

ECONOMIC COMMENTARY

Federal Reserve Bank of Cleveland

Are Wages Inflexible?

by Ben Craig

How often does an average worker's hourly wage change? Do employees and employers avoid wage cuts? When wage changes occur, do they tend to come in gradual, small adjustments or in the form of a single large increase? Finally, do pay cuts follow the same pattern as pay raises?

The answers to these questions are of intense interest to macroeconomists, because the nature of market wage-adjustment processes lies at the heart of many long-standing debates about the effects of monetary policy. For example, workers may resist *nominal* (actual dollar) wage cuts, but be willing to accept unchanged nominal wages as the overall price level rises (and thus see a decline in their *real*, or inflation-adjusted, wages). In this case, it may be in society's best interest to achieve positive, moderate rates of inflation.

Beyond monetary policy questions are a host of other important policy issues that depend crucially on the nature of wage adjustments in U.S. labor markets. For instance, cross-regional differences in returns to workers may persist because wage compensation patterns respond sluggishly to changing economic conditions. Also, labor market rigidities may critically interfere with the private sector's ability to withstand the effects of increased international competition.

This *Economic Commentary* documents two important facts about how wages change for hourly workers. First, contrary to the common presumption that wages are "sticky" (that is, they respond

sluggishly to changing circumstances), nominal wage changes are in fact prevalent. Furthermore, there is little evidence to suggest the presence of downward wage rigidity: Actual wage cuts are common in the data examined here.

Second, we explore the possibility that only *some* wages are sticky by examining the relationship between the frequency of wage changes and their magnitude. For example, some might expect adjustment pressures in sticky-wage sectors to build over time, resulting in relatively large changes when they do occur. However, our investigation suggests that, if anything, infrequent wage adjustments tend to be smaller in magnitude than frequent ones.

Taken together, these facts present a challenge for proponents of the view that labor markets are subject to substantial wage rigidity. Indeed, the evidence presented here makes a compelling case for the view that wage flexibility is pervasive in the U.S. economy.

■ The SIPP Data

The characteristics of wage adjustment can be evaluated with real-world data that carefully measure hourly earnings. A particularly useful data set for this purpose is the Survey of Income and Program Participation (SIPP) from the U.S. Census Bureau. The SIPP examined 15,000 households from October 1983 through May 1986 to observe how people use government transfer programs such as welfare (or AFDC) to balance out changes in their lives, such as divorce or loss of a job. Every four months, people

Using data adapted from the U.S. Census Bureau's Survey of Income and Program Participation, the author shows that wage adjustments for hourly employees are much more variable than is commonly supposed. Workers whose wages change often are likely to experience larger fluctuations, while those whose wages change infrequently tend to see smaller movements. Wage flexibility would appear to be the rule, rather than the exception, in U.S. labor markets.

were asked if they were paid on an hourly basis and, if so, the amount of that rate on their last paycheck. The interviews provided eight separate wage measurements over the period.

The SIPP is especially valuable because it covers many people at separate moments in a short time frame. Other data sets survey workers' wages over longer sample periods, but measure their hourly pay only once a year.¹ This may be less accurate than the SIPP's measurements for two reasons. First, people may have only a hazy recollection of their pay rates over the entire year. There is no substitute for being able to refer to a recent pay stub. Second, surveys that depend on annual recollections often assign a wage rate from annual earnings (taken from W-2 income tax forms) divided by the person's estimate of hours worked over the past year. Artificial variation may be

introduced into constant annual salaries as people report different hours worked from year to year. This estimate also might change from year to year even if the hours worked did not.

From the 15,000 original households chosen for the SIPP survey, we developed a sample that isolated wage changes for hourly employees. We excluded salaried workers and those paid on commission, and removed anyone not continuously employed with the same firm for the entire period because of layoff, job switch, or retirement. Finally, we included only those workers who responded to all eight interview cycles in the survey, leaving us with a final sample of 2,700 people who reported an hourly wage for all eight measurements.²

Because salaried workers are excluded, this sample does not represent a "snapshot" of the U.S. labor force. A person on salary is more likely to be older, to have less variability in earnings, and to be better educated (and thus able to negotiate a steadier income) than the hourly wage earners represented in our sample. Further, by excluding people who were not continuously employed during the two years of the SIPP interviews, we may have left out people who had sticky wages, but were laid off during some portion of this period because of their sticky wages. However, the wage measurements for the SIPP sample are much closer to the actual hourly price of labor than are the usual measures of annual earnings divided by a guess at annual hours.

■ Are Wage Changes Infrequent?

Table 1 indicates the percentage of workers in the sample who experienced nominal wage changes (out of a possible seven changes) during the eight interview cycles. For example, the third column (labeled column 2) identifies people whose wages changed twice over the sample period. The bottom row of this column tells us that 8.1 percent of the sample experienced a total of two changes. The other entries in the column break down this percentage according to the number of negative wage changes: 6 percent of the sample experienced two

TABLE 1 PERCENTAGE OF PEOPLE EXPERIENCING NOMINAL WAGE CHANGES, OCT. 1983–MAY 1986

Negative Wage Changes	Total Wage Changes								Total Negative Changes
	0	1	2	3	4	5	6	7	
0	1.4	2.4	6.0	5.3	3.5	2.2	0.9	0.4	22.0
1	—	0.5	2.0	5.0	7.2	7.6	4.2	1.5	27.9
2	—	—	0.2	0.9	4.3	7.2	8.4	5.2	26.2
3	—	—	—	0.0	0.4	2.3	6.8	8.0	17.4
4	—	—	—	—	0.0	0.1	1.6	3.9	5.6
5	—	—	—	—	—	0.0	0.1	0.7	0.8
6	—	—	—	—	—	—	0.0	0.0	0.0
Total	1.4	2.9	8.1	11.2	15.4	19.3	22.0	19.7	100.0

SOURCE: Author's calculations from the SIPP. Numbers may not add up exactly because of rounding error.

positive wage changes, 2 percent saw one negative and one positive change, and only 0.2 percent had two changes that were both negative.

The far right column summarizes the share of the sample that experienced negative wage changes. For example, because the first row of the table pertains to individuals who had no negative changes, the first entry in the last column tells us that 22 percent of the sample experienced no negative adjustments in their nominal pay over the sample period.

More than three-quarters of the sample had their wages change four or more times over the two-and-a-half-year span. For those who think wages are sticky, this may seem like an astounding amount of variation. Equally surprising is that half of the sample shows two or more declines in wages during this period. This is especially interesting because the sample covers October 1983 to May 1986—the middle of the longest postwar economic expansion in U.S. history.

A tiny fraction (less than 1 percent of those with negative wage changes) saw only negative changes. In other words, a negative wage change for a person almost always occurs in the context of other positive wage changes. Even the small number of respondents who reported only negative wage changes experienced two or fewer changes during this

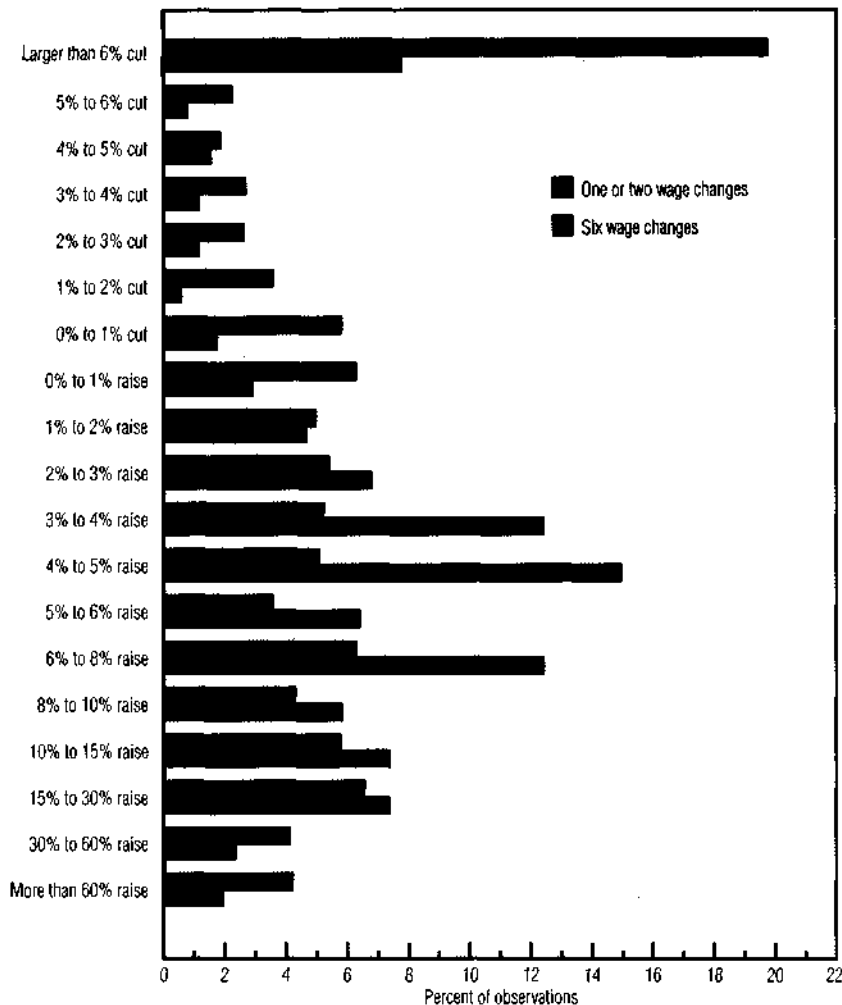
period. This is consistent with the view that wage changes are somewhat independent from period to period. Incurring a pay cut is a bit like throwing a fair die and getting a six. If the die is thrown seven times, many people will get at least one six. Fewer than one in 100,000 will roll seven consecutive sixes.³

■ Are Wage Changes Like Earthquakes?

Perhaps variations in the nature and degree of wage stickiness in various occupations might explain differences in the number of wage changes observed in this sample. If we accept this image of a sticky wage, then a wage behaves somewhat like a geological fault. Pressure builds up along the fault until the earth can no longer hold it back, and the fault snaps to a new equilibrium level. The "stickier" the fault, the more violent the eventual earthquake.

In the case of a sticky wage, wages with fewer changes should experience more violent motion when they are finally forced to change. Wages that change often should vary only a little each time. In this case, they are like "slippery" faults with many mild earthquakes. The result of this image is that fewer wage changes imply a large wage change if people remain in the same job.⁴

FIGURE 1 SIZE OF A SINGLE WAGE CHANGE FOR FREQUENT AND INFREQUENT WAGE FLUCTUATIONS



SOURCE: Author's calculations from the SIPP, October 1983–May 1986.

We examine whether this implication of the sticky-wage scenario is evident in our sample in figure 1, which shows the frequency of the percentage wage change for those who experienced one or two changes (mauve bars) and for those who experienced six changes (blue bars).⁵ If the sticky-wage hypothesis is true, the blue bars should be clustered around zero, indicating small percentage wage changes for people with frequent pay adjustments. In other words, people with many wage changes would reach their final wage after a series of small movements. The mauve bars, associated with workers who experience just a few

adjustments in our sample, should not be clustered around zero, because those with large changes would tend to move in a few large jumps.

As is quickly evident from figure 1, the data do not support this particular image of the sticky wage. People whose wages change often are also more likely to experience larger changes, whether in the form of raises or cuts. On the other hand, people whose wages change infrequently are affected less often, and when their wages move, they do so in smaller amounts.⁶

Concluding Remarks

The wage changes in the sample of workers drawn from the SIPP data show much greater variability than is often supposed. Further, because we directly examine intrayear wage changes, our analysis points up much variability that would be disguised in an annual observation. For example, over the two-and-a-half-year period, less than 10 percent of the observations posted a net wage decrease.⁷ Only 1.4 percent of our sample experienced no wage changes, but half saw their wages decline two or more times during part of the nation's longest postwar economic expansion.

Fewer wage changes are associated with smaller wage changes, and frequent wage changes are usually accompanied by a greater net change overall. The flexible-wage viewpoint gets strong support from data in which short-run hourly wages are measured precisely.⁸

Many of the stories told about wage stickiness apply precisely to those workers included in the SIPP sample. Workers covered by collective bargaining agreements, for example, are more likely to be hourly wage earners who are included in the sample. Yet, the empirical evidence strongly suggests that wages are flexible. More than 87 percent of the sample experienced three or more wage changes for eight measurements made from October 1983 to May 1986. Wages decreased for more than 87 percent of the workers during the same time. On balance, evidence seems to indicate that substantial flexibility is the rule, rather than the exception.

Footnotes

1. For two excellent surveys of recent research on wage stickiness based on annual data (such as the Michigan Panel Study of Income Dynamics), see D. Mitchell, "Keynesian, Old Keynesian, and New Keynesian Wage Nominalism," *Industrial Relations*, vol. 32 (1993), pp. 1-29; and Gary Solon, Robert Barsky, and Jonathan A. Parker, "Measuring the Cyclicalities of Real Wages: How Important Is Composition Bias?" *Quarterly Journal of Economics*, vol. 109, no. 1 (February 1994), pp. 1-25.

2. Each person in our sample answered "yes" to the question, "Were you paid by the hour on this job?" The wage was the answer to the question, "What was your regular hourly pay rate at the end of last month?"

3. Independence of wage changes would be consistent with wages adjusting quickly to an independent external shock. The distribution of wage changes is not quite independent. There is a "memory" of past changes that makes similar present changes slightly more probable. A probability of one-sixth (or the chance of rolling a six with a fair die) for wage decreases is quite consistent with the sample.

4. An alternate view might be that an "earthquake" occurs only if the person changes his job. In this case, the sticky-wage view offers no prediction of the magnitude of the wage movement.

5. We discarded frequencies for which no wage change occurred, so that the percentages graphed in the figure represent an estimate of the probability density of the size of the wage change, given that a change occurs. Each person with six wage changes contributes six observations to the percentage wage changes in the blue bars.

6. The same conclusions are evident when the density of wage changes is graphed in alternate ways. For example, when the total wage change for the entire sample period is graphed for the groups that experienced two or fewer changes, the total change is much more likely to be smaller than for the group experiencing six wage changes.

7. Other studies using an annual sample frequency have exposed fewer wage decreases. David Lebow, David Stockton, and William Wascher, in "Inflation, Nominal Wage Rigidity, and the Efficiency of Labor Markets" (Board of Governors of the Federal Reserve System, unpublished manuscript, 1994), find that annual differences in earnings are clustered around zero, which supports a mild wage stickiness. The differences between their findings and ours can be explained by the variation in samples (they use the entire Panel Study of Income Dynamics, including salaried workers, as well as annual frequencies). High-frequency data are also important in measuring relationships between wages and behavior. See Jean Kimmel and Thomas J. Kniesner, "The Intertemporal Substitution Hypothesis Is Alive and Well (But Hiding in the Data)," Indiana University, Working Paper 93-014, 1993.

8. However, some care should be taken in interpreting this observation. Perhaps some wages are "sticky" exactly because the return to the employer/firm wage adjustment is small at any given time. Furthermore, small deviations from optimal price-setting can result in significant macroeconomic effects in some "new Keynesian" frameworks. See, for instance, Gregory N. Mankiw, "Small Menu Costs and Large Business Cycles: A Macroeconomic Model of Monopoly," in G. Mankiw and D. Romer, eds., *Imperfect Competition and Sticky Prices*, Cambridge, Mass.: MIT Press, 1985, pp. 29-42.

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