White-collar pay levels linked to corporate work force size

Larger-size firms generally pay high salaries for white-collar workers, although the pay advantage varies by occupation and skill level

MARTIN E. PERSONICK AND CARL B. BARSKY

"It may seem paradoxical that buyers of labor with the most monopoly power generally pay the highest rates of wage and benefit compensation." With this provocative thought, Professor Richard Lester in his comprehensive 1967 study invited the next generation of researchers to explore size-of-establishment differences in employee compensation.[1] In response, researchers during the past 15 years have "rediscovered" this once-neglected field as fertile ground for debate. While most have argued that big employers pay employees more, others contend that size, *per se*, is not a determinant of wage levels but rather reflects marked differences in the quality of workers employed by large and small firms. Responding to his own paradox, Lester suggested several reasons a large employer might pay higher wages than other firms, including: public opinion, ability to pay, and as compensating differentials for the "impersonal and confining aspects of large establishments."

This article examines the relationship between work force size and pay levels of white-collar employees, using data from the Bureau of Labor Statistics national survey of professional, administrative, technical, and clerical pay (PATC). By using the narrowly defined occupational work levels of the PATC survey, this analysis limits the distorting effects of variations in worker quality on pay levels. The principal findings of the analysis are: pay levels tend to increase with employer work force size but above-average levels are associated only with large firms; and wage premiums attributable to a firm's size are larger for entry level than for experienced professional workers—an indication of competition among small and large employers to attract and retain skilled personnel.

Past studies of the links between work force size and pay levels have reviewed several other possible explanatory variables relating to establishment or worker characteristics, or both. The variables included here were chosen on the basis of significance in previous analyses and availability in the data source selected—the 1980 national PATC survey. The variables are: two measures of work force size (number of employees in the establishment and world-wide corporate employment of the establishment's parent company); industry division (for example, manufacturing, trade, or services); and geographic location (four Census regions). Data on union status, missing from the PATC survey, were developed from the BLS area wage survey program; but these industry averages of unionization proved to be highly correlated with the industry variable and thus were excluded from the final regression analysis. Their omission probably had only minimal impact on this analysis, based on a recent study that showed relatively small union wage differentials for white-collar employees, and no discernible effect on the work force size variables when the union variable was excluded.[2]

Controlling for variations in worker quality continues to be an obstacle to accurate measurements of wage premiums attributable to work force size. For example, a

Martin E. Personick is a project director and Carl B. Barsky is an economist in the Division of Occupational Pay and Employee Benefit Levels, Bureau of Labor Statistics.

BLS researcher found that half of the apparent size premium disappeared when traditional proxies for worker quality—education and work experience—were included in an analysis of data from households sampled in the Current Population Survey.[3] Other researchers have also pointed to unmeasured individual worker characteristics such as dependability, tenure, and "firm-specifi c" training in espousing reasons for finding a positive relationship between work force size and pay levels.[4]

This study limits the direct influence of education and work experience on salary levels by grouping workers into occupational classifications that are each narrowly defined to represent comparable job content among establishments.[5] This approach departs from previous studies where educational background and overall work experience are important determinants of the distribution of workers among occupations, and thereby influence earnings. However, education and experience are relatively uniform for workers within a specific PATC-defined occupation and, as a rule, are less influential in explaining pay variations among individuals performing the same or similar tasks.

Analytical techniques and data

Two basic approaches are followed in this analysis: (1) cross-tabulation of pay levels by corporate employment size group and (2) multiple regression techniques. The first approach measures gross pay differentials because it does not control for interplay among the various possible influences on pay levels. On the other hand, multiple regression measures the net effect of each explanatory variable, such as work force size, after allowing for the influence of other variables in the equation.

As previously mentioned, the 1980 PATC survey of about 3,500 private sector establishments is the data source for this analysis. Conducted annually by the Bureau of Labor Statistics, the survey results provide the basis for recommendations on annual pay changes for Federal white-collar employees. Selection of PATC survey occupations and other specifications as to the coverage of the study, such as minimum employment size of the establishments, industrial coverage, and geographic scope, are the responsibility of the President's Agent (Secretary of Labor and heads of the Office of Management and Budget and the Office of Personnel Management), under the Federal Pay Comparability Act of 1970.[6] The narrowly defined occupational classifications of the survey provide the link between private and Federal Government sectors thereby permitting carrying out of the congressional directive that "Federal pay rates be comparable with private enterprise pay rates for the same levels of work."[7]

The March 1980 PATC survey included 21 occupations, and all but one were divided into two work levels or more. Each level describes duties and responsibilities in private industry that are comparable with those of specific Federal white-collar employees. Of the 91 occupational work level (job) categories in the survey, 25 contain enough workers for this analysis. They are distributed over 12 of the 21 surveyed occupations, and include professional/administrative, technical support, and clerical workers.[8] Straight-time earnings of full-time workers, the measure reported in the PATC survey, forms the basis for this analysis of pay levels.

Cross-tabular results

Cross-tabulations revealed a strong tendency for pay levels to rise, as corporate employment grew. (See table 1.) Depending on the job category, pay ranged from 1 to 16 percent below the PATC survey averages in firms with fewer than 1,000 workers to 4 to 24 percent above in firms with 250,000 workers or more. Table 1 also presents clerical and technical workers in the largest corporate categories as enjoying a somewhat greater pay advantage than their professional colleagues.

For professionals, the pay advantage for working in large corporations was less at journeyman level than at entry level, indicative of competition among small and large firms alike for experienced workers.[9] The higher

Table 1. Relative pay levels by corporate employment-size group, selected white-collar occupations in private establishments, March 1980

Occupational level and Federal equivalent	Mean salary for size groups as a percent of surveywide average[1]					
	Fewer than 1,000 employees	1,000 to 2,500	2,500 to 10,000	10,000 to 50,000	50,000 to 250,000	250,000 or more
Professional and administrative:						
Accountants I (GS-5)	88	93	98	100	102	122
Accountants III (GS-9)	94	94	96	100	102	114
Accountants IV (GS-11)	97	96	97	100	99	109
Auditors III (GS-9)	92	92	97	101	104	121
Buyers III (GS-9)	99	94	96	98	101	113
Buyers IV (GS-11)	90	89	96	98	100	109
Chemists II (GS-7)	89	83	97	103	105	111
Chemists IV (GS-11)	93	91	94	99	104	108
Engineers I (GS-5)	88	93	99	100	102	106
Engineers III (GS-9)	95	95	97	101	99	107
Engineers VI (GS-13)	99	99	98	98	99	105
Engineers VII (GS-14)	95	98	102	97	99	104
Technical support:						
Computer operators III (GS-6)	94	97	96	100	104	117
Computer operators IV (GS-7)	88	92	95	99	104	116
Drafters II (GS-3)	93	97	97	100	107	124
Drafters IV (GS-5)	97	94	93	99	103	113
Engineering technicians III (GS-5)	93	97	93	101	100	107
Engineering technicians V (GS-9)	92	93	96	98	98	105
Clerical:						
Accounting clerks II (GS-3)	95	93	97	101	104	116
Accounting clerks III (GS-4)	91	93	95	103	106	115
Key entry operators I (GS-2)	91	98	94	102	111	124
Key entry operators II (GS-3)	90	95	94	103	104	124
Secretaries II (GS-5)	88	91	94	100	103	118
Secretaries IV (GS-7)	84	93	94	100	104	123
Typists I (GS-2)	95	91	96	100	108	116

[1] Published averages, the base for these pay relatives, have been adjusted to exclude observations in establishments not reporting corporate employment.

Table 2. Relative pay levels by industry division, selected white-collar occupations, March 1980

[Average salary for each occupation in all industries = 100]

Occupation	Industry division					
	Manufacturing	Public utilities[1]	Wholesale trade	Retail trade	Finance, insurance, and real estate	Selected services[2]
Accountants	100	104	96	96	94	96
Engineers	100	102	96	([3])	([3])	98
Computer operators	105	114	101	([3])	91	90
Accounting clerks	101	118	99	93	88	96
Typists	105	120	107	100	87	101

[1] Transportation (except U.S. Postal Service), communications, electric, gas, and sanitary services.

[2] Limited to engineering, architectural, and surveying services; commercially operated research, development, and testing laboratories; advertising, credit reporting and collection agencies, computer and data processing services; management, consulting, and public relation services; noncommercial educational, scientific, and research organizations; and accounting, auditing, and bookkeeping services.

[3] Insufficient employment in one work level or more to warrant separate presentation of data.

average pay for entry-level professionals in large firms may partly reflect payment for a "higher quality" of worker, that is, the academic reputation of the college from which he or she graduated or higher standing within the graduating class. In contrast, past work experience and job performance are less important in setting salaries for beginning professionals whose job tenure is brief.

These overall comparisons mask the degree to which pay in individual firms deviated from group averages. As a rule, less than half of the firms with 50,000 workers or more paid their nonclerical employees at least 5 percent above PATC survey averages; by individual job category, the proportion of employers ranged from 25 to 58 percent. For clerical jobs, the proportions ranged from 54 to 63 percent. Similarly, not all firms in smaller-size groups paid less than the average. For each job, at least 7 percent of the employers with fewer than 1,000 workers paid 5 percent or more above the survey average.

Variations in industry pay levels (table 2) and employment distributions (table 3) appear to account for part of the differences in pay levels between large and small firms. To illustrate, the five occupational work levels shown in table 3 have a disproportionately high number of manufacturing industry workers in large firms. Conversely, finance, insurance, and real estate workers in these job categories (service industry for engineers) tend to concentrate in small firms. As in the blue-collar sector, white-collar pay levels are higher in manufacturing[10] than in either finance, insurance, and real estate or service industries. Pay levels of medium-size firms (2,500 to 10,000 workers) are bolstered by the presence of public utilities—traditionally one of the highest-paying industry sectors.

Unlike the aforementioned association between size of firm and industry, corporate size appears to be largely independent of regional location. Accordingly, regional pay differences do not seem to account for much of the wage premium associated with work force size. Moreover, pay differences between the highest- and lowest-paying regions were relatively small—typically less than 10 percent. As noted in a previous BLS study,[11] a regional pay advantage may reflect more the industry orientation of a particular job, such as the Southern pay premium traditionally reported for chemists who are extensively employed by high-paying petrochemical firms in that region.

Regression results

Multiple regression analysis disclosed a statistically significant relationship between large corporate size, *per se*, and higher pay, when other measured characteristics are held constant. This was true for all but one (engineering technician V) of the 25 job levels studied. In some cases, as illustrated in table 4, pay in firms with 250,000 employees or more averaged 9 to 20 percent above firms with fewer than 1,000 employees.[12] A smaller size premium, found less often, was reported for

Table 3. Relative industry employment levels by corporate employment size groups, selected white-collar occupations, March 1980

Occupation and industry division[1]	Percent of workers in:			
	All size groups	50,000 or more[2]	2,500 to 10,000	Fewer than 1,000
Accountants III:				
Manufacturing	65	78	55	41
Public utilities	9	4	21	7
Trade	7	9	6	15
Finance, insurance, and real estate	11	([3])	12	30
Engineers III:				
Manufacturing	77	92	61	53
Public utilities	7	([3])	23	([3])
Services	10	4	14	42
Computer operators III:				
Manufacturing	41	60	34	23
Public utilities	7	10	8	([3])
Trade	14	12	14	19
Finance, insurance, and real estate	23	4	32	41
Services	11	5	11	16
Accounting clerks III:				
Manufacturing	43	50	38	35
Public utilities	18	29	23	4
Trade	14	13	11	18
Finance, insurance, and real estate	18	5	25	36
Typists I:				
Manufacturing	36	45	35	20
Public utilities	7	11	12	([3])
Trade	8	18	5	12
Finance, insurance, and real estate	42	22	40	61
Services	5	4	6	5

[1] See table 2, footnotes 1 and 2 for coverage of nonmanufacturing industry divisions. Industry divisions with less than 5 percent of the workers in an occupational work level are not shown.

[2] The two largest-size groups shown in table 1 were combined to provide sufficient observations for a meaningful profile of industry employment distribution of relatively large corporations. To simplify this analysis, the medium-size firm is represented by the 2,500 to 10,000 employee group, omitting corporations with 1,000 to 2,500 and 10,000 to 50,000 employees.

[3] Less than 4 percent.

the second and third largest corporate-size groups. Below the 10,000 worker cutoff, significant size premiums were usually absent—not surprising given the relatively small differences in actual pay levels among the three smallest size groups. (See table 1.)

Substituting establishment size for corporate size in the regressions did not alter the basic findings that large employers provide higher pay levels for white-collar workers. For a large majority of the 25 job levels, significant pay premiums attributable to establishment size began with the 1,000 to 2,499 employees group; for the largest establishments (10,000 employees or more), the size premium over the smallest group (fewer than 500 employees) was typically 10 to 15 percent for professional/administrative categories and 20 percent or more for the clerical/technical job levels.

The simultaneous effect of establishment and corporate size on pay levels also was tested in separate sets of regressions. The work force variable was defined as four combinations: (1) small establishment (fewer than 2,500 employees)/small corporation (fewer than 50,000 employees); (2) small establishment/large corporation; (3) large establishment/small corporation; and (4) large establishment/large corporation. Compared with the small establishment, small corporate-size category, the other three groups had statistically significant salary differentials for a large majority of the 25 job categories studied. However, of the three, only the large establishment/large corporation group stood out with significant salary premiums for all jobs.

Of the two work force size measures used, corporate size generally provided a better explanation of the salary variation for professional job categories, that is, higher adjusted coefficients of multiple determination ($\hat{R}^2$), while establishment size produced somewhat better regression results for clerical positions. This is consistent with and may partly reflect the differing pay-setting practices of the two occupational groups: a national or regional market for professionals and a local wage area for clerical workers. Regardless of the work force size measure used—corporate or establishment—regression results explained more of the salary variation for entry-level than for higher-level professional job categories. This is in line with the more uniform work experience and job tenure noted for entry-level professionals than for journeymen.

Salary differences found by simple cross-tabulation (table 1) can be labeled *gross* differentials, and those isolated by multiple regression techniques, *net* differentials. Table 5 compares gross and net percentage pay differentials associated with corporate work force size. The table shows that gross differentials are generally larger than net differentials. This expected pattern reflects the tendency for characteristics associated with higher pay

Table 4. Regression analysis of average monthly salaries for selected white-collar occupations, March 1980

Variable	Percent of 25 occupations studied with significant coefficients[1]	Accountants III	Engineers III	Computer operators III	Accounting clerks III	Typists I
		(Coefficients shown in percent)				
Constant	N.A.	$1,725	$1,913	$1,080	$919	$772
Corporate size (number of employees):						
1,000 to 2,499	20	...	...	...	...	...
2,500 to 9,999	20	...	...	...	...	...
10,000 to 49,999	60	4.7	5.4	4.8	10.3	9.6
50,000 to 249,999	76	7.2	4.7	8.6	14.9	9.0
250,000 or more	96	19.6	12.5	17.5	17.7	
Industry division:						
Mining/construction	64	8.3	3.3	−18.3	10.4	13.4
Public utilities[2]	80	8.1	5.3	7.9	13.5	−13.9
Finance, insurance, and real estate	71	...	...	−8.7	−7.2	−14.5
Wholesale trade	26	...	...	...	...	−15.4
Retail trade	68	4.3	...	6.2	−7.3	...
Selected services[2]	24	...	...	−12.7	...	
Region:						
Northeast	60	−7.7	−3.7	−4.1	3.8	5.4
North Central	36	−3.0	...	...	5.4	6.2
West	52	−2.5	...	6.4	4.2	
Statistical information:						.21
Adjusted coefficient of determination ($\hat{R}^2$)	N.A.	.23	.12	.21	.20	$759
Mean (Y)	N.A.	$1,776	$2,013	$1,079	$1,028	854
Number of observations (S)	N.A.	1,476	1,154	1,174	1,534	

[1] Because the regression coefficients are based on a sample, they may differ from the figures that would have been obtained from a complete census. Chances are about 2 in 3 that an estimate from the sample would differ from those in a total census-derived value by less than the standard error, and about 19 in 20 that the difference would be less than twice the standard error. It is the latter 5 percent significance level that is used here; the percent of the 25 occupations studied that had a significant coefficient is shown for each variable, for example, only 20 percent for the 2,500 to 9,999 corporate size-group.

[2] See table 2, footnotes 1 and 2 for coverage of nonmanufacturing industry divisions.

NOTE: Y is the mean of the earnings (dependent) variable weighted by occupational employment. S is the number of establishments in the sample with employees in the occupations studied. Dashes indicate that the coefficient was not significant at a 5 percent level. N.A. = Not applicable.

Table 5. Percentage earnings differences between large and small firms, selected white-collar occupations, March 1980

Occupational work level	Percent difference	
	Gross	Net
Accountants I	38.6	33.9
Accountants III	21.3	19.6
Accountants IV	12.4	13.3
Auditors III	31.5	20.0
Buyers III	14.1	15.6
Buyers IV	21.1	20.8
Chemists II	24.7	19.7
Chemists IV	16.1	13.1
Engineers I	20.5	19.0
Engineers III	12.6	12.5
Engineers VI	6.1	9.0
Engineers VII	9.5	11.3
Computer operators III	24.5	17.5
Computer operators IV	31.8	21.5
Drafters II	33.3	37.4
Drafters IV	16.5	19.1
Engineering technicians III	15.1	13.8
Engineering technicians V	14.1	[1] 12.4
Accounting clerks II	22.1	17.3
Accounting clerks III	26.4	17.7
Key entry operators I	36.3	27.4
Key entry operators II	37.8	31.4
Secretaries II	34.1	29.2
Secretaries IV	46.4	41.3
Typists I	22.1	9.0

[1] The net difference for engineering technicians V is statistically significant at a 10-percent level; all other work levels shown are significant at 5 percent.
NOTE: Large size equals 250,000 employees or more; small size, fewer than 1,000 employees. "Gross" and "net" differentials are defined in the text.

levels, such as high-paying manufacturing and large corporate size, to be found together. This compounds the impact attributable to any single characteristic by simple cross-tabulation. Regression techniques separate such combinations and measure the impact of individual components.

Implications for future research

This study illustrates the usefulness of surveys that provide detailed information on narrowly defined occupations, which control for differences in worker quality. It makes clear that questions relating to work force size and occupational pay seem more appropriate for an establishment survey than a household one. Yet, as noted earlier, the inclusion of information on the educational background and work experience of employees (easier to get in household interviews) enhances the usefulness of most size/pay estimates. Two BLS studies have utilized the best features of both approaches: in 1972 a study of the clothing industry obtained for the first time demographic characteristics from employee interviews and occupational wages from their employers[13] and a subsequent study matched observations on individuals and their employers from two establishment surveys—Employer Expenditures for Employee Compensation and Area Wage Surveys—and the Current Population Survey of households.[14] Either approach, although expensive and time consuming, is necessary to adequately control for productivity differences among workers.

The corporate work force variable could be redefined in future surveys to report the work force size for a parent company only if it has a direct input to the wage and salary administration of its affiliated establishments. This study included corporate work force obtained for both *divisions* of companies whose pay decisions are usually reviewed by the parent firm and for *wholly-owned subsidiaries* that operate independently of that type of review. This proposal would reduce the number of affiliates reported in the largest corporate-size classes and probably would tend to increase the pay differential between large and small employers.

Finally, if resources were made available, two other establishment characteristics could be added to the PATC survey to help improve explanations of white-collar pay levels—union status of white-collar and of blue-collar workers and location by area population size. The latter may be especially important for clerical and technical job categories. A metropolitan/nonmetropolitan area variable was not included in this analysis because more than 90 percent of white-collar workers covered by the PATC survey were employed in metropolitan areas.

IN SUMMARY, this analysis found white-collar pay levels generally increasing with employer size. This was observed both before and after allowing for the impact of other measured variables, such as industry and region. However, the amount of the salary premium attributable to work force size varied by occupation and skill level—similar to the way education and other worker quality traits have affected results in previous studies. Narrowly defined occupational classifications broaden opportunities for BLS establishment surveys to be used in research usually reserved for household-type surveys. Further improvements in both kinds of surveys, and combining their best features, are needed to better measure and control for differences in productivity-related characteristics among workers. □

FOOTNOTES

[1] Richard Lester, "Pay Differentials by Size of Establishment," *Industrial Relations*, October 1967, pp. 57–67.

[2] Joseph R. Antos, "Union Impacts on White Collar Compensation," *Industrial and Labor Relations Review*, forthcoming.

[3] Wesley Mellow, "Employer size, unionism, and wages," paper presented at Conference on New Approaches to Labor Unions, October 1981, at Virginia Polytechnic Institute and State University.

[4] See, for example, Stanley H. Masters, "Wages and Plant Size: An Inter-industry Analysis," *Review of Economics and Statistics*, August 1969, pp. 341–45 and Walter Y. Oi, "The Fixed Employment Costs of Specialized Labor," paper presented at Conference on The Measurement of Labor Cost, December 1981, at Williamsburg, Virginia.

In Vladimir Stoikov, "Size of Firm, Worker Earnings, and Human Capital: The Case of Japan," *Industrial and Labor Relations Review*, July 1973, the author argues that size of enterprise is of minor importance and that interfirm wage differentials are explained almost exclusively by differences in worker skills and knowledge.

[5] Occupational definitions are presented in *National Survey of Professional, Administrative, Technical, and Clerical Pay, March 1980*, Bulletin 2081 (Bureau of Labor Statistics, 1980), pp. 38–68. Several occupations used in this analysis have exclusions that help to narrow their definition. For example, the accountant definition does not cover workers whose principal or sole duties consist of designing or improving accounting systems or other nonoperating staff work, such as budget or financial analysis; the computer operator definition includes workers operating the control console of a digital computer and not those operating computer terminals; and the typist definition does not include word processors and publication typists. In addition, workers without college degrees are almost always excluded from the professional jobs studied.

[6] The industrial coverage and minimum-size establishment is as follows: manufacturing (100 or 250 employees); transportation, communication, electric, gas, and sanitary services (100 or 250 employees); mining and construction (250 employees); wholesale trade (100 employees); retail trade (250 employees); finance, insurance, and real estate (100 employees); and selected services (50 or 100 employees).

[7] 5 U.S.C. Sec. 5301 (a) (3) (1970). The pay-setting role of the PATC survey is described in George L. Stelluto, "Federal pay comparability: facts to temper the debate," *Monthly Labor Review*, June 1979, pp. 18–28.

[8] Table 1 lists the 25 job categories. Work levels are identified by Roman numerals, the higher the numeral the greater the duties and responsibilities. Numbers of work levels in the PATC survey vary by occupation, ranging from one for messengers to eight for chemists and engineers. For professional occupations, the first two levels are considered entry and developmental; the next two levels, journeymen; and higher levels, generally supervisory or managerial in nature.

[9] Microdata from the PATC survey have shown over the years that pay levels within an establishment are typically higher relative to the survey-wide averages for experienced levels of professional positions than for entry levels. This is especially true for small, relatively low-paying establishments.

[10] Previous BLS research on area pay differences found that wage variation reflects not only the relative presence or absence of manufacturing activity but also the kind of manufacturing industries. We found that this also applies to occupational pay differences by size of firm. That is, high-paying manufacturing industries were relatively more important employers in the largest firm-size groups. For example, in the large-size groups (50,000 employees or more), two-thirds of the accountants III employed by manufacturing firms were in high-paying industries; in the small-size group, the corresponding proportion was two-fifths. An industrial profile of large, low-paying firms, that is, with pay levels 5 percent or more below the PATC survey averages, showed that their mix of manufacturing industries, like that of small firms, was less favorable than for the large firm-size groups as a whole. The data to support these findings for other jobs studied are available upon request.

[11] Harry F. Zeman, "Regional pay differentials in white-collar occupations," *Monthly Labor Review*, January 1971, pp. 53–56. Because the PATC survey was designed to yield nationwide data, regional estimates are not regularly published; small differences in these estimates should be cautiously interpreted.

[12] Several categories were defined for each characteristic studied, for example, six corporate employment-size groups or four geographic regions. (Actual employment rather than employment groups was not available.) The coefficients presented in table 4 are the percent differences between the category of each characteristic that is shown and the one that is not shown, but is embodied in the "constant" term: that is fewer than 1,000 workers, manufacturing, and the South.

[13] See *Wages and Demographic Characteristics in the Work Clothing Inaustry*, March 1972, Bulletin 1858 (Bureau of Labor Statistics, 1975).

[14] Antos, "Union Impacts."