

ECONOMIC COMMENTARY

Federal Reserve Bank of Cleveland

How Are Wages Determined?

by Erica L. Groshen

For economists, wage determination seems to be like the weather: a popular topic of conversation, but a subject that inevitably remains open-ended. Part of the reason for this lack of resolution is that economists tend to think of the labor market as a classical competitive market. In that context, employers do not set wages; instead, they passively pay the wage that results from supply and demand conditions in the labor market.

Seeing employers as price-takers, however, does not explain many of the observed patterns of wages, such as wage variation across industries for apparently equivalent workers. Nor does it explain why employers perceive themselves as choosing a wage within a market-determined range of feasible wages, and how they make that choice. Rather, evidence suggests that viewing employers as wage-setters lends significant insight into the wage-setting process.

Understanding wage determination is the key to understanding important aspects of the economy, such as income distribution, poverty, consumer spending, and the perpetuation of inflation. A line of inquiry that expands our understanding of the wage-setting process promises to provide insight into these issues.

This *Economic Commentary* presents some findings on the employer's role in wage-setting. These findings are based on observed wage patterns among individual employers in three labor markets in the Fourth Federal Re-

serve District: Cleveland, Cincinnati, and Pittsburgh.

■ Why Is It Important to Understand the Wage-Setting Process?

If employers are price-takers, who simply pay their employees a market-determined wage, then an individual's pay should depend almost entirely on his or her characteristics (or human capital): education, age, IQ, and experience. Even in the most detailed studies, however, these factors explain less than half of the wage variation in the population.

Table 1 shows the limited explanatory power of demographic information in the Current Population Survey (CPS), by listing how much of the variation in wages is explained by four groupings of variables.¹ The results are typical of those found in household surveys.

In this sample, the usual human capital variables (those included in group 1) explain only a quarter of the variation in the log of wages. Adding occupation (as in group 2) raises explanatory power by 16 percent, while including other demographic variables (those introduced in group 3—race, sex, and union status) explains another 6 percent. Finally, in group 4, the introduction of industry variables raises the explanatory power to 51 percent of the variation of wages.

What drives the half of wage variation that all of these variables don't explain? Would an understanding of these

Much of the variation in wages among employees cannot be explained by the usual variables of individual worker characteristics, demographics, and industry classification. Based on evidence from three labor markets in the Fourth Federal Reserve District, the author finds that employer differentials account for a large share of the variation in wages, with important implications for economics and management.

unexplained wage patterns shed light on the causes of movement in aggregate wages?

For instance, the macroeconomic models that help us understand and predict unemployment and inflation differ radically in their assumptions about the wage-setting process. Classical Keynesian models assume rigid or "sticky" wages; companies do not adjust wages downward. In contrast, most real business cycle models assume immediate adjustment of wages, but slow adjustment of workers between jobs.

Fifty years after Keynes, we still don't know in what way wages may be sticky. For instance, are wage adjustments mostly employee-specific, or employer-specific? When do wage adjustments precede inflation, and for whom, and when do they lag inflation? Do aggregate wage changes primarily reflect changes in the composition of employ-

ment or changes in wage rates to incumbent workers?

The answers to these questions and to many other related ones would be useful to the business community as well as to economists. Management has a continuing interest in understanding how its competitors in the labor market set wages, and in the relative merits of different approaches. At the same time, insights into the wage-setting process will enhance the ability of economists to understand aggregate economic behavior, such as business cycles, inflation, and income distribution.

Recent analysis suggests that much of the unexplained variation in wages among employees is linked to the characteristics of their employers. Unfortunately, most wage data come from household surveys of wage-earners (such as the U.S. Census and the CPS), rather than from establishment surveys of wage-paying employers, so they lack any employer-specific information, except for industry and sometimes employer size. To study the wages of employees, one must understand the role of employers in wage-setting, which necessitates gathering wage data by employer and about the employer.

■ How Much Do Wages Vary by Employer?

To study wage variation by employer, we use a data set that follows the wages paid by a sample of employers in three Fourth Federal Reserve District cities to employees in specific occupations from 1955 through 1988. The data include observations on an average of 76 employers per year, each for an average of 12 years, covering about 24 occupations each. This longitudinal file offers a unique opportunity to study the wages paid by a panel of employers over an extended period of time.

One measure of the extent to which wages vary by employer is the expected wage difference between two random workers in the same occupation, employed by different firms in the same metropolitan area. On the basis of work

TABLE 1 TYPICAL CROSS-SECTIONAL WAGE REGRESSION RESULTS IN THE CURRENT POPULATION SURVEY

Group	Explanatory Variables	Proportion of Wage Variation Explained (R^2)
1	Years of Education, Age, Age-Squared	.26
2	Years of Education, Age, Age-Squared, Occupation	.42
3	Years of Education, Age, Age-Squared, Occupation, Race, Sex, Union Status	.48
4	Years of Education, Age, Age-Squared, Occupation, Race, Sex, Union Status, Industry	.51

NOTE: Dependent variable was log (hourly earnings). Mean: 2.05, standard deviation: 0.55. Number of observations: 150,579.

SOURCE: Current Population Survey One-Quarter Earnings Sample, 1986. Sample includes all people employed in nonagricultural industries for wages and salaries, aged 18-54.

done at the Federal Reserve Bank of Cleveland and by others, the expected wage difference is 10 to 15 percent, when averaged over all of the occupations in the firms.² While the employer differential received by some occupations may be slightly higher, and that received by others may be lower, employer wage differentials are usually remarkably uniform across occupations.

For example, choose a worker and then choose another in the same occupation but working for a different employer. One of the workers will usually earn 10 to 15 percent more than the other. That's the difference between \$20,000 and \$22,000 or \$23,000—or between \$40,000 and \$44,000 or \$46,000. The magnitude of the differential is significant: it is on the same order as the union wage differential, which most employers and workers treat as substantial.

■ Are Employer Wage Effects Transitory?

These results would not be terribly striking if wage differences among employers were short-lived. For instance, suppose the lower-paid of the two workers described above were offered the opportunity to switch employers in the next year (keeping the same occupation). Should she bother?

She should, if she knew that the wage differential between the two jobs next year is highly *positively correlated* with the wage differential this year. On the other hand, if these differences are random (that is, if the correlation between any two years is zero), then knowing this year's differential gives no information about what it will be next year. On average, it doesn't matter if she switches. Finally, she should definitely stay at her current job if the firms balance off a relatively high wage this year by paying a low salary the following year. In this case, wage differentials are *negatively correlated* over time.

In the sample of employers in Cleveland, Cincinnati, and Pittsburgh, the correlation for company wage effects one year apart is strikingly high: 0.91. This number is close to 1, the number obtained if these wage differentials were absolutely permanent over time. So, she should switch employers.

Suppose she were offered the chance to switch in two or three or four years; should she? That depends on the correlations of company wage effects two, three, or four years apart. Figure 1 shows changes in the persistence of company wage differentials from the city average over time. The horizontal scale shows the number of years apart for which the persistence is calculated.

The vertical scale measures persistence (correlation over time), which ranges from -1 (if employers offset wage differences over time), through 0 (random changes), to 1 (perfectly constant).

In the figure, persistence starts at 1, goes down to 0.91 after one year, declines to 0.6 after 12 years, then drifts down more slowly over the next 20 years, ending around 0.5, still significantly above 0.³

With the persistence of employer wage effects over 33 years still in the neighborhood of 0.5, employees could rationally base today's decision about switching companies on the basis of information that was three decades old! Or, from another perspective, much of the company wage differential received by a worker when she first starts with a company will be received each year over the span of a 33-year career.

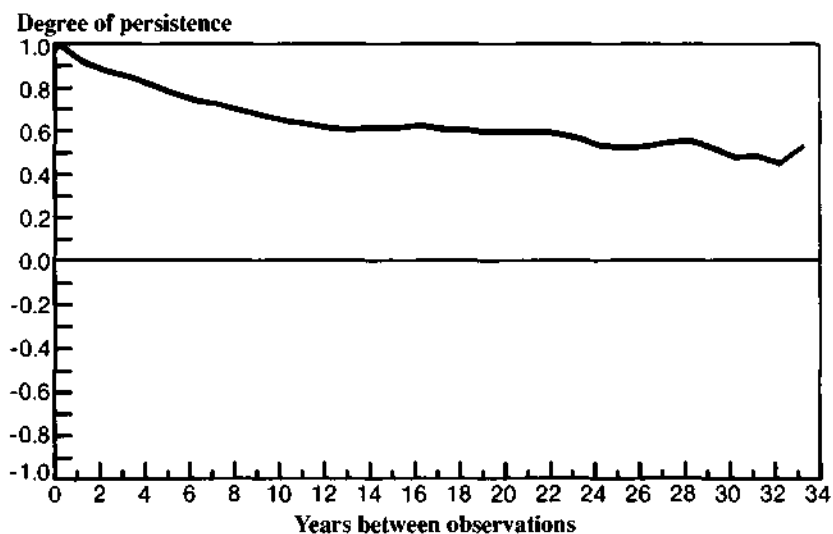
The strong persistence of these company wage effects suggests that they must be based on fundamental characteristics of the firm, and at the same time rules out temporary error as a major source of such variation. Nevertheless, persistence over time is not perfect, raising the following question: to what do company wage differentials actually respond?

■ Why Do Wages Vary Among Employers?

Employer wage effects are linked to measurable characteristics of employers, such as industry, size, union status, technology, and product.⁴ However, knowing that such links exist still does not explain the basis of employer wage differentials. Instead, these links and the findings discussed above invite further speculation and research into the possible sources of such wage variation.

The five possible candidates and some of their policy implications are discussed in an article in a recent Federal Reserve Bank of Cleveland *Economic Review*.⁵ Each model explains not only why an employer would want to deviate from a market mean wage, but

FIGURE 1 THE PERSISTENCE OF EMPLOYER WAGE EFFECTS OVER TIME



SOURCE: Author's calculations from the Federal Reserve Bank of Cleveland Community Salary Survey, 1955-1988.

also what (usually a productivity difference) allows the deviation to be sustained over a long period. They can be summarized as follows.

- (1) Employers systematically sort workers by ability. This would imply that the highest-wage employers in our sample have the most able workers in all occupations.
- (2) Wages vary because of compensating differentials for different conditions of employment. So, these high-wage employers may provide little job security, poor working conditions, or few fringe benefits.
- (3) Costly information generates or perpetuates random variations in wages. Wage variations are mistakes on the part of some of these employers; they misjudge conditions in their labor market.
- (4) Wage payments above the market rate may be cost-efficient for some employers (of a particular technology or size, for example) because of savings on supervision, turnover, or other factors. Some of these companies count on the fact that workers who know that they have a high-wage job are less

likely to quit the job, or to risk losing it by shirking or being careless.

- (5) Finally, workers inside firms are sometimes able to claim some of the profits generated by firms in imperfectly competitive markets. Some of the high-profit companies implicitly share some of their profits with their workers.

As suggested above, the size and persistence of employer differentials effectively eliminates random variations (explanation 3). Other research on compensating differentials and fringe benefits suggests that usually, except in occupations where risk of death is a factor, high wages are associated with better working conditions and fringes, especially across firms. This evidence makes explanation 2 less than convincing; the occupations surveyed here are not subject to much variation in the risk of death or injury.

Attempts to look for evidence of sorting by human capital (explanation 1) and efficiency wages (explanation 4) have met with mixed success, and are hampered by the lack of good information on worker productivity and effort. Profit-sharing (explanation 5) remains an intriguing possibility, all the more

so because it may be more amenable to testing than the others. Some authors have presented preliminary tests supporting this hypothesis, but the results are inconclusive as yet.⁶

■ Conclusion

What does the importance of employer characteristics mean? It suggests that employers are not passive price-takers in the labor market. Within bounds imposed by the labor market, employers can and do set wages for their employees, presumably in order to enhance worker productivity and to improve their profits.

Of course, this evidence does not argue that employer characteristics explain all of the variation in wages, or that education and experience have no effect on wages. But it does imply an important role for personnel policy that has many implications for economics and management. For example, employers may be able to compete more effectively if they improve their understanding of the activities of their competitors in the labor market. And, a deeper understanding of wage inflation and business cycles will need to incorporate the role of labor market institutions and personnel policies in wage determination.

■ Footnotes

1. The Department of Labor's Bureau of Labor Statistics conducts the monthly Current Population Survey of more than 50,000 U.S. households in order to measure national labor-force activity. This survey is widely used in empirical labor economics research.
2. See Erica L. Groshen, "Sources of Wage Dispersion: The Contribution of Inter-employer Wage Differentials Within Industry," Federal Reserve Bank of Cleveland *Working Paper* 8802, June 1988; "Do Wage Differences Among Employers Last?" Federal Reserve Bank of Cleveland *Working Paper* 8906, June 1989; and "Rent Capture, Ability-to-Pay and Salaries in the Private Sector," Proceedings of the Forty-Second Annual Meeting of the Industrial Relations Research Association, Madison, Wisconsin, 1990 (forthcoming). See also Jonathan S. Leonard, "Wage Structure and Dynamics in the Electronics Industry," *Industrial Relations*, vol. 28 (spring 1989), pp. 251-75.
3. See Groshen, "Do Wage Differences Among Employers Last?" for the persistence of employer wage differentials over six years in a Bureau of Labor Statistics Area Wage Survey. Leonard, "Wage Structure and Dynamics," looks at persistence in a private wage survey of high-tech employers in California.
4. See Groshen, "Sources of Wage Dispersion."

5. See Erica L. Groshen, "Why Do Wages Vary Among Employers?" Federal Reserve Bank of Cleveland *Economic Review*, 1988 Quarter I.
6. See Groshen, "Rent Capture, Ability-to-Pay, and Salaries"; Leonard, "Wage Structure and Dynamics"; and David Blanchflower, Andrew Oswald, and Mario Garrett, "Insider Power in Wage Determination," National Bureau of Economic Research *Working Paper* 3179, November 1989.

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