comparisons of industrial wage structures across nations. Table 3 presents evidence on the universal similarity in wages among manufacturing industries in 14 countries in 1973 and 1982. The data are drawn from the International Labor

Table 3: Correlations of Log Manufacturing Wages Among Countries -- 1982

	Canada	France	Japan	US	Germany	USSR	UK	Bolivia	Yugoslavia	Norway	Mexico	Sweden	Korea	Poland
Canada	1.0	.85	.82	.92	.83	.41	.88	.43	.61	.67	.55	.79	.75	.45
France		1.00	.95	.90	.87	.71	.93	.45	.84	.80	.52	.84	.81	.47
Japan			1.00	.89	.86	.84	.93	.59	.88	.80	.58	.81	.82	.65
US				1.00	.85	.33	.95	.51	.79	.67	.81	.82	.86	.70
Germany					1.00	.78	.90	.49	.77	.74	.51	.84	.87	.50
USSR						1.00	.81	.34	.63	.47	.57	.54	.41	.64
UK							1.00	.56	.75	.70	.74	.83	.84	.63
Bolivia								1.00	.43	.41	.54	.45	.40	.46
Yugoslavia									1.00	.65	.44	.78	.75	.50
Norway										1.00	.33	.74	.65	.38
Mexico											1.00	.46	.43	.23
Sweden												1.00	.82	.47
Korea													1.00	.43
Poland														1.00

Notes: See Data Appendix for further details.

Organization's (ILO) Yearbook of Labor Statistics and described in greater detail in the Data Appendix.

In general, the pattern of relative wages is remarkably similar across countries particularly when attention is confined to developed capitalist economies. The correlations are quite high, typically between .7 and .9.[5] The correlation in wages between the U.S. and other countries in 1982 was very high, ranging from .95 with England to .33 with the Soviet Union. Eight of the 13 correlations between the U.S. and other countries are above .8, and 11 are above .6. In comparison the correlation of relative industry wage differentials in the south and nonsouth regions of the U.S. is .91.[6] The industry wage structure is roughly as similar between different regions within the U.S. as it is between the U.S. and other countries.

Graph 2 presents a representative plot of US industry wages against industry wages in Japan. Both countries clearly have a similar industry wage structure. The transportation industry, for instance, is a high wage industry in both countries while the apparel and textiles industries are examples of low wage industries in both countries.

In addition to the 1982 results, we examined correlations among industry earnings in 1973 for the same sample of countries. There appears to be no trend in the correlation in industry wages between the U.S. and other countries between 1973 and 1982. In six countries the correlation with the U.S. was stronger in 1982, while in seven countries the correlation with the U.S. was weaker in 1982.

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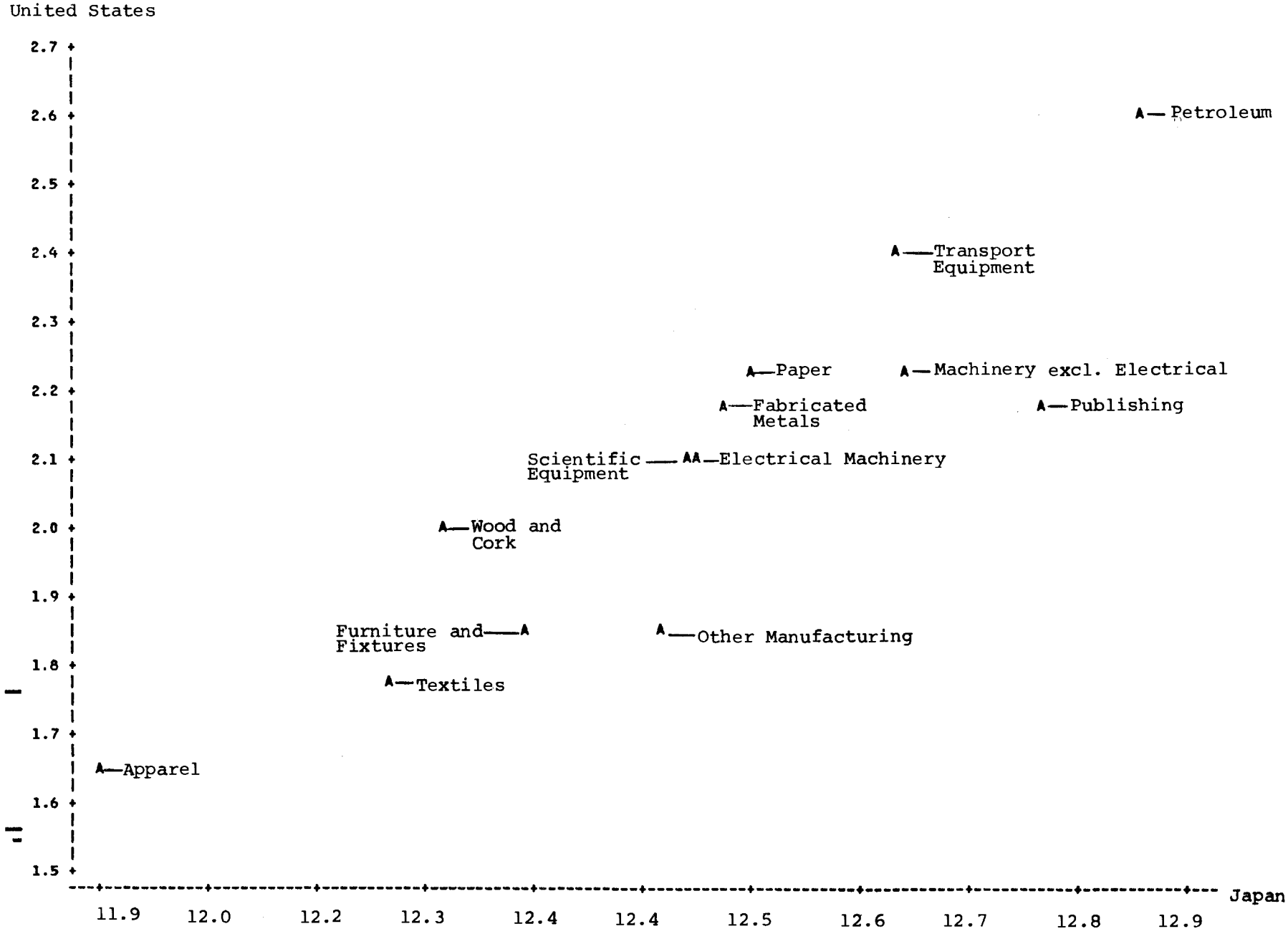
[5] Correlations are of log wages, which eliminates the need to adjust for exchange rates and inflation. Results were qualitatively similar when the correlations were weighted by U.S. industry employment shares.

[6] This correlation is for all industries after controlling for labor quality, occupation, and demographic factors.

GRAPH 2: PLOT OF INDUSTRY WAGE STRUCTURE IN US VS. JAPAN (Log Wages)



Bolivia and Mexico stand out as countries which had dramatically more similar wage structures in comparison to the U.S. in 1982 than in 1973. The correlation in wages between Mexico and the U.S. increased from .16 to .81, and the correlation between Bolivia and the U.S. increased from .20 to .51 between 1973 and 1982. The process of development may be very important in determining the ultimate structure of industry wages.

Table 4 shows that relative wage dispersion as measured by the standard deviation in log average earnings in manufacturing industries is substantial in all countries. In 1982 the standard deviation ranged from a high of 31.4% in Korea to a low of 8.1% in Sweden. In general, developed capitalist countries tend to have greater dispersion in wages across industries than underdeveloped, socialist or communist countries. This may reflect the greater level of human capital attainment in the more developed capitalist countries.

Overall the available information on wage structures in different countries suggest a similar conclusion to the historical data on wage structures. The rankings of different industries are remarkably stable, but there is a moderate degree of variation in the magnitude of industry wage differentials among countries.

Wage Differentials for Different Kinds of Workers

Another way to gain insight into the inter-industry wage structure is by examining how it varies across different types of workers and plants. We find the inter-industry wage structure to be quite stable

Table 4: Wage Dispersion Among Manufacturing Industries
Select Countries

	Year	
	Standard Deviation of Log Wages	
Country	(1) 1973	(2) 1982
Bolivia	.204	.168
Canada	.225	.239
France	.143	.126
Germany	.137	.141
Japan	.216	.263
Korea	.349	.314
Mexico	.147	.155
Norway	.075	.107
Poland	.126	.097
Sweden	.067	.081
USSR	.117	.101
United Kingdom	.087	.140
United States	.206	.241
Yugoslavia	.126	.120

See Data Appendix for description of data set. 1981 data are used in column (2) for Bolivia, France and USSR.

among workers with short and long job tenure, young and old workers, and workers in different occupations, but some differences are apparent across different types of firms.

Table 5, drawn from Krueger and Summers (1986), compares the industry wage structure for several subsamples of workers. The first four rows show that industry attachment has about the same effect on wages of young and old workers, and workers with short and long spells of job tenure. Whatever leads to inter-industry wage differences does not appear to involve the recruitment of new workers or the human capital of older ones. It also appears that there is a high correlation between the wage structures of blue and white collar workers suggesting that the inter-industry wage structure is not simply a reflection of job characteristics.

Dickens and Katz (1986a) extensively examine the issue of whether or not industry wage differentials follow similar patterns for workers in different occupations. Their analysis reveals a remarkable similarity in the inter-industry wage structure of different occupational groups. For instance, they find a correlation of .86 between industry wages of laborers and managers, and .77, after controlling for individual characteristics. The industry wage structure is very similar for workers in radically different occupations.

An important variable that affects wages is employer size. Several studies have documented a positive relationship between company or establishment size and wages, even after controlling for labor quality and working conditions (Mellow, 1982 and Brown and Medoff,

1985). If high wage industries are composed of larger than average firms, the industry wage structure may in part reflect the employer size wage differential. To test the importance of firm size in determining industry wages, we analyze the industry wage structure separately for workers in small firms (less than 100 employees) and large firms (more than 1,000 employees). We find a high correlation between industry wage differentials in small and large firms, but the dispersion in industry wages is significantly lower among workers in small firms.

A related issue to firm size is self employment. The self employed are the ultimate small firm. Despite the fact that skills are likely to be diverse among the self employed and the substantial errors in reporting self-employment, inter-industry wage variations are about one-quarter smaller among the self employed than among other workers. Again, however, there is a high correlation between industry wage differentials of the self employed and other workers.

Additional evidence on the similarity of wage structures for different types of workers comes from data on different establishments in a single industry. Groshen (1986) reports evidence that establishments tend either to pay high or low wages to all occupational groups.[7]

[7]Leonard (1986) finds weak evidence of a positive correlation between wages in different occupations across establishments in the "high technology" sector. For instance, the correlation of receptionists' and light truck operators' wages across establishments was .35. However, Leonard did not find a statistically significant correlation of wages between occupations in nearly half of the occupation pairs he studied.

Table 5: The Inter-Industry Wage Structure Of Different Types of Workers

Sample	Standard Deviation of Industry Wage Differentials[a]	Weighted Correlation with Complement[b]
Age		
(1) Age 20-35	.139	.85
(2) Age 50-65	.134	
Tenure		
(3) Tenure ≤ 1	.087	.75
(4) Tenure > 10	.096	
Firm Size		
(5) 1-99 Employees	.073	.78
(6) 1,000 or More Employees	.111	
Types of Employment		
(7) Self Employed	.097	.84
(8) Privately Employed	.133	
Occupation		
(9) Blue Collar	.126	.63
(10) White Collar	.140	

[a]Rows (7) and (8) are unweighted; all other rows are weighted by 1984 employment.

[b]Complement is the other reported subsample. Correlations are not adjusted for sampling variation.

[c]Controls are the same as in Table 1. Year dummies were also included in rows (7) and (8).

[d]Sample sizes for rows (1) through (10), respectively, are 4,932, 1,811, 5,116, 1,619, 3,752, 3,497, 3,378, 46,232, 3,959, and 6,335. Rows (1), (2), (7) and (8) are 1984 CPS. Rows (3) through (6) are 1979 CPS. Rows (7) and (8) are May 1975, 1976, 1977, and 1978 CPS.

By applying analysis of variance techniques, Groshen is able to attribute the share of individual wage variation that is due to several factors. She then divides the total variation in wages that is due to each source. Most importantly, she controls for narrow occupational grades, gender and region. Table 6 reports some results of this analysis. The table shows that establishment is an important factor in the dispersion of wages, even after controlling for occupation and occupation-establishment interaction. In the Industrial Chemicals industry, for instance, establishment effects alone result in a 13% standard deviation of wages. In comparison, occupation, gender, region and form of payment contribute 9% to the standard deviation in wages. The total standard deviation in wages for workers in the Industrial Chemicals industry is 17%.

Why are wages so strongly affected by establishment controls? Groshen finds that establishment characteristics, including size, region, major product, proportion male, technology and payment method, can explain about half of the establishment effects. However, there is a substantial amount of idiosyncratic variation in wages among establishments. These findings at the establishment level suggest that some establishments pay high wages for workers for workers of a given quality and others pay low wages for workers of the same quality.

Characteristics of High and Low Wage Industries

Several researchers have studied the characteristics associated with high and low wage industries. Here we review the evidence on two

Table 6: Estimated Standard Deviations of Wages in Various Classes[a]

Source	Plastics	Industrial Chemicals	Wool Textiles	Shirts and Nightwear	Cotton Textiles	Struct. Steel	SIMPLE MEAN
Occupation, Sex Region & Incent.	.18	.09	.09	.09	.10	.17	.12
Establishment	.14	.13	.11	.09	.06	.13	.11
Interaction	.09	.05	.05	.07	.05	.07	.06
Individual	.07	.03	.09	.14	.10	.04	~~.08~~ .09
TOTAL	.25	.17	.18	.20	.16	.18	.19

a For instance, in the Plastics industry, the standard deviation in log wages across establishments is]8%, controlling for occupation, sex, region and form of payment (incent.). The total standard deviation is the standard deviation in log wages in across all workers without controls.

We are grateful to Erica Groshen for allowing us to present this table which is drawn from her dissertation.

key factors -- the industry's ability to pay high wages and union density. A comprehensive survey of the relationship between wages and several industry characteristics is provided in Dickens and Katz (1986b) in this volume.

Table 7 summarizes select empirical estimates of the relationship between an industry's ability to pay high wages and the wage structure. Indirect measures have been used to proxy for an industry's ability to pay high wages. The table reports the change in wages associated with a two standard deviation change in each measure of the industry's ability to pay.

The nature of the product market affects a firm's competitiveness, with firms in monopolistic or oligopolistic industries insulated from market pressure that accompanies a policy of paying supra-competitive wages. Several studies have examined the effect of product market structure on wages. Market structure is typically measured by the four firm concentration ratio, degree of import penetration, and barriers to entry. In general, there is some evidence that less competitive industries pay higher wages, though this finding is sensitive to the extent of labor quality controls.

Weiss (1966) finds industry concentration to have a large impact on wages. A two standard deviation increase in the concentration ratio, for instance, is associated with a 17.5% increase in annual income. Weiss further finds that the concentration rate has a greater impact on wages for nonunion employees than union employees. When he adds labor quality controls and additional industry controls, however, the effect of the concentration ratio becomes insignificant.

Similarly, Pugel (1980) finds that the concentration ratio becomes statistically insignificant once labor quality controls are added to the model. However, Kwoka (1983), Mishel (1982) and Dickens and Katz (1986b) find that the concentration ratio has an important effect on wages even after controlling for individual human capital. Furthermore, Lawrence and Lawrence (1985) find that the change in the concentration ratio has a large effect on the change in wages. Since time-invariant industry human capital will net out in the change specification, Lawrence and Lawrence's analysis suggests that the concentration ratio has an independent effect on wages.

An alternative measure of an industry's ability to pay is economic profit. This variable, although difficult to quantify, has the advantage of taking in account other input costs, such as materials. One disadvantage of using the observed profit rate as a measure of ability to pay is that profit is necessarily reduced as wages increase. Therefore the relationship between the profit rate and wages will understate the strength of the true relationship between ability to pay and wages. Nonetheless, Slichter (1950), Pugel (1980), and Dickens and Katz (1986b) find that the profit rate has a strong relationship with average wages in manufacturing industries. Furthermore, in terms of two standard deviation changes in the independent variable, the profit rate has a greater effect on wages than the concentration ratio. Pugel finds that additional labor quality controls tend to attenuate the effect of the profitability on earnings. More profitable industries tend to use some of their rents to hire better quality labor, and share some of their rents with their workers.

Slichter (1950) and Dunlop (1948) were among the first economists to analyze the relationship between labor's share of costs in an industry and average wages. The general conclusion of their analysis is that wages are inversely related to labor's share of costs. This finding is even more remarkable when one considers the simultaneity bias involved, since labor's share necessarily increases with the average wage rate, holding the level of employment constant. This result is significant for two reasons. First, it follows from Marshall's laws of demand that labor's share of total cost is positively related to the elasticity of labor demand under assumptions likely to be met in the economy. The elasticity of labor, in turn, determines the trade-off between wages and employment. Second, increased wages have a smaller impact on profits if labor's share is small.

A related issue is the relationship between the capital-to-labor ratio and average industry wages. If capital is plentiful relative to labor, the firm's profit is less affected by wage increases. Recent studies by Lawrence and Lawrence (1985) and Dickens and Katz (1986b) support the conclusion that the capital-labor ratio is positively related to wages in an industry. Workers in more capital intensive industries are paid higher wages, all else the same.

Lastly, Dickens and Katz (1986b) and Garbarino (1950) present evidence suggesting that union density is positively correlated with industry wages for both union and nonunion employees.[8] Additional

[8] Freeman and Medoff (1981) find evidence to the contrary for nonunion employees in micro data. They do not find a statistically significant relationship between the union density in an industry or region and wages for a sample of nonunion employees, controlling for individual characteristics.

Table 7: Survey of Selected Studies on Wages and Profitability

A. Four Firm Concentration Ratio (CR)

Authors and Year	Data	Controls	Effect of a 2 SD change in CR on wages[a]
1. Weiss[b] (1966)	Individual data from 1960 Census of Population merged with 1960 Survey of Manufacturing. Male semiskilled workers only. Dependent variable is annual earnings.	None	17.5%*
		Union rate, union*CR	35.3%*
		Union rate, industry characteristics, demographic and labor supply variables.	.2%
2. Lawrence and Lawrence (1985)	Manufacturing industries, various sources. Dependent variable is log total compensation.	Average industry human capital, Industry characteristics, K/L	6.6%*
		Same as above but change specification, 1980-1970.	7.0%*
3. Dickens and Katz[c] (1986b)	Two step procedure. Industry wages from regression using 1983 CPS and individual controls, Nonunion workers.	Individual human capital controls	7.5%*
4. Pugel (1980)	Industry data from survey of Manufacturers, IRS, and other sources.	Skill index, industry demog. controls, union rate, estab. size.	5.0%*
		Median education, industry demog. controls, union rate, estab. size.	1.9%
5. Kwoka (1983)	Individual data from the Quality of Employment Survey merged with industry data.	CR*Union, union, plant size	18.5%*
		CR* Union, union, plant size, and individual human capital.	10.8%

B. Capital to Labor Ratio

Authors and Year	Data	Controls	Effect of 2 SD Change in K/L on Wages
1. Lawrence and Lawrence[d] (1985)	See above. Dependent variable is log average hourly earnings.	1984 cross section	21.2%*
		Change specification 1984-1970	19.2%*
2. Dickens and Katz[c] (1986b)	See above.	Individual human capital controls.	10.8%*

C. Profit Rate

Author and Year	Data	Controls	Effect of 2 SD change in Profit Rate on Wages
1. Slichter[e] (1950)	National Industrial Conference Board Profit is measured by net income/sales.	None	21.3%*
		Labor costs/ sales	16.7%*
2. Dickens and Katz[c] (1986b)	See above. Profit rate is net income/sales.	Individual human capital controls.	10.3%*
3. Pugel (1980)	See above. Profit is before-tax profit plus interest on debt minus .04 times total assets net of depreciation all divided by business receipts, and multiplied by shipments divided by total employee hours.	Skill index, industry demog. controls, union rate, estab. size.	27.8%*
		Median Educ., industry demog. controls, union rate, estab. size.	13.2%*

Notes:

a. The actual SD of the independent variable was used whenever it was reported; when not reported, the SD in CR, K/L or profit rate was assumed to be .146, .170, and .031, respectively. K/L is measured in 1000's of 1972 dollars. These are the SD's in Dickens and Katz (1986b).

b. Weiss uses a linear specification. Percentage change is in mean annual earnings.

c. Authors' calculations from Dickens and Katz (1986b), using the formula $b = [\text{corr}(x,y)][\sigma_y / \sigma_x]$.

d. Lawrence and Lawrence use a log-log specification. A semi-elasticity was derived by dividing the estimated elasticity by the mean capital-labor ratio.

e. Authors'calculations from data reported in Slichter (1950).

* Statistically significant at 10% level.

evidence on the relationship between wages and union density is in Podgursky (1982), which analyzes CPS micro data. Podgursky finds that the proportion of workers in an industry that are covered by union contracts has a large effect on wages of nonunion workers in large establishments, but little effect on wages of workers in small establishments.

It is by no means clear, however, that the observed relationship between unionization rates and industry wages represents a causal relationship. Historical evidence suggests that high wage industries already paid relatively high wages before the advent of wide-scale unionization in manufacturing. For instance, the Big Three automobile manufacturers in the US were wage leaders prior to successful organization of General Motors and Chrysler in 1937 and Ford in 1941.[9] Furthermore, unions have tended to concentrate their organizing efforts in industries which have a greater ability to pay high wages, and these industries appear to share their rents with unorganized workers anyway.[10] Lastly, international evidence shows that the industry wage structure is similar in countries where there is not a threat of unions and in countries where there is widespread collective bargaining. All of this suggests that union density is a correlate of industry wage differentials, but probably not an underlying determinant of the industry wage structure.

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[9] Bernstein (1976) provides an excellent survey of the unionization of the Auto industry and of the effects of unions on wages and working conditions in the Auto industry.

[10] Kwoka (1983) and others find that industry concentration has a greater effect on wages for nonunion than union workers. This finding implies that even in the absence of unions firms tend to share their monopoly rents with their workers.

There is some evidence that the characteristics associated with high wage industries in the 1970's and 1980's were associated with high wage industries throughout the twentieth-century. Slichter's (1950) analysis of the rank correlations between industry wages in 1939 and several variables led him to conclude that ability to pay as measured by labor's share and profit margin was the key determinant of industry wages. This finding is supported by Katz's (1986) more sophisticated econometric analysis of the 1939 Conference Board Data. Garbarino (1950) also finds evidence of a strong relationship between industry concentration and wages. Furthermore, Katz (1986) and Garbarino (1950) find weak evidence that high wage industries were more highly unionized than low wage industries in the 1930's and 1940's.

III. Implications of the Evidence

The evidence in the preceding section indicates the presence of pervasive regularities in the wage structure. A similar industrial pattern of wages recurs in different eras and different places and for workers with very different characteristics. Such a uniform pattern ought to be explicable without resort to highly idiosyncratic factors specific to specific workers, industries, times or places. This section discusses possible explanations for the observed patterns. It concludes that they cannot plausibly be rationalized without the introduction of non-competitive considerations or additional constraints, but remains agnostic as to just what factors lead to inter-industry differences in wages.

Competitive Explanations

The competitive model has helped economists to understand an enormous range of phenomenon and has all the attributes of good theory. It offers clear predictions as to how firms and workers will behave given the constraints they face and how the interactions of worker and firm behavior will combine to determine equilibrium wages and levels of employment. The theory is specific enough to make falsifiable predictions while at the same time general enough to be applicable in a wide variety of settings. Where plausible competitive explanations of economic phenomena can be provided, they are to be preferred both on the grounds of simplicity, and because of the discipline the competitive model requires. We therefore begin by considering competitive explanations for the wage structure.

Competitive theory offers two broad classes of explanation for the finding that workers with the same measurable characteristics are paid different wages in different industries. Differentials may reflect differences in unmeasured labor quality or may compensate for non-pecuniary differences in job attributes. In either case wage differentials do not signal opportunities for firms to increase profits by reducing wages for they would find themselves unable to hire workers of the same quality at reduced wages. Refutation of these ideas is difficult since they postulate that it is unobserved characteristics of workers and jobs which give rise to the observed wage structure. Nonetheless our reading of the available evidence is that it is

difficult to convincingly account for the wage structure on the basis of unobserved quality differentials or compensating differentials.

It is obvious that unobserved quality differences account for much of the variation in the wages that workers with different characteristics receive. Surely much of the variation in the wages of different workers reflects differences in their productivity. At issue however, is whether differences in the average wage paid in different industries can be traced to differences in the average level of unobserved quality. Four types of evidence suggest to us that it is unlikely that a large part of unobserved wage differentials reflect differences in labor quality.

First, if industries hired workers of differing quality because of differences in their technology, one would expect that controlling for measurable correlates of quality would tend to reduce industry wage differentials. However Krueger and Summers (1986) report that after controlling for sex and occupation, adding controls for tenure, age and education to a wage equation reduces the standard deviation of industry wage differentials by less than 10 percentage points. Unless unmeasured aspects of labor quality are only very weakly correlated with tenure, age and education, and are far more important than measurable aspects, it is hard to see how they could account for inter-industry wage differences.

Second, Krueger and Summers (1986) and Vroman (1978) present longitudinal evidence of wage differences which closely parallel those

found in the data presented in the preceding section.[11] When individual workers move between industries their ability presumably does not change but their wages do change by amounts similar to the industry effects estimated in cross sectional data. Furthermore, the estimated wage gain from entering an industry is not significantly different from the estimated wage loss from leaving it, suggesting that the selection biases are not confounding the longitudinal results.

Third, the available evidence summarized above suggests that the pattern of inter-industry wage differentials is very similar for different types of workers. There is little apriori reason to expect that clerical workers with high unmeasured labor quality should be complementary with manual workers with high unmeasured labor across industries even if unmeasured labor quality is important in determining wages. If differences in unmeasured labor quality were of paramount importance one would expect the magnitude of inter-industry wage differentials to be greatest for older more experienced workers for whom selection could be much more perfect and this also is not observed.

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[11] We note, however, the contrasting findings by Murphy and Topel in this volume which suggest that most of the observed industry wage differences are due to unobserved individual components. There are two major differences between Murphy and Topel's analysis and previous longitudinal studies that might account for their different findings. The first difference stems from the treatment of measurement error. Murphy and Topel use an instrumental variable procedure to avoid measurement error bias while Krueger and Summers (1986) adjust OLS results for measurement error, and Vroman analyzes employer-reported data which are less likely to be contaminated by measurement error. Second, Murphy and Topel focus on changes in occupation-industry cells while others have examined just industry effects. It is possible that unobserved worker specific differences affect observed occupation wage differences but not observed industry wage differences.

Fourth, the evidence surveyed in the preceding section indicates that there are strong regularities in the pattern of industrial wages. More profitable industries, those with more monopoly power, and those where labor's share is smaller pay higher wages. These regularities appear to be statistically significant to hold in different times and places, and to account for a fairly large fraction of inter-industry wage variations. If unmeasured labor quality were the correct explanation for inter-industry wage differences, one would not expect to be able to explain wage differentials with variables reflecting product market characteristics so their significance casts doubt on the unmeasured quality explanation for wage differentials.[12] These four considerations lead to us to doubt that unmeasured quality is the proper explanation for inter-industry wage differentials.

The second competitive explanation for wage differentials can be disposed of more briefly. The last two points made with respect to the unmeasured quality argument apply equally well to the compensating differentials argument. More importantly, the available empirical evidence suggests that differentials are exacerbating rather than compensating. Krueger and Summers (1986) provide evidence that the extent of industry wage differences is increased by about one fourth when fringe benefits are taken into consideration. They further show that controlling for a number of job attributes tends if anything to

[12] One could try to salvage the unmeasured quality argument by pointing to capital skill complementarities. Note however that the only available evidence that such complementarities exist is based on measurable aspects of quality, and that wages are correlated with other industry characteristics even when the capital labor ratio is held constant. Summers (1986) discusses some historical evidence suggesting that increased capital intensity substituted for skilled workers in automobile manufacturing.

increase estimates of the extent of inter-industry wage variation. A final piece of evidence against the hypothesis of compensating differentials is the finding reported in Pencavel (1970) and confirmed by Krueger and Summers (1986) that high wage industries have lower quit rates than low wage industries. There would be no reason to expect this pattern if wage differentials simply compensated for differences in the non-pecuniary attributes of jobs.

Non Competitive Theories

The central task of any non-competitive explanation for inter-industry wage differentials is to explain why high wage industries and firms do not cut their wages. Only two answers to this question are logically admissible. Either firms would find that reducing wages would reduce profits, or they choose not to maximize profits. Economists have a strong preference for the first answer, that firms profit maximize but there are reasons to believe that considerations other than profit maximization influence the wage structure. We consider these first and then turn to profit maximizing explanations for the observed industry wage structure

The most plausible argument that firms pay wages higher than would be consistent with profit maximization invoke agency problems involved in monitoring managers. In his seminal study of inter-industry wage differences, Slichter (1950) treats inter-industry wage differences as being the result of "managerial policy". Managers may well have objectives other than maximization of shareholder wealth and

shareholders may find it difficult to monitor and/or control their behavior. Lee Iacocca's recent assertion that "the chairman [of a publicly held company] is morally accountable to his employees and stockholders" is revealing in this regard (p.104). Even if top management is dedicated to the maximization of shareholder wealth, the middle level managers who set wages are likely to internalize the welfare of their subordinates as well as that of shareholders. This may explain the common observation that managers are prone to inflate their employees' performance ratings. Lastly, in a study of one of the famous instances of a firm's choosing a high wage policy, Summers (1986) examines the circumstances surrounding Henry Ford's introduction of the five dollar day in 1914 and concludes that the enormous prior profitability of the Ford company exerted an important influence.

It is noteworthy that high wages tend to be paid in industries that are concentrated, have high profits, and have relatively small labor shares. Postulating that managers maximize a utility function which includes both profits and the well being of their workers generates exactly these predictions. Where firms face inelastic product demand curves, the cost of raising wages would be reduced. High profits would make achieving other goals more attractive. The cost of raising workers wages would be lower where the labor share was smaller. The rent sharing view is also consistent with the observation that high wage industries reward all types of workers about equally, despite wide differences in their backgrounds and job characteristics.

Casual empiricism about the situations where wage concessions are granted also suggests the importance of rent sharing. It is perhaps

revealing that industries which are in serious trouble succeed in extracting wage concessions from workers located both in parts of the country where the labor market is strong, and where it is weak. On the other hand, employers in profitable industries never ask for or get wage concessions from employees working in regions where there is high unemployment. Another example of the importance of rent sharing in the determination of wages is provided by deregulation of airlines. Competitive theory might lead one to expect that this would increase the wages of airline workers as reduced ticket prices increased the demand for airline flights. Yet the experience even at nonunion airlines that have grown under deregulation is that wages have fallen significantly.

The positive relationship between wages and firm size has been noted many times. Most recently Brown and Medoff (1985) have demonstrated the existence of substantial size wage effects even after controlling for worker quality and compensating differentials. It is reasonable to assume that agency considerations are most important in the large establishments that pay the highest wages.

The hypothesis that firms set wages to achieve objectives other than profit maximization encounters an obvious problem. While it is plausible that some or even most managers might pursue goals other than profit maximization, it is hard to believe that all managers do so. Why do not firms managed by profit maximizers drive the others out of business? An obvious answer that may contribute to the explanation of the linkages between wages and concentration is that there are barriers to entry in some industries, and so managers who are prepared to pay

low wages cannot enter. Where firms have market power, they can afford the luxury of some inefficiency.

This consideration is probably not sufficient to explain how firms that pay high wages endure. To some extent, the payment of higher wages must yield benefits to firms beyond the warm glow it gives managers. The feature common to all efficiency wage theories is that over some range increases in wages raise the profits that firms earn.[13]

Before considering specific reasons why paying high wages might prove profitable, and how their importance might differ across industries, it is useful to note the interaction between efficiency wage ideas and the rent sharing ideas discussed above.[14] If efficiency wage considerations are important, changes in wages will have much less than proportionate effects on firms' costs because of the resulting changes in productivity. This will make indulging a taste for paying high wages less costly. Indeed, starting at the profit maximizing wage level, the cost of indulging a taste for high wages slightly would be zero as argued by Akerlof and Yellen (1984) and in a somewhat different context by Bulow and Summers (1986).

We have stressed the rent sharing aspect of wage setting as an explanation for differences in the inter-industry wage structure because of the difficulty of accounting in any other way for the similarity in the wage pattern for all different types of workers.

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[13] Note that even in a competitive model, firms can increase profits by increasing wages. Below a certain wage level, firms cannot attract labor and so increasing wages raise profits. The distinguishing characteristic of efficiency wage models is a continuous non-monotonic functional relationship between wages and profits.

[14] Katz (1986) provides a thorough survey of the efficiency wage literature and evaluation of available empirical evidence.

Efficiency wage models based on turnover, or the problem of effort elicitation would predict that wage patterns would differ across jobs that varied in the amount of specific human capital they required or in the ease with which workers could be monitored. Models based on selection effects would also predict that inter-industry wage patterns would differ for workers holding different types of jobs.

An explanation alternative to rent sharing would hold that firms pay efficiency wages in some job categories and then face horizontal equity constraints which lead them to pay higher wages even to workers doing jobs where efficiency wage elements are not important. Frank (1985) makes a persuasive case for the importance of such horizontal equity effects. They immediately raise the question of what enforces the horizontal equity constraints. What sanction leads firms to pay horizontally equitable wages? The only plausible answer to this question is the threat that workers who feel unfairly treated will withhold effort. But once this effect is admitted, it is hard to see why workers do not evaluate the fairness of their wage package on the basis of how the firm is doing as well as how other workers fare. This idea is developed in a formal efficiency wage model by Akerloff (1984).

This last possibility provides an additional explanation for rent sharing by firms. It may be the case that managers reward workers with a share of the rents earned by the firm not because they want to but instead because of the threat that workers will withhold effort. Failure to pay "fair" wages may then reduce profits by undermining worker morale. It is likely to be difficult to distinguish empirically managers' desire to pay high wages from their response to the potential

sanction of withheld effort. But in the end the distinction may not be an important one. In either case, the appropriate theory of wage setting involves the determination of fair wages.

Our conclusion is that the industry wage structure reflects firms' sharing of rents with workers. These rents may be the result of monopoly power, returns to intangible assets, or returns to capital that is already in place. Where rents per workers are greatest, wage rates tend to be highest. Rent sharing is much less costly than it might first appear because efficiency wage considerations cause wage increases to result in much less than proportional increases in labor costs. Particularly in environments where efficiency wage considerations are important, this makes it possible for firms paying high wages to survive. Whether firms share rents because of managers desire to help workers, or because of the threat that workers will withhold effort is an open question. In all likelihood both elements are present in most settings.

IV. Conclusions

Our conclusion that the inter-industry wage structure cannot plausibly be interpreted as a competitive outcome has significance for both micro and macroeconomic issues. It undermines the classical presumption that markets allocate output in an optimal fashion and makes meaningful the claims of some critics of laissez faire that some industries are better candidates for policy encouragement than others. And since involuntary unemployment can be regarded as confinement to

the low wage home production sector of the economy, a finding of significant non-competitive inter-industry wage variations renders plausible claims that economies are subject to chronic involuntary unemployment and casts doubt on the equilibrating properties of the free market. The remainder of this section develops these two points in more detail.

The standard argument that the free market allocates labor optimally is easily stated. Firms hire labor to the point where wages equal marginal products. Competition insures that all firms pay workers of a given type an equal wage. It follows immediately that the marginal product of workers in all industries is equalized. An argument of this kind lies behind standard treatments of the desirability of free markets and free trade. One of the principal recognized exceptions to the rule that free markets allocate resources optimally, is the case where wages cannot vary freely and therefore are not equalized across sectors of the economy. In this case as many authors have recognized there is an argument for subsidizing high wage industries so that they expand to the point where the marginal product of labor equals its opportunity cost rather than its wage.

Economists have always regarded this argument as suspect. Where the wage in a sector is increased by government action, or collective action by workers, there is always the view that subsidies are very much second best to removing the wage distortion. They are second best in both the technical sense that the subsidized outcome does not correspond to an optimal allocation of resources, and in the broader sense that the level of wage distortions is likely to be increased if policy makers consistently subsidize high wage industries.

The finding that competitive economies give rise to substantial inter-industry wage variations even where the government does not intervene and unions are not present suggests that subsidies may not always represent an inferior second best policy. Where equilibrium wage differentials arise from considerations having to do with motivating workers, selecting them, or their bargaining power as insiders, they may be ineradicable. Furthermore, in at least some circumstances it would not be desirable to eradicate them even if it were possible. Consider for example the case where firms in some industries pay above market wages in order to induce workers not to shirk as in Shapiro and Stiglitz (1984) and Bulow and Summers (1986). Eliminating wage differentials would make it impossible for firms to elicit effort from their workers and would obviously be inefficient. In circumstances where eradicating wage differentials is impossible or undesirable, subsidies become the first best policy for increasing economic welfare.[15]

Identifying a market failure is a necessary but not sufficient condition for the desirability of policy intervention. Feasible policy interventions may carry with them collateral costs sufficiently large so as to outweigh the benefits. The political process may not permit welfare enhancing policies to be undertaken even where they are feasible. We have little to contribute to the discussion of the political aspects of industrial policies beyond the observation that in

[15] In rent sharing models, it is not obvious whether firms are likely to be operating on their labor demand curves as presumed in the argument presented here. The question which we are unable to resolve here depends on how the firm determines the set of workers with whom rents are to be shared.

the modern world, public non-involvement is probably a meaningless benchmark: government decisions that will inevitable be made do affect the composition of output. Two potential collateral costs of subsidies to high wage industries -- their apparently antiegalitarian character and the rent seeking that they may generate are examined in Bulow and Summers (1986) and Summers (1986) with the conclusion that they probably do not vitiate the case for at least small subsidies to high wage industries.

The finding of large inter-industry wage differentials has significant implications for macroeconomic as well as microeconomic theory. It has become fashionable in recent years to denounce involuntary unemployment as a meaningless concept. Lucas (1978) for example argues that "involuntary unemployment is not a fact or phenomenon which it is the task of theorists to explain". If the argument that many workers are rationed into low wage jobs is accepted, it is difficult to see how the argument that some are rationed entirely out of market work can be rejected. Studying the inter-industry wage and employment patterns may give insight into the processes which generate involuntary unemployment, because the wages of low wage workers unlike the reservation wages of the unemployed can be observed. The extraordinary resilience of the inter-industry wage structure at least challenges the presumption that flexible wages adjust to eliminate unemployment over short periods of time.

The significance of the finding of inter-industry wage differentials for macroeconomic theory goes beyond the fact that they are analogous to involuntary unemployment. As Harris and Todaro (1970)

DATA APPENDIX

The data for international wage comparisons are reported in the ILO Yearbook of Labor Statistics (1983). The following table describes the data for each country.

Country	Earnings Measure	Workers Covered	Years	Number of Industries
Bolivia	Wage rate per month	Men only	1973, 1981	20
Canada	Earnings per hour	All workers	1973, 1982	21
France	Earnings per hour	All workers	1973, 1982	20
Germany	Earnings per hour	All workers	1973, 1982	24
Japan	Earnings per hour	All workers	1973, 1982	21
Korea	Earnings per month	All workers	1973, 1982	26
Mexico	Earnings per hour	All workers	1973, 1981	22
Norway	Earnings per hour	Men only	1973, 1982	27
Poland	Earnings per month	All workers	1973, 1982	28
Sweden	Earnings per hour	Men only	1973, 1982	26
USSR	Earnings per month	All workers	1973, 1981	19
United Kingdom	Earnings per hour	Men only	1973, 1982	21
United States	Earnings per hour	All workers	1973, 1982	17
Yugoslavia	Earnings per month	All workers	1973, 1982	28

Note: Earnings include wages and all wage supplements.

in considering development issues were the first to stress, wage differentials may themselves be a source of unemployment. Where wages differ individuals have an incentive to remain unemployed and queue for jobs. And employers have incentives to act in ways which perpetuate involuntary unemployment. To take one example, it is a cliche that employers often turn away overqualified workers. Why? Probably the most plausible reason is the justified suspicion that they will soon leave for higher wage employment and force them to again incur the costs of hiring and training a new worker. If all employers offered workers of a given quality the same wage, such considerations could not arise.

Future research should concentrate on the measurement and explanation of inter-industry wage differences. Existing empirical work has been much more successful in ruling out some explanations than in supporting others. Theoretical work has been ingenious in demonstrating that implications of wage differentials for optimal economic policy depend on their source. Progress will ultimately require the development of theories that account for the regularities noted here and make additional verifiable predictions. We hope that this review of the available empirical evidence and its implications provides a start in this direction, and that others will turn their attention to the problem of the wage structure.

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