

## RESEARCH BRIEF

# Aggregate Nominal Wage Adjustments: New Evidence from Administrative Payroll Data

Based on BFI Working Paper No. 2019-42, "[Aggregate Nominal Wage Adjustments: New Evidence from Administrative Payroll Data](#)," by John Grigsby, UChicago PhD student; Erik Hurst, professor, UChicago's Booth School of Business; and Ahu Yildirmaz, co-head of ADP Research Institute

### KEY TAKEAWAYS

- ✓ By textbook definition, wages should fall when demand for labor declines
- ✓ However, to this point, economists have not detected much evidence for such decreases, dubbing this phenomenon "wage stickiness"
- ✓ New research upends this conventional wisdom, revealing that many workers received nominal wage cuts following the Great Recession
- ✓ Those receiving bonuses, as well as those who changed jobs, were particularly vulnerable to pay cuts

Textbook economics tells us that when the demand for something decreases the price of that product will also decrease. This should also hold for the price of labor, or wages. As employers demand fewer workers, wages should decrease as more workers compete for fewer jobs.

However, in the US economy over the past 10 years or so, as labor markets variously softened over time (unemployment reached 10 percent in October 2009), wages held mostly steady and did not drop as expected. The phenomenon, known as wage stickiness, has been credited with inhibiting a drop in nominal wages during the Great Recession, as well as holding down wages as the economy recovered.

Economists have posited theories about the nature of wage stickiness; however, what they have lacked are data to test those theories—until now. In "[Aggregate Nominal Wage Adjustments: New Evidence from Administrative Payroll Data](#)," John Grigsby and Erik Hurst of the University of Chicago, and Ahu Yildirmaz of the ADP Research Institute, use data from ADP, LLC (one of the world's largest payroll processors) to shed new light on wage adjustments over the last decade. While the goal of this work is to improve the technical efficacy of existing models, it also reveals facts about whether—and how—wages adjust to shifts in labor demand.

**Figure 1: 12-Month Nominal Base Wage Change Distribution, Job-Stayers**



Notes: Please see full paper online for notes to this and all figures.

### Not as sticky as you think

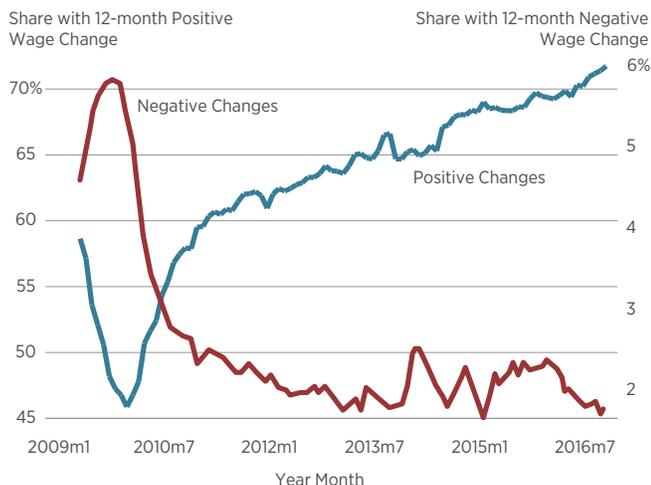
One reason that existing models are hampered in their analysis of wage stickiness is their reliance on self-reported wage data. Most existing data are based on household surveys that are prone to measurement error. In addition, existing datasets do not incorporate changes in wages over time due to tips, commissions, bonuses, and overtime, for example, nor do they include the value derived from fringe benefits. Finally, most current models do not capture differences among job-changers and job-stayers, a distinction that would help explain wage dynamics over the course of such economic shocks as, say, the Great Recession.

The authors' use of ADP data addresses these and other current limitations. The anonymized data include per pay-period nominal wages (unadjusted for inflation) for about 20 million

workers that allow for tracking within and across firms, that incorporates other forms of payment like bonuses and fringe benefits, and that allows for analysis over time to account for business cycle fluctuations.

The authors find that most low-income workers rely on base pay for their wages, receiving little in the way of bonuses, performance pay, and commissions. As incomes increase, though, bonuses play a larger role: median households derive 3 percent of their income from bonuses, the 80th percentile equals five percent, the 95th percentile equals 10 percent, and the 99th percentile equals 16 percent. These insights, including the influence of benefits, allow the authors to measure the relevance of various forms of compensation on aggregate fluctuations. In other words, how do these insights about wages and other forms of income at an individual level inform our understanding of wages across the broader economy?

**Figure 2: Time Series of Nominal Base Wage Adjustments, Job-Stayers**

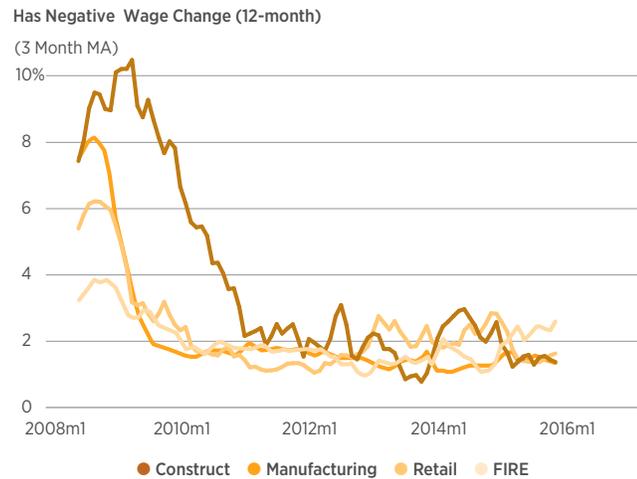


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A series of figures describes some of the authors' findings. First, these new data confirm the hypothesis that wages are downward sticky: people rarely get a pay-cut. Figure 1 shows the distribution of 12-month nominal base wage changes from May 2008 to December 2016, the period of this study. The full paper breaks down the data within Figure 1, but key takeaways include:

- roughly one-third of hourly and salaried workers did not receive a wage change in a given year;
- the patterns of wage changes among hourly and salaried workers closely mirror each other;

**Figure 3: Time Series of Wage Changes by Industry, Job-Stayers**



Notes: Please see full paper online for notes to this and all figures.

- only 2.4 percent of all workers (hourly and salaried) who remained employed at one firm over 12 months received a nominal wage cut;
- and for those who did receive a nominal wage increase, most—about 27 percent—saw a raise between 2 and 4 percent.

Figure 2 illustrates wage adjustments over time, and shows that the number of workers (hourly and salaried) who received pay increases following the onset of the Great Recession fell dramatically (solid line), while those receiving pay cuts spiked upward. As the economy grew out of the recessionary period, though, pay increases became the norm.

As noted above, the rich dataset employed by the authors allows them to analyze wage movements at the firm/industry level. Figure 3 shows how the wages of workers in certain

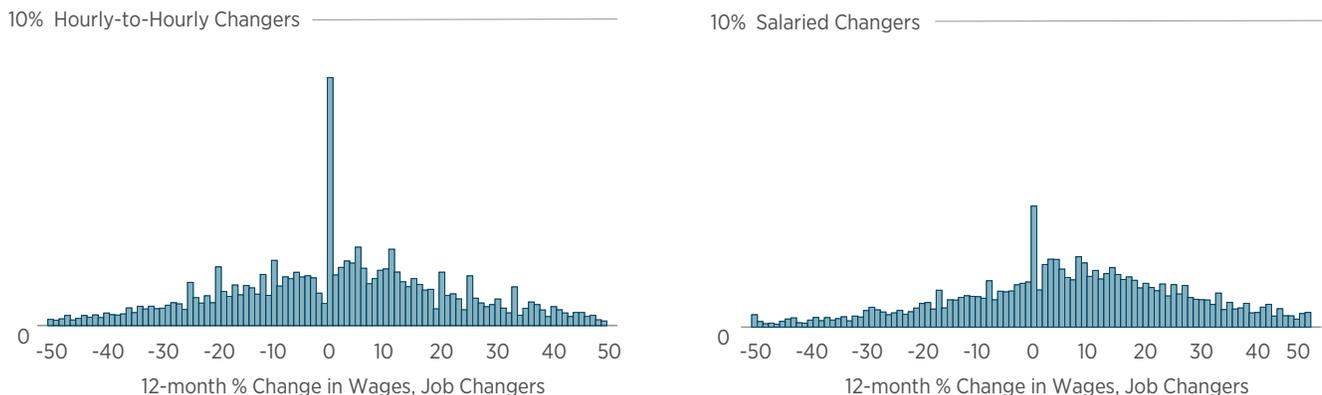
Existing models are hampered in their analysis of wage stickiness because of their reliance on self-reported wage data, which are prone to measurement error.

industries fared in the years following the Great Recession. Manufacturing and construction were two of the hardest hit industries; about 10 percent of construction workers and 8 percent of manufacturing workers received year-over-year nominal wage cuts in 2009; retail and finance fell 6 and 3 percent, respectively. By 2012, continuing workers in all four industries had a roughly 2 percent probability of receiving a nominal wage cut.

Figure 4 offers new insights into the nature of wage changes for job-changers, a sharp distinction from that of job-stayers, as reflected in Figure 1. Figure 4 clearly shows that wages are less sticky for job-changers, whether they are hourly (39.2 percent receive a wage cut) or salaried (31.2 percent receive a wage cut) workers. These new facts, and others, about job-changers directly challenge the assumptions of existing models about the nature of wage stickiness.

Finally, the role of bonuses and fringe benefits among those who remain in the same job over 12 months is described in Figure 5. Here we can see bonus income and fringe benefits are much less important for the wages of lower income workers. Bonus income becomes increasingly important as wages rise, and fringe benefits are also a key part of compensation once wages reach the 20th percentile.

**Figure 4: 12-Month Base Wage Change Distribution for Job-Changers**

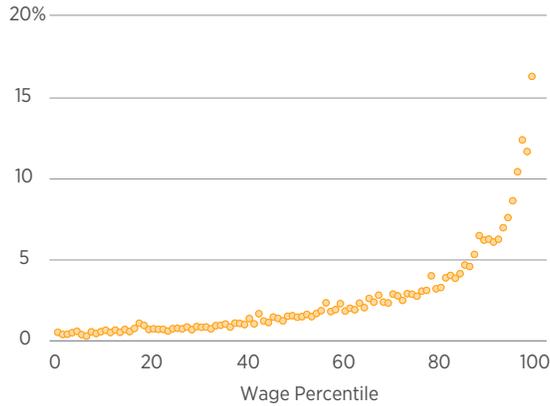


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**Figure 5: Bonus and Fringe Benefit Share by Employee Base Wage Percentile, Full-Year Job-Stayers, Excluding Commission Workers**

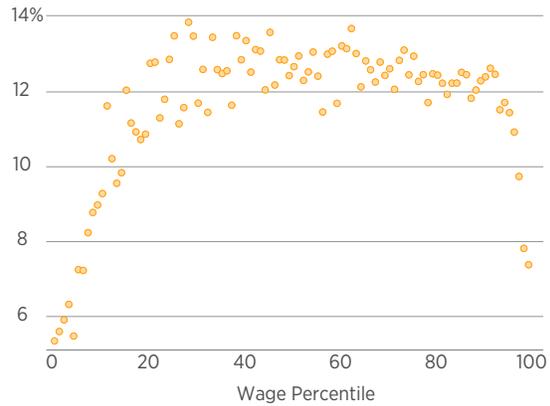
**Share in Bonus Out of Total Earnings**

Mean Share of Total Compensation in Bonus



**Share in Fringe Benefits out of Total Compensation**

Mean Share of Total Compensation in Fringe Benefits



Notes: Please see full paper online for notes to this and all figures.

**Conclusion**

Employing robust, anonymized, payroll data from roughly 20 million US workers between 2008 and 2016 allows the authors to make important contributions to economists’ understanding of whether and how wages react to business cycles. Among other facts, the authors reveal that only about 2 percent of workers who remain employed with the same firm over a year receive a nominal wage cut. However, of those workers who receive bonuses, roughly 16 percent of job-stayers receive a nominal wage cut (or 6 percent of all workers, on average). Further, about 40 percent of job changers receive a nominal cut in pay within a year.

Technically, the contributions of this paper are important: The incorporation of these data and the revealed facts in this paper will contribute to the fine-tuning of existing models and should help economists present a more accurate depiction of what happens to wages during business cycles.

Wages, it seems, are not as sticky as previously thought. For policymakers, these insights are also important, but further research is needed to determine how policy may alter in light of these revelations.

**CLOSING TAKEAWAY**

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