Research Summaries

Incomplete experience rating in State unemployment insurance

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By now it is well established that the existence of unemployment insurance (UI) affects decisions on both the supply and demand sides of the labor market. Theoretical work on such effects has appeared within the past decade, and empirical tests of the basic theoretical propositions have appeared more recently.[1] On the supply side, the tendency of the availability of UI benefits to extend the duration of nominally involuntary unemployment and perhaps to increase labor force participation and improve the success of job search as evidenced by wage gains of job changers has been examined and supported by recent research.[2]

A link between the existence of UI and labor demand has been demonstrated by examination of the system of experience rating—or incomplete experience rating—used to finance benefits in most States. In the United States, States finance UI benefits through a payroll tax on covered employers. In the context of such a financing system, experience rating is the use of payroll tax rates that change inversely with the stability of an employer's labor demand, where that stability is indicated by a measure such as a "reserve ratio"—the employer's accumulated contributions to the system less his accumulated liability in the form of paid-out benefits, with the difference expressed as percentage of his average taxable payroll over some period. Incomplete experience rating limits the allowable tax rates to a relatively narrow range; for example, no State tax rate currently exceeds 10 percent of taxable payroll, and most States have a nonzero minimum rate.

The intuitive argument about the effect of incomplete experience rating on labor demand, or more particularly layoff rates, begins with the realization that many employers assigned either the minimum or the maximum UI payroll tax rate have a zero marginal tax cost of an extra layoff. Those assigned the minimum rate will be contributing to

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the system regardless of their benefit liability. To the extent that they accumulate reserves beyond those required to maintain their minimum rate assignment, they may have an incentive to draw down the excess through extra layoffs, or "UI holidays." Employers already at the maximum rate cannot be further penalized for additional layoffs; thus, they may also have an incentive to provide UI holidays as part of their contract (implicit or explicit) with their workers. Any resulting benefit liability that exceeds their own contributions is paid from the net contributions of other employers (cross-subsidization).

While this connection has been well established theoretically, empirical support has been scarce because of a lack of data. However, the three studies that have been published support the existence of such a relationship.[3] Indeed, the most recent of these finds that the increase in temporary layoff unemployment resulting from the implicit cross-subsidization that incomplete experience rating allows is not only larger but also statistically more significant than the "supply side" unemployment effect of the level of the benefits. The author of that study concludes that, "without changing benefit levels available to unemployed workers, a significant reduction in layoff unemployment could be achieved by changing the incentives offered by current UI [financing] laws."[4] Moreover, he finds that "the impact of the unemployment insurance subsidy on layoff unemployment is powerful—the imputed subsidy accounts for more than a quarter of all layoffs in the data. . . ." Unfortunately, none of the recent studies considers the incentive that employers assigned the minimum rate have to increase their layoffs, although there is some unpublished evidence suggesting that this effect is small or nonexistent.[5]

The growing body of evidence that incomplete experience rating does increase the amount of layoff unemployment leads one to ask what proportion of employers are subject to the layoff incentives of such cross-subsidization, and, perhaps more importantly, how long particular employers remain at tax rates that allow them to be implicitly subsidized? These issues are important, for persistent subsidization of some employers indicates that the employment stabilization incentives built into the UI system are not working, and it may lead to distortions in the industrial and occupational structure of a State's economy.

To address these questions, I analyzed fiscal 1975–78 UI data for a random sample of more than 17,000 New Jersey employers.[6] The results, presented below, show that, at any time, large proportions of employers are assigned the minimum and maximum tax rates. More importantly, most of these employers have a low probability of moving to any other rate category over time. Indeed, most of them can be assumed to be assigned a limiting rate permanently, thus precluding their effective experience rating.[7]

Distribution of employers by rates

Table 1 shows the distribution of employers in the sample by tax rate category for each of the study years. "Graded" employers are firms for which the State had sufficient payroll and turnover information to assign a UI tax rate. The group consists of employers at the minimum rate (1.2 percent of taxable payroll); those at the maximum rate (6.2 percent); and those taxed at one of a range of rates in between the two limits. "Other" employers are those to which a rate could not be assigned in the usual manner, either because of inadequate data or their lack of experience in the system. "Inactive accounts" are employers that were not in business during a given year.

Mid-rate employers, the third category of graded units, are the only ones that might be considered truly experience rated, in that their tax rate assignments can respond in either direction to changes in their turnover behavior; all other employers are at least temporarily immune to changes in their payroll tax rate.[8] Given this characterization of the system, the imposition of employment stabilization incentives through experience rating is remarkably incomplete.

In each study year, fewer than 41 percent of the active accounts fell into the mid-rate category; moreover, table 1 indicates that only about half of the graded employers could be considered effectively experience-rated.

Because the tax rate reflects an employer's recent history of labor turnover, patterns of experience ratings should lag the business cycle by 1 to 2 years. Between 1973 and 1976, business conditions were increasingly recessionary, and thus experience ratings should be rising over the years covered in this study. This is, in fact, the story told by table 1. The proportion of graded employers at the maximum tax rate increased steadily from 8.5 percent in fiscal 1975 to 16.5 percent in fiscal 1978, while the proportion at the minimum rate decreased steadily from 38.0 percent to 32.4 percent. However, there is a surprising regularity in these data for consecutive years, for, while there was a clear shift of proportions from the minimum to the maximum rate as the unemployment rate rose, the proportion of graded employers assigned the middle rates remained at about half throughout the period, regardless of business conditions.

In addition to this consideration of the likelihood of finding an employer on the responsive portion of the tax schedule at a point in time, it is necessary to examine the amount of time employers *remain* in experience rating categories. An effective experience rating system should induce employers to minimize their labor turnover, and employers paying the maximum tax rate should have a special incentive to avoid such a tax. However, the recent theoretical work on the effects of incomplete experience rating suggests that this is a naive prediction. In particular, theory suggests that employers have very little incentive to avoid the maximum tax rate.

An approach to determining the effectiveness of an experience rating system is to observe the movement of employers among the assignable tax rates. One method of determining this involves the use of Markov analysis.

We know that the movements of employers among tax rates can be described by a transition matrix—in the current context, a 5-by-5 matrix composed of the three graded categories plus "other" and "inactive accounts." Any cell of the matrix indicates the proportion of employers assigned the particular tax category given along the vertical axis whô move into a tax category given along the horizontal axis in a particular year. The proportion in each cell is thus a transition probability. Moreover, the transition probabilities found along the diagonal of the matrix represent the proportion of employers who remain in a particular category from one year to the next.

A "simple" Markov model would assume that the movement of employers among the tax rates can be fully described by a single matrix of transition probabilities which applies to all employers—in this case, that all employers in a rate assignment category have the same probability of making a given transition to another category between periods. A mover-stayer model, on the other hand, is appropriate when

Table 1. Distribution of employees by tax rate category, fiscal 1975–78

Tax rate category	Fiscal 1975	Fiscal 1976	Fiscal 1977	Fiscal 1978
Total employers	17,252	17,252	17,252	17,252
Percent	100.0	100.0	100.0	100.0
Graded employers	10,163	11,317	12,483	12,858
Minimum-rate employers ..	3,863	4,212	4,284	4,168
Percent of total	22.4	24.4	24.8	24.2
Percent of graded employers	38.0	37.2	34.3	32.4
Mid-rate employers[1]	5,432	5,838	6,336	6,564
Percent of total	31.5	33.8	36.7	38.0
Percent of graded employers	53.4	51.6	50.8	51.0
Maximum-rate employers...	868	1,267	1,863	2,126
Percent of total	5.0	7.3	10.8	12.3
Percent of graded employers	8.5	11.2	14.9	16.5
"Other" employers	5,057	5,935	4,490	3,159
Percent of total	29.3	34.4	26.0	18.3
"Inactive accounts"	2,032	[2]0	279	1,235
Percent of total	11.8	0.0	1.6	7.2

[1]These employers were assigned one of the following rates between the maximum (6.2 percent) and the minimum (1.2 percent): 1.6, 1.9, 2.3, 2.7, 3.0, 3.4, 3.7, 4.1, 5.5, and 5.9 percent.

[2]Value is zero because the random sample of employers was drawn from the fiscal 1976 universe of active accounts.

employers in a given category can be either movers, whose rate assignments follow a regular transition matrix, or stayers, who remain in their category permanently, that is, with a probability of 1.[9] In that case, there are two applicable transition matrixes: a conventional one for movers; and another for stayers, having 1 in the cells along its diagonal and zeros elsewhere.

The importance of determining which of these two processes better describes the movement of employers should be clear. That is, is it reasonable to assume that some employers are permanently either immune to or subject to the employment stabilization incentives of the experience rating system by staying in particular categories of ratings, or is it more accurate to assume that all employers are movers? Evidence that there are stayers in the nonresponsive minimum- and maximum-rate categories and that they represent a large proportion of employers would affect an assessment of the system's degree of experience rating: larger proportions of stayers in nonresponsive categories are evidence of less effective experience rating.

To decide which of the two models is more appropriate for the New Jersey data, I tested the statistical significance of the difference between the proportion of employers who actually remained in a category for the 4-year period and the proportion who would remain in that category if only a simple Markov process of average transition probabilities were operating.

Let d_i represent the difference between the fraction of employers in category i in the initial period who remain in that category through the terminal year of the data (f_i) and the expected value of the fraction under the null hypothesis.[10] Thus,

$$d_i = f_i - \overline{p}_{ii}^n$$

where

n = the number of transitions in the data (in this case, $n = 3$); and

$\overline{p}_{ii} \equiv \dfrac{\sum\limits_{t=1}^{3} w_{ii}(t)}{\sum\limits_{t=1}^{3} w_i(t)}$ = the average probability of staying in a category for one period under the assumption of a Markov process; with

$w_{ii}(t)$ = the number of employers in category i in period t who are also in category i in period $t + 1$; and

$w_i(t)$ = the number of employers in category i in period t.

The square of d_i divided by its variance $(s_{d_i}^2)$[11] is distributed χ^2 with one degree of freedom. The sum of the ratios for the five categories is distributed χ^2 with five degrees of freedom. It is used to test the null hypothesis that there is no significant difference between the number of employers remaining in a category over the 4 years and the number that would remain according to the simple Markov process.

If the null hypothesis is rejected, the mover-stayer model is more appropriate.

Following are the ratios of d_i^2 to its variance for each assignment category, as well as the summary test statistic for the null hypothesis:

Category	Ratio value
Minimum-rate	100.478
Mid-rate	40.968
Maximum-rate	75.524
"Other"	613.389
"Inactive accounts"	3.824
Total	834.183

The value for "total" leads one to reject the null hypothesis of a simple Markov process at the .005 level of significance. Moreover, the relative values of the category ratios are interesting. Given that a higher ratio implies a more significant deviation of a category's actual stayers from the expected proportion, one should note that the ratios for minimum- and maximum-rated units are much higher than that for mid-rated employers. This suggests that there is a much stronger tendency for the former employers to stay in their categories relative to the Markov process than is found among mid-rated employers. This tendency in these categories which do not impose employment stabilization incentives on employers weakens the effects of experience rating, as does the stronger tendency for mid-rated employers to move out of the responsive part of the tax schedule, as evidenced by their relatively low ratio.[12]

Because the mover-stayer model is more appropriate, I estimated (1) the proportions of stayers (s_i) in each category and (2) the transition probabilities (m_{ij}) of a Markov matrix for movers only. Leo Goodman suggests using the following approximations to maximum likelihood estimators of these parameters when the sample size is large and there are a number of periods of data:[13]

s_i = the proportion of employers in experience rating class i in the initial period who remain in that class for the next n periods ($n = 3$ here); and

$\overline{m}_{ij}$ = the average number of employers in experience rating category i in one period who are in category j in the following period divided by the average number of employers in category i over all periods but the last, for all i and j (both averages calculated after deleting the estimated number of stayer employers from category i).

Estimates of s_i shown below indicate that large proportions of employers stay in their category over time:

Assignment category	Percent stayers
Graded employers at:	
Minimum rate	55.9
Mid rates	57.1
Maximum rate	66.1
"Other" employers	30.0
"Inactive accounts"	0.0

Among the graded employers, the proportion of stayers is always more than one-half. The important result here is that the proportions of stayers in the minimum- and maximum-rate categories are so high: in particular, almost two-thirds of the maximum-rated employers remain in their category throughout the period. While the virtually permanent assignment of the maximum rate to such a large proportion of employers could be at least partly attributable to factors such as the naturally higher turnover rates of some industries (for example, construction) relative to others (such as banking), it is also consistent with the conclusion that incomplete experience rating actually induces higher layoff rates.[14]

Estimation of the transition matrix for movers ($\bar{m}_{ij}$) indicates that, with the exception of the "inactive accounts" category, movers are more likely to stay in their current category than to move between periods. (See table 2.) Moreover, among the graded employers, the highest such "retention" rate is for the maximum-rate category, where almost two-thirds of the movers remained in the category from period to period. Thus, even for employers designated as movers, transition between categories seems slow, especially among the nonresponsive maximum-rate group.

Interpreting the results

The significance of these results is probably best understood in light of some related findings regarding the extent of cross-subsidization in the New Jersey UI system. Available data allow one to estimate the average surplus or deficit per employee-year experienced by each covered employer since its UI account was opened.[15] A surplus position indicates that, on average over the life of the business, an employer has contributed more to the system than his laid-off employees have drawn in benefits; a deficit position indicates that the employer, through laid-off employees, has been receiving a net subsidy from the system. The calculations for the sample of employers studied here show that, as of the end of 1975 and 1976, those assigned the maximum tax rate had net deficit positions per employee-year of $844 and $728, respectively, or about 9 percent of the State's 1975 annual gross wage for a production worker in manufacturing.[16] Taken with the finding that about two-thirds of the employers at this tax rate can be assumed to be "stayers," this suggests that the majority of employers at the maximum rate have been receiving an annual payroll

subsidy of about 9 percent of their gross wages. While these calculations are admittedly crude, they do hint at the magnitude of the cross-subsidization that incomplete experience rating can allow.

These results also help one understand the explanatory power of the minimum and maximum tax rates in layoff equations. Studies by Joseph Becker and Frank Brechling indicate that narrower bounds on assignable tax rates result in a larger proportion of employers being assigned the limiting tax rates.[17] The preceding discussion indicates that, for a given rate schedule, most employers assigned to a limiting tax rate tend to stay there even as business conditions change, and those that move away from such categories do so only very slowly. Thus, a State's maximum and minimum rates represent not only the potential range of responsiveness of its experience rating system but also the potential for actual avoidance of the employment stabilization incentives by a large proportion of employers. Evidence such as Robert Topel's suggests that employers at these limiting rates—especially at the maximum rate—do indeed generate extraordinary turnover rates through their layoffs.[18]

However, the New Jersey results must also be considered in light of the number of employees affected. Because employers at the maximum or minimum rates account for about 20 percent of employment in the sample, the proportion of workers affected by incomplete experience rating is smaller than the proportion of employers—a situation that somewhat mitigates the unemployment effects of the lack of experience rating at the limiting rates.[19] Also, one must keep in mind that different macroeconomic conditions (such as falling unemployment rates) could yield different parameter estimates. For example, conditions of full employment could result in a smaller estimate of the proportion of stayers in the maximum-rate category, although the number of minimum-rate stayers would probably rise.

EVEN SO, THE IMPRESSION left by this discussion of tax rate assignments is that the system analyzed here, which is not atypical, seems to lack strong incentives for employment stabilization, particularly for employers at the maximum rate. Employers tend to sort themselves into tax categories and stay there or to move among categories very slowly. Thus, most employers are either always or never facing the employment stabilization incentives of the UI experience rating system. For employers at the maximum rate, this results in large negative reserves that require subsidization by other employers in the given State's system. ☐

Table 2. Period-to-period transition probabilities among rate assignment categories for "movers"

Initial status	Status next period				
	Minimum-rate	Mid-rate	Maximum-rate	"Other"	"Inactive accounts"
Minimum-rate	.586	.336	.016	.019	.042
Mid-rate	.192	.606	.120	.049	.032
Maximum-rate	.001	.141	.664	.136	.059
"Other"	.098	.154	.048	.642	.058
"Inactive accounts"	.058	.090	.026	.708	.119

——FOOTNOTES——

[1] Two sources that together give an adequate introduction to and survey of current research on the effects of UI on labor market decisions are Daniel Hamermesh, *Jobless Pay and the Economy* (Baltimore, MD., The Johns Hopkins University Press, 1977); and Robert Topel and Finis Welch,

"Unemployment Insurance: Survey and Extensions," *Economica*, August 1980, pp. 351–79.

[2] See, for example, Ronald G. Ehrenberg and Ronald Oaxaca, "Unemployment Insurance, the Duration of Unemployment, and Subsequent Wage Gain," *American Economic Review*, December 1976, pp. 754–66.

[3] Frank Brechling, "Layoffs and Unemployment Insurance," in *Low-Income Labor Markets* (New York, National Bureau of Economic Research, 1979); Terrence C. Halpin, "The Effect of Unemployment Insurance on Seasonal Fluctuations in Employment," *Industrial and Labor Relations Review*, April 1979, pp. 353–62; and Robert H. Topel, "On Layoffs and Unemployment Insurance," *American Economic Review*, September 1983, pp. 541–59.

[4] Topel, "On Layoffs," p. 555 (his emphasis).

[5] See Denton Marks, "Evidence on the Effect of Incomplete Experience Rating in Unemployment Insurance on Layoff Rates in the Manufacturing Sector," Working Paper 732 (Vancouver, University of British Columbia, 1981).

[6] While one might question the broad applicability of research based on data from one State, New Jersey is a particularly good State to study for this type of project because: (1) it uses the reserve ratio system of experience rating, which is used by more States (32) than any other system; (2) it is among the top 10 States in number of workers covered and has a large representation of all industries; and (3) it has one of the lowest levels of "no-fault" benefits in the country—a feature which allows a clearer analysis of the degree of completeness of the experience rating tax schedule itself. Also it forgives very few negative balance accounts. Overall, the New Jersey UI financing system has little leakage.

Finally, microdata required for these calculations are sufficiently scarce that it would be virtually impossible to perform any sort of national analysis.

[7] Joseph Becker has provided information on this question for the State of Massachusetts for the period 1960–68. He shows the number and proportion of employers who were assigned the maximum or minimum tax rate for anywhere from 5 to 9 years during this period. While his findings suggest that a large number of employers do spend large proportions of time at a limiting tax rate, his evidence is considerably less complete than that presented in this research. First, Becker does not test the statistical significance of his results. There is no hypothesis formulation or testing. Moreover, his data are from Massachusetts, where maximum and minimum rates span a short range relative to other States. This fact alone increases the likelihood of employers being assigned limiting rates in the particular State. (See footnote 17 and related text.) Finally, Becker does not consider the movement of employers among tax rates or the probabilities of various tax rate assignments. See Joseph M. Becker, *Experience Rating in Unemployment Insurance* (Baltimore, MD., The Johns Hopkins University Press, 1972).

[8] Minimum- and maximum-rated employers can be considered not experience rated because their marginal UI tax cost of a layoff is negligible. Similarly, "inactive accounts" employers are not experience rated. "Other" accounts are (1) those too new to be eligible for a reserve ratio (less than 3 years' experience), which are assigned a flat rate of 3.4 percent; and (2) those for which a reserve ratio cannot be calculated—accounts in "formula breakdown" status—which could receive only one of two possible tax rates (4.1 or 6.2 percent).

[9] For discussions of the Markov model, see T.W. Anderson and Leo A. Goodman, "Statistical Inferences About Markov Chains," *Annals of Mathematical Statistics*, March 1957, pp. 89–110; and Leo A. Goodman, "Statistical Methods for the Mover-Stayer Model," *Journal of the American Statistical Association*, December 1961, pp. 841–68. For an application of this method in a policy context (specifically probabilities of movement into and out of poverty), see John J. McCall, *Income Mobility, Racial Discrimination and Economic Growth* (Lexington, MA, D.C. Heath and Co., 1973).

[10] The discussion follows Goodman, "Statistical Methods," and McCall, *Income Mobility*.

[11] Goodman shows that the variance of d_i can be estimated by:

$$s_{d_i}^2 = \frac{\bar{p}_{ii}^n (1 - \bar{p}_{ii}^n)}{w_i(1)} - \frac{n\bar{p}_{ii}^{2n-1}(1 - \bar{p}_{ii})}{\overline{w}_i}$$

where $\quad \overline{w}_i = \dfrac{\sum\limits_{i=1}^{n} w_i(t)}{n}$.

See Goodman, "Statistical Methods," p. 864.

[12] For technical reasons, the ratio for "other" is more difficult to interpret. Fortunately, the rejection of the null hypothesis does not depend on this component of the sum of ratios. In the case of "inactive accounts," the sample selection process guarantees that the employer stays in this category throughout the 4-year period. Because the file from which the random sample was drawn contains only active accounts, there can be no employers coming into or going out of the inactive category in the period from which the sample is drawn. Because the random sample was taken from the second period, the inactive category column is all zeroes in the 1975–76 transition matrix, and the inactive accounts row is all zeroes in the 1976–77 matrix.

Thus, it is not surprising that the ratio for this category is small, although the estimate is probably biased downward. It is reasonable to expect that there are covered employers who exit from their industry and stay out of the industry permanently. Thus, the ratio for this category should support the mover-stayer model.

Matrices indicating the annual transitions made by employers during the 4-year period fiscal 1975–78 are available from the author.

[13] Goodman, "Statistical Methods," pp. 851–55.

[14] Results for the "other" and "inactive accounts" categories are not discussed at length here because technical problems render their interpretation very complex. It should be noted, however, that the inability to identify certain employers in the "other" category may lend a considerable downward bias to the parameters shown above for mid- and maximum-rate employers. Also, sample selection problems bias the "inactive accounts" estimate toward zero, when it probably should, in fact, be positive. These problems are discussed, and alternative parameter estimates based on adjusted data are presented in my paper, "The Degree of Experience Rating in Unemployment Insurance: Evidence on the Permanence of Payroll Tax Rate Assignments," Working Paper 734 (Vancouver, University of British Columbia, January 1984).

[15] See Denton Marks, "Incomplete Experience Rating and Cross-subsidization of Payrolls," Working Paper 733 (Vancouver, University of British Columbia, October 1981).

[16] The comparable figures for minimum-rate employers are surpluses per employee-year of $112 and $108. Comparable figures for mid-rated employers as a group are unavailable, but there are figures by the various tax rates covered by the category. The deficits are preceded by " – ":

Tax rate	End of 1975	End of 1976
1.6	$86.7	$81.4
1.9	69.4	72.6
2.3	64.2	67.5
2.6	53.1	46.2
3.0	51.2	41.8
3.4	39.9	36.6
3.7	40.2	30.4
4.1	17.9	15.5
5.5	– 46.5	– 44.3
5.9	– 155.4	– 141.2

The employers with the net surplus position represent about 80 percent of the employment in the mid-rate category.

It should be noted that these calculations disregard differences in the timing of contributions and payment of benefits because the data do not allow any matching of the flows. Thus, it is impossible to determine the role that changing price levels and forgone interest play in the cross-subsidization process.

[17] See, for example, Frank Brechling, "The Incentive Effects of the U.S. Unemployment Insurance Tax," in *Research in Labor Economics 1* (Greenwich, CT, JAI Press, 1977), p. 83.

[18] See Topel, "On Layoffs."

[19] Denton Marks, "The Mitigating Effect of Employer Size in Incomplete Experience Rating," Working Paper 824 (Vancouver, University of British Columbia, September 1982).

Wet corn mills yield top pay among grain industries

Wet corn milling had the highest pay levels of four grain mill industries, according to a Bureau of Labor Statistics survey of occupational pay. At $10.72 per hour, average earnings in wet corn mills in September 1982 were 25 percent higher than in flour mills ($8.59), 34 percent higher than in blended flour plants ($8.01), and 72 percent higher than in rice mills ($6.25).[1] Nearly all workers in wet corn mills were located in metropolitan areas—chiefly within the Great Lakes States—in plants with 100 workers or more, and in establishments where collective bargaining agreements covered a majority of the workers. These characteristics, historically associated with higher pay levels, were found to a lesser extent in each of the other milling industries studied. Rice mill workers, for example, were concentrated in the Southwest, one of the lowest paying regions, and just under half of the workers were unionized.

The grain mill products industries covered by the survey employed just over 23,000 production workers in September 1982. Slightly more than one-third of the workers were employed in flour mills, approximately one-fourth each in wet corn mills and blended flour plants, and about one-sixth in rice mills.

Regional employment patterns varied considerably by industry. Flour milling, for example, the largest of the four industries with 8,115 production workers, was found in nearly all regions of the country. In contrast, slightly more than four-fifths of the 3,236 rice milling employees were in the southwest. Except for rice milling, the Great Lakes region was the major center of production; it accounted for nearly three-tenths of the production work force in flour milling, and for three-fifths of the workers in both the blended flour and wet corn milling industries.

Pay. Table 1 presents nationwide average pay rates for representative occupations in the grain milling industries. As with the industry averages, occupational pay levels were consistently highest in wet corn mills. This was true even where comparisons could be made within the same geographic region. In each industry, maintenance journeymen usually were the highest paid and custodial or general labor personnel, the lowest.

Nearly all workers in each industry were paid according to formal time-rated pay plans. Except in rice mills, where rate-range plans prevailed, most workers were paid single rates for specified occupations. Although single rate pay systems generally result in narrow earnings distributions, wide differences in pay scales among establishments produced a contrary effect in flour mills and blended flour plants. Blended flour plants had one of the highest wage dispersion indexes (57) among the industries in which the Bureau studies occupational pay.[2] Wage dispersion indexes

Table 1. Number and average straight-time hourly earnings of production workers in selected occupations in the grain mill industries in the United States, September 1982

Occupation	Flour and other grain mills		Rice mills		Blended and prepared flour mills		Wet corn mills	
	Number of workers	Average hourly earnings[1]	Number of workers	Average hourly earnings[1]	Number of workers	Average hourly earnings[1]	Numbers of workers	Average hourly earnings[1]
Elevator operations	463	$8.60	113	$6.09	—	—	93	$10.17
Bulk cleaners	95	8.98	22	7.67	—	—	15	9.25
Receivers	264	8.56	66	5.50	—	—	47	10.62
Weighers	104	8.36	25	6.28	—	—	31	9.92
Processors:								
Flour	1,273	8.88	—	—	—	—	—	—
Rice	—	—	528	6.03	—	—	—	—
Blended flour	—	—	—	—	1,013	6.64	—	—
Wet corn	—	—	—	—	—	—	1,491	10.69
Packers:								
Flour	1,068	7.72	—	—	—	—	—	—
Rice	—	—	277	5.87	—	—	—	—
Blended flour	—	—	—	—	426	6.73	—	—
Wet corn	—	—	—	—	—	—	271	10.33
Material movement:								
Laborers, material handling	925	7.95	317	4.91	172	6.17	196	10.19
Power-truck operators	312	9.22	113	6.17	260	8.01	162	10.51
Maintenance:								
Electricians	101	10.68	21	11.01	—	—	215	11.75
General mechanics	360	9.42	184	7.73	332	10.27	300	11.00
Millwrights	148	10.88	14	8.64	—	—	159	11.81
Oilers	183	8.52	—	—	—	—	48	10.73
Sheet-metal workers	54	10.80	—	—	—	—	101	11.66
Service and custodial:								
Guards	22	5.55	27	5.78	—	—	51	9.43
Janitors	515	8.52	192	4.78	185	6.75	176	9.78

[1] Excludes premium pay for overtime and for work on weekends, holidays, and late shifts.

NOTE: Dashes indicate that no data were reported or that data did not meet publication criteria.

for the other grain milling industries were 13 for wet corn, 33 for flour, and 37 for rice.

Benefits. Virtually all production workers were in grain mills providing paid holidays and vacations after qualifying periods of service. The most common holiday provision in rice mills was 8 days; in wet corn mills, 10 days; and in flour mills and blended and prepared flour establishments, 12 days. Typical vacation provisions in each industry granted at least 1 week of paid time off after 1 year of service, at least 2 weeks after 3 years, and 3 weeks or more after 10 years. Vacation benefits were less generous in rice mills than in the other industries, particularly after longer periods of service.

All or virtually all production workers were in mills that provided at least part of the cost of hospitalization, surgical, basic medical, and major medical insurance coverage. Life insurance plans were available to at least nine-tenths of the workers in each industry. Accidental death and dismemberment insurance coverage was available to about half of the workers in blended flour plants, and to three-fourths or more of the workers in each of the remaining industries.

Retirement pension plans—other than Federal social security—applied to at least nine-tenths of the production workers in the flour, blended flour, and wet corn mill industries; the proportion was four-fifths in rice mills.

A COMPREHENSIVE REPORT on the survey findings, *Industry Wage Survey: Grain Mill Products, September 1982*, Bulletin 2207 (Bureau of Labor Statistics, 1984) is for sale ($3) by the Government Printing Office, or by any of the Bureau's regional offices. □

————*FOOTNOTES*————

[1] Earnings data exclude premium pay for overtime and for work on weekends, holidays, and late shifts.

[2] To provide a common reference for comparing wage dispersion, an index is calculated for an industry by dividing the middle range of the earnings distribution by the median. For a discussion of occupational pay relationships by industry, see Carl B. Barsky and Martin E. Personick, "Measuring wage dispersion: pay ranges reflect industry traits," *Monthly Labor Review*, April 1981, pp. 35–41.