AEA Papers and Proceedings 2021, 111: 1–6
https://doi.org/10.1257/pandp.20211056

Nominal Wage Adjustments during the Pandemic Recession†

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In many models, the cyclical behavior of wages is a key determinant of employment fluctuations. Employment fluctuations will be more pronounced if wages are less able to adjust to the cycle. A large literature examining the employment consequences of the pandemic recession has emerged in the past year. However, because wages are difficult to measure without measurement error at a high frequency, little is known about wage dynamics at this time.

In this paper, we use detailed administrative payroll data on tens of millions of US workers to explore nominal wage adjustments during the 2020 pandemic recession. About 6 percent of workers received nominal wage cuts between March and June 2020, and these cuts were concentrated at the top of the distribution. However, about 30 percent of the nominal wage cuts were reversed by November. Both firms and industries that shrank by more were more likely to cut wages and less likely to increase wages of surviving workers. As a result, models of nominal wage rigidities with heterogeneous firms should allow for a positive covariance between idiosyncratic employment declines and wage cuts for remaining workers.

I. Data

We use anonymized administrative individual panel data provided by ADP, which processes payroll for over 20 million individual workers in the United States per month.[1] The data contain monthly aggregates of anonymized individual paycheck information as well as all relevant information needed for human resource management. Crucially, we observe, without measurement error, the statutory per-period contract rate—or base wage—for all employees. For hourly workers, this base wage is simply the worker's hourly wage. For salaried workers, it constitutes the pay that the worker is contracted to receive each pay period (weekly, biweekly, or monthly). The base contract wage is measured as of the last pay period of the month. In this paper, we explore a worker's base wage separately from other forms of compensation including bonuses, commissions, performance pay, and overtime premiums. As highlighted in Grigsby, Hurst, and Yildirmaz (2020), a worker's base wage maps most closely to the firm's notion of the marginal cost of a worker.

We note four major sample restrictions for our analysis. First, we restrict attention to workers between the ages of 21 and 60, inclusive. Second, we use a dataset containing firms with more than 50 employees for this project. Thus our results exclude employees who work for very small employers. The sample criteria used in this paper is the same as that used in Grigsby, Hurst, and Yildirmaz (2020), which studied the nominal wage adjustments during the 2008–2016 period, and Cajner et al. (2020), which studied the evolution of the US labor market during the early parts of the pandemic recession.[2] Third, we restrict our sample to

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†Go to https://doi.org/10.1257/pandp.20211056 to visit the article page for additional materials and author disclosure statement(s).

[1] ADP is a large international provider of human resource services including payroll processing, benefits management, tax services, and compliance. ADP has over 650,000 clients worldwide.

[2] Grigsby, Hurst, and Yildirmaz (2020) benchmark the ADP data to other datasets and show that it is broadly representative of the US labor market. Additionally, Grigsby, Hurst, and Yildirmaz (2020) show that the nominal wage adjustment patterns for employees working in firms with fewer than 50 employees are broadly similar to the wage adjustment patterns for employees working in firms with

individuals who remain continuously employed with the same firms between the two time periods we are studying. Often, we will be measuring wage changes of a worker between two consecutive months. However, in some of our analyses, we will be tracking workers over multiple months. Finally, we restrict our sample to all workers who are in the ADP dataset in calendar years 2019 or 2020. Given the writing of our paper, we have data only through November 2020.

Conditional on having at least 50 employees, the sample we have slightly underrepresents firms with at least 5,000 employees. To account for the concern that the data do not perfectly represent the universe of all US firms with at least 50 employees, we follow Grigsby, Hurst, and Yildirmaz (2020) and reweight the ADP data to match the 2017 US Business Dynamic Statistics data of employment shares within each firm size by industry cell for firms with greater than 50 employees.

II. Nominal Wage Adjustments in 2020

Panel A of Figure 1 shows the fraction of US job stayers who received a nominal wage cut during each month of 2019 (dashed line) and 2020 (solid line). During 2019, only about 0.3 percent of workers received a nominal wage cut in each month. However, there was a spike in nominal wage cuts during the early part of the pandemic recession: nearly 2.5 percent of all workers who remained employed received a nominal wage cut in April. Nominal wage cuts remained elevated through July. Collectively, roughly 6 percent of workers received a nominal wage cut during the first 4 months of the recession. This is comparable to the 6 percent of workers who received a nominal wage cut during the Great Recession (Grigsby, Hurst, and Yildirmaz 2020).

These cuts were not even throughout the distribution. Panel B shows the propensity for nominal wage cuts by workers in different initial wage quintiles. We define fixed wage quintiles for the whole sample using the wage distribution of February 2020. A few striking features of the figure are worth noting. First,

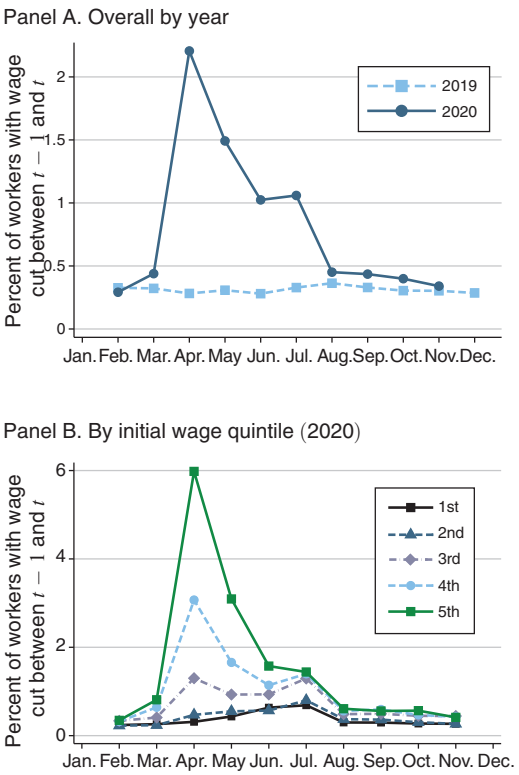

FIGURE 1. TIME SERIES OF MONTHLY NOMINAL BASE WAGE CUTS

Notes: Figure shows the time series of the probability that a worker receives a nominal month-over-month base wage cut, conditional on staying at their firm. Panel A plots the overall time series for 2019 (light blue dashed line) and 2020 (dark blue solid line) separately. Panel B plots the time series for 2020 across workers' initial wage quintile. Wage quintiles defined using the distribution as of February 2020.

the propensity to receive a nominal wage cut is increasing in initial wage. Second, for workers in the bottom 40 percent of the wage distribution, nominal wage cuts did not increase at all during the pandemic. Third, nearly 13 percent of workers in the highest wage quintile received a nominal wage cut at some point between April and July. Finally, for all groups, nominal wage cuts returned to baseline by August. The fact that nominal wage cuts are concentrated among high-wage workers is one of the key new results in this paper.

The concentration of wage cuts in the top of the distribution stands in contrast to the

more than 50 employees. See Grigsby, Hurst, and Yildirmaz (2020) for additional details pertaining to the ADP data.

concentration of job loss at the bottom of the distribution (Cajner et al. 2020). Between February and April 2020, over 30 percent of workers in the bottom wage quintile lost their job. Conversely, only 10 percent of workers in the top wage quintile lost their job during this period. Firms were much more likely to fire low-wage workers and cut the wages of high-wage workers.

In the online Appendix, we show the time series of nominal wage increases. Unlike nominal wage cuts, there is a modest seasonality in base wage increases over the year. Nominal wage increases occurred with a lower frequency in 2020, especially during the early portion of the year. Collectively, the pandemic recession saw many more nominal wage cuts and fewer nominal wage increases. As a result, nominal base wage growth for US workers slowed during the pandemic recession. Not only was job loss high but wage growth was low.

Figure 2 examines the extent to which nominal wage cuts during the pandemic recession were permanent. Here, we limit our sample to workers who are continuously employed at the same firm from February of a given year through the relevant month of analysis. Panel A takes a sample of individuals whose June 2019 nominal base wages were lower than their February 2019 nominal base wages at the same firm. By definition, 100 percent of these workers had a nominal wage cut between February and June. We then follow these workers into July. The July number measures the fraction of these workers who remained at the firm and whose July 2019 base wage remained lower than their February 2019 base wage. We do this separately for workers in different initial wage quintiles. Nominal wage cuts during the early portion of 2019 were mostly permanent throughout the year. By November, between 80 and 90 percent of those who received a wage cut between February and June still had a lower wage relative to February. What's more, the wage cuts for high-wage workers in early 2019 were more persistent through November of 2019 compared to lower-wage workers (90 versus 80 percent).

Panel B of Figure 2 shows the analogous patterns during the pandemic recession. The sample focuses on continuously employed workers at the same firm who received a nominal wage cut between February and June 2020. Nominal wage cuts during the early part of the pandemic

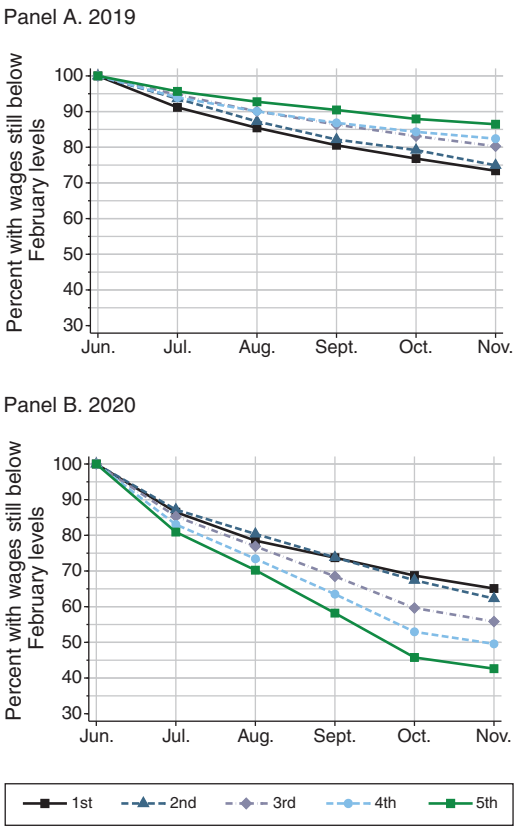

FIGURE 2. PERMANENCE OF BASE WAGE CUTS BY INITIAL WAGE QUINTILE

Notes: Figure shows the permanence of base wage cuts. The sample is restricted to workers who received a nominal base wage cut between February and June, conditional on remaining at the same firm. The figure plots the share of those workers with wages still below their February levels as of the month listed on the horizontal axis conditional on remaining at the same firm. This is done separately for each worker's February wage quintile, defined using the February 2020 wage distribution. Panels A and B plot the patterns for 2019 and 2020, respectively.

recession were much less permanent than wage cuts during 2019. Nearly 60 percent of workers in the highest wage quintile who received a nominal wage cut between February and June had those wage cuts reversed by November. Likewise, roughly 30 percent of workers in the lowest wage quintile who received a nominal wage cut in the early part of the pandemic had those wage cuts reversed by November. Although high-wage workers were more likely to receive

nominal wage cuts during the 2020 recession, these wage cuts were largely temporary.[3]

III. Nominal Wage Adjustments and Firm Employment Growth

Classic macro models of the labor market struggle to generate substantial drops in employment during recessions. As a result, many models employ some form of wage rigidity to generate fluctuations in employment. Underlying this is the implicit view that cutting wages and cutting employment are substitutes for firms seeking to reduce their wage bill. Here, we ask whether firms that cut employment avoided wage cuts.

To answer this question, we use the unique feature of the ADP data that allows us to observe the universe of workers within a given firm. We segment firms into bins based on their employment change between February and June of a given year. Specifically, we split firms into symmetric bins of firm growth (shrinkage) of 0 percent, 0–1 percent, 1–5 percent, 5–10 percent, 10–25 percent, 25–50 percent, and 50–75 percent. Figure 3 shows how these firms adjusted the wages of their employees. We compute the fraction of surviving employees that received a nominal wage cut (panel A) or increase (panel B) between February and April of the given year. We do our analysis both for 2019 (dashed lines) and 2020 (solid lines) within each panel. Since very few firms grew by more than 25 percent in 2020 or shrunk more than 75 percent in 2019, we omit those growth bins for clarity.

Panel A of the figure shows that in 2019 there was little relationship between firm growth rate and the share of employees who received a nominal wage cut. This is not surprising given that both nominal wage cuts were rare and very few firms experienced large employment declines. Most workers who received a nominal wage cut likely did so for idiosyncratic employee-specific reasons (like poor performance).

The patterns are starkly different during the pandemic. Firms that experienced large employment declines between February and June 2020 were much more likely to cut the nominal base wages of their remaining employees. Firms that experienced employment declines of 50–75 percent cut the nominal wages of 11 percent of their remaining workers. These firms were mostly concentrated in the food service and entertainment industries. Firms that experienced employment declines of between 10 and 50

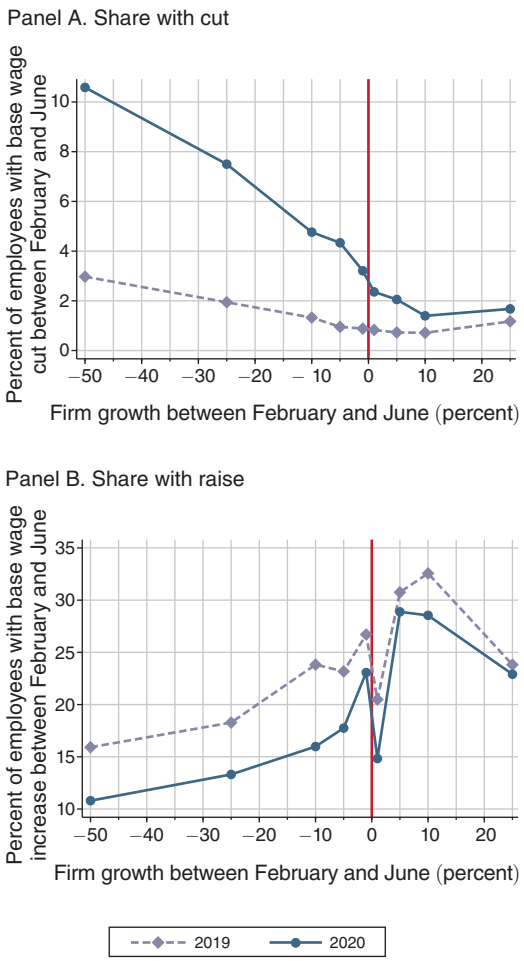

Figure 3. Probability of Employee Wage Change by Firm Growth Rate Bin: 2019 and 2020

Notes: Figure shows the probability that surviving workers' base wages are adjusted between February and June against their firm's employment change between February and June, for 2019 (light blue dashed) and 2020 (dark blue solid) separately. Firm growth (shrinkage) is grouped into symmetric bins of 0 percent, 0–1 percent, 1–5 percent, 5–10 percent, 10–25 percent, 25–50 percent, and 50–75 percent. Markers correspond to the right end-point of a bin: for instance, the marker at −25 corresponds to firm a firm shrinking between 25 and 50 percent. Panels A and B plot the propensity for wage cuts and increases, respectively.

[3] This pattern may in part reflect the end of furloughs of salaried workers, which would appear as declines in the per-week contract pay in our data.

percent between February and June 2020 cut, on average, the nominal wages of between 5 and 7 percent of their employees. To put things in perspective, the median surviving firm reduced their employment by about 10 percent during this period, and many more closed. Firms that experienced employment gains, on the other hand, cut the nominal wages of their workers only by between 1 and 3 percent, which was still higher than any firm growth bin in 2019.

There are two main takeaways from panel A of Figure 3. First, firms that had large employment declines were much more likely to cut the nominal base wage of incumbent workers. In many macro models, firms face a trade-off between cutting nominal wages of their employees and laying off their workers. However, a first-order feature of the microdata is a negative correlation between a firm's employment growth rate and its propensity to cut the nominal wages of remaining employees. This finding is consistent with firms receiving different fundamental shocks during the recession. The firms receiving large negative shocks adjusted on both the quantity margin (laying off workers) and the price margin (reducing the wages of their remaining workers). Such a first-order empirical correlation needs to be modeled when assessing whether nominal wage rigidities exacerbate employment fluctuations during business cycles. The second key finding is that even growing firms during the pandemic were more likely to cut the nominal wages than in nonrecessionary periods, suggesting strong strategic complementarities in wage cuts.

Panel B of the figure shows the relationship between firm employment growth and the propensity for remaining employees to receive a nominal base wage increase. Not surprisingly, wage increases were more common in 2019 at every level of firm growth relative to 2020. Additionally, in both years, as firms grow, they are more likely to increase the nominal wages of their workers. Most of the mass of growth in 2019 is close to zero. Firms that grow or shrink by small amounts are more likely to increase the wages of their workers than firms that grow by larger amounts.

In the online Appendix, we additionally show the relationship between firm growth and wage cuts between February and June 2020, separately by workers' initial wage quintiles. The wage cuts of high-wage workers are more tightly linked to firm growth, perhaps due to differences in implicit contracts.

IV. Conclusion

Not only has the pandemic recession generated historic employment declines, it has also led to frequent cuts in nominal wages among those who kept their jobs. The scale of these cuts are themselves remarkable: within three months in 2020, as many wage cuts had occurred as occurred throughout the Great Recession. Unlike employment declines, wage cuts were concentrated at the top of the wage distribution. However, these cuts have been relatively short lived, particularly among high earners. Finally, wage cuts have been concentrated in firms that have seen large employment declines. Wage cuts appear to not be a substitute for cutting employment, at least when the shock to labor demand is this large.

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