



25-5 US Wage Patterns During and After the Pandemic

Insights from a Novel Data Source

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ABSTRACT

This paper adds to a growing body of evidence on the underlying determinants of pandemic and postpandemic wage patterns by leveraging private-sector payroll records from ADP Inc., a dataset that comprises more than 25 million employees, or about 1 in 6 workers in the United States. The paper finds that the pandemic's disruption of industry sectors and workers drove large swings in pay growth as lower-wage workers left the labor force in the spring of 2020 and were hired back a year later. It also triggered a shift to larger year-over-year pay gains that so far have endured, albeit with some moderation.

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Introduction

Between February and April 2020, the United States lost nearly 22 million jobs in the non-farm sector, according to the Bureau of Labor Statistics. In the four years since the COVID-19 pandemic, the economy has journeyed from this steep and swift decline to a robust and prolonged recovery. This recovery has been accompanied by outsized gains in wages.

This paper adds to a growing body of evidence on the underlying determinants of pandemic and postpandemic wage patterns. To reach this conclusion, we turned to private-sector payroll records from ADP Inc., a dataset that comprises more than 25 million employees, or about 1 in 6 workers in the United States. This dataset is an important complement to government collections such as the Current Employment Statistics program, the Current Population Survey, and the Quarterly Census of Employment and Wages.

One limitation of this worker-level data is that it goes back only to 2018, which prevents historical comparisons of the pandemic period with other economic downturns. Our paper begins with background on pandemic employment, then explores wage patterns during the ensuing recession and recovery. Our analysis yields several important insights about pay growth during this period.

- Early in the pandemic, average wages rose, but the lowest-paid workers were most likely to be laid off.
- The initial employment rebound in lower-paying industries led to a decline in average industry wages as lower-paid workers were rehired.
- Upward pressure on wages that emerged with the worker shortage of 2021 proved enduring even as the shortage eased.
- Pay changes for job-changers varied with labor demand during the pandemic.
- Changes in the age structure of employment influenced wage trends during the pandemic.

We conclude with implications for future pay growth.

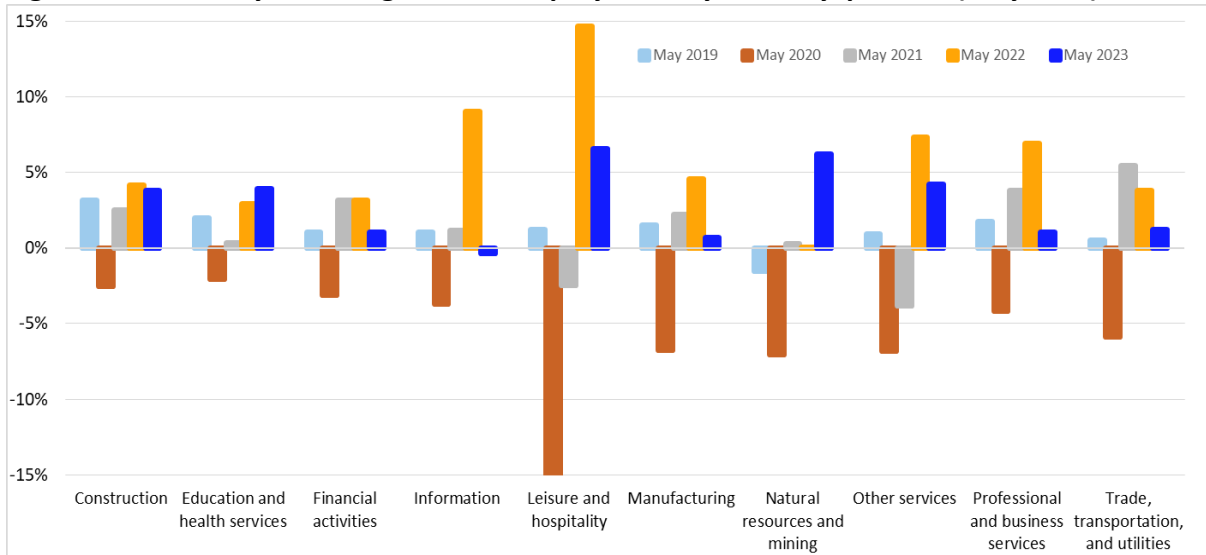
From job bust to job boom

In February 2020, the last month before the pandemic shutdown, the unemployment rate stood at 3.5 percent. This rate capped a 10-year period of economic expansion, the longest in US history. Consistent with low unemployment, the labor market was defined by solid hiring. Wage growth was moderate and higher than price inflation.

These Goldilocks conditions were dramatically disrupted, of course, when businesses, particularly customer-facing service providers, were forced to suspend or shutter operations in the spring of 2020.

By May 2020, every major industry had shed jobs. Figure 1 shows the year-over-year change in employment using the ADP records for 10 sectors between 2019 and 2023. Leisure and hospitality saw the biggest decline, with headcount falling 15 percent from the previous year. The sector shed further jobs between May 2020 and May 2021.

Figure 1 Year-over year changes in US employment by industry, percent (May data)



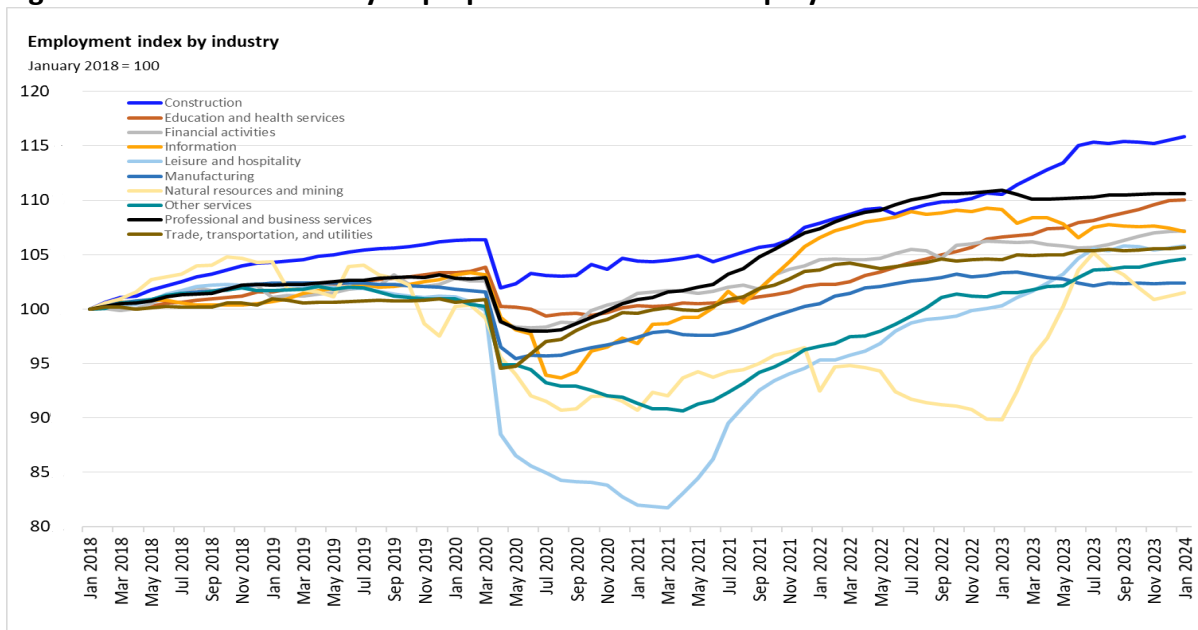
Source: ADP payroll data.

Not only did leisure and hospitality experience the steepest job losses, the sector also took a long time to recover those jobs. In fact, it took the sector 33 months to return to prepandemic employment levels. Only the much smaller mining and natural resource sector took longer, 39 months, to fully recover (figure 2).

Education and manufacturing took 26 months to return to prepandemic employment levels; other services recovered after 30 months.

Finance, professional business services, information, and trade, transportation, and utilities all returned to their prepandemic headcount within two years.

Figure 2 Months to recovery to prepandemic levels of employment



Source: ADP payroll data.

The supply-demand mismatch

For a decade, the United States had low and stable inflation, steady and low unemployment, and moderate wage gains. The pandemic upended this almost-textbook balance of labor supply and demand.

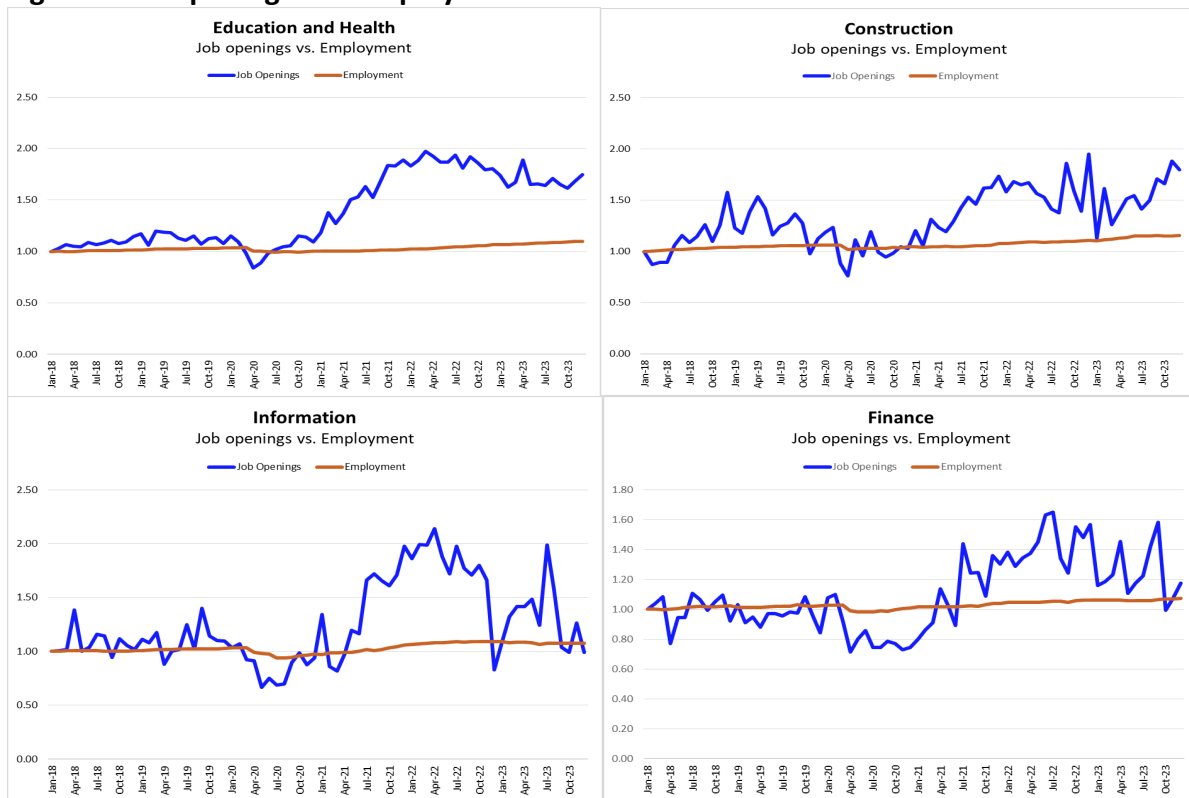
After the steep spring downturn in 2020, companies began to rehire employees aggressively that summer. By the spring of 2021, the Federal Reserve finds that the number of available jobs had begun to exceed the number of available workers as shown in its [March 2024 Monetary Policy Report](#).

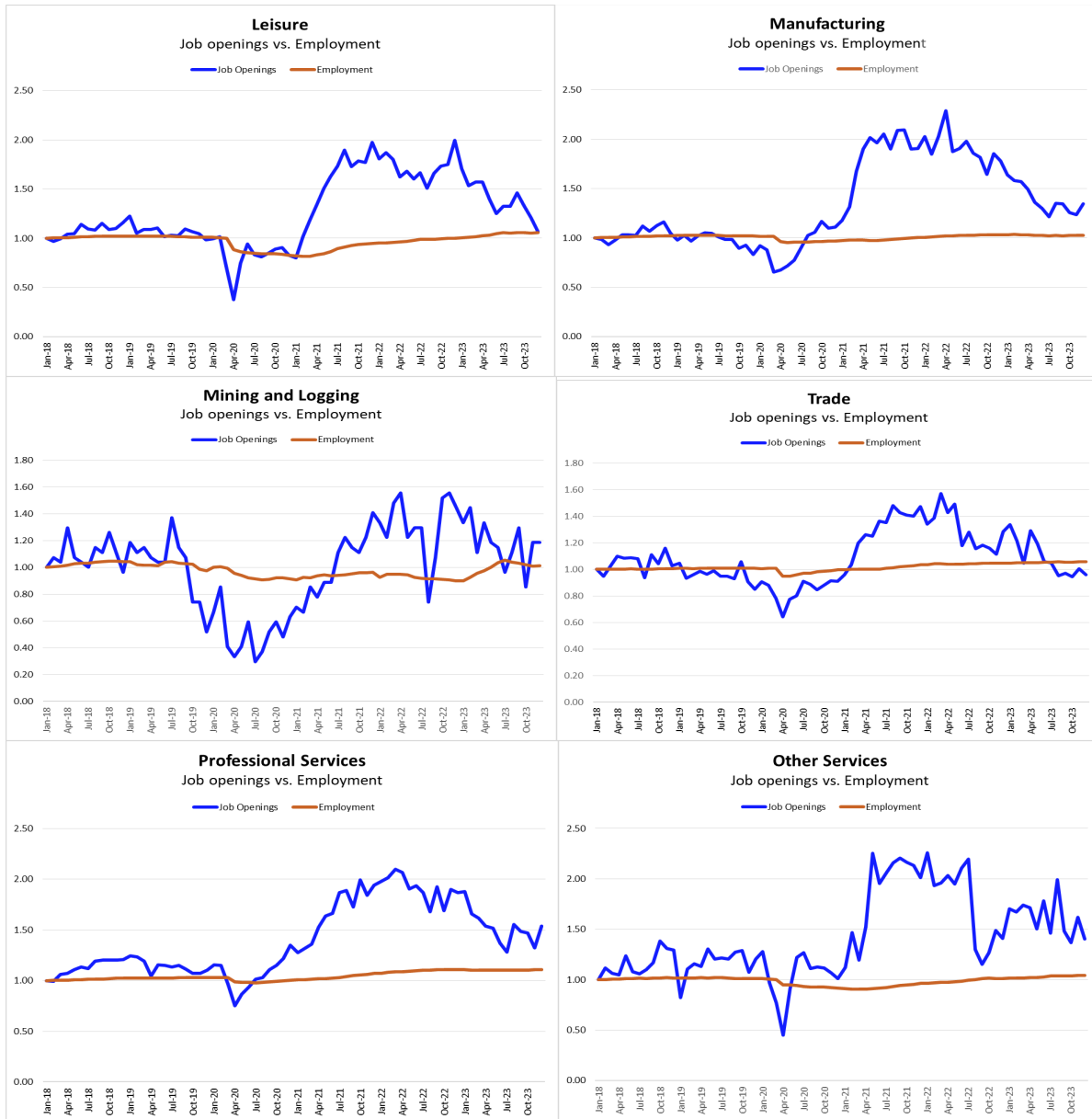
We leverage ADP’s finely grained worker-level data to analyze the demand-side dynamics of the labor market at the industry level. An industry-specific analysis is warranted by the disproportionate impact of the pandemic-driven shutdown on service-providing employers, especially in the leisure and hospitality industry.

ADP’s private-employer payroll data corresponds to employment—that is, demand that has been satisfied. Data on job openings from the Bureau of Labor Statistics speak to anticipated employer demand that has yet to be satisfied.

In figure 3, we index openings and employment to January 2018. For each of our 10 industry super sectors, job openings fell in spring 2020 before mounting a comeback in the summer. Openings started to rise steadily in the second half of 2020 and then surged in spring 2021, with postings holding fairly steady at high levels through 2022.

Figure 3 Job openings and employment





Source: ADP payroll data; Bureau of Labor Statistics, Job Openings and Labor Turnover Survey.

Still, even aggressive hiring and increased demand did little to expand the pool of available workers. The elevated levels of job openings suggest that worker supply continued to lag employer demand in every industry until fall 2022. Perhaps not surprisingly, the biggest mismatch in worker supply and demand appears to have been in the hardest-hit sector: leisure and hospitality.

Pay growth patterns and their drivers

To analyze the effect of postpandemic employment trends on pay growth, we tracked hourly base pay for an anonymized sample of more than 20 million workers. For hourly workers, we

looked at the job’s hourly base pay. For salaried workers, the hourly wage is imputed by dividing the base salary by hours worked, assuming those employees are full time. Our pay measures are job-based, with each job defined as a unique pairing of worker and employer.

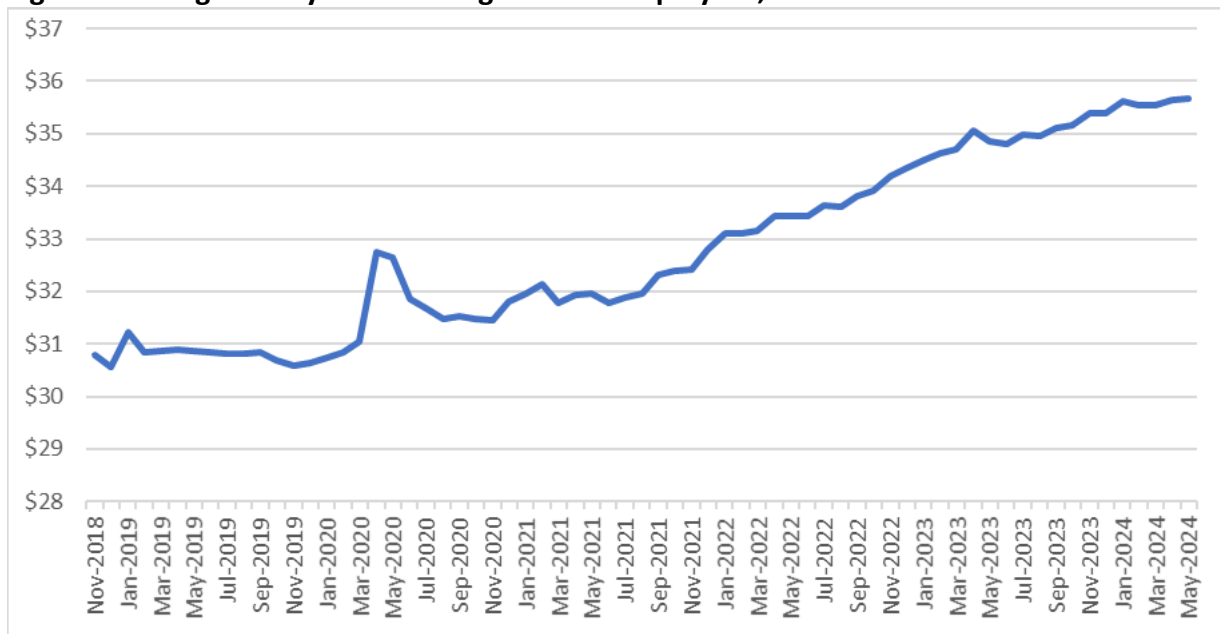
Steep job losses followed by rapid-fire hiring reshuffled pay distribution during the pandemic. In an earlier [analysis](#), Wang and Richardson show that workers in the bottom quartile of the pay distribution saw the largest percentage pay gains between March 2021 and March 2024, while workers in the top quartile saw the biggest dollar increases. The result was a 5-percentage-point widening of the pay gap between top- and bottom-quartile earners.

The insights that follow expand on this analysis.

Insight 1: Early in the pandemic, average wages were elevated by layoffs of the lowest-paid workers.

A notable feature of the pandemic economy was that average private-sector hourly earnings jumped sharply between March and April 2020, rising by more than 5.5 percent, from \$31 to \$32.70 an hour, as seen in figure 4. (The Bureau of Labor Statistics’ average hourly earnings series saw a similarly large jump.)

Figure 4 Average hourly US base wages for all employees, US dollars



Source: ADP payroll data.

This jump in aggregate hourly earnings reflects compositional changes in employment. Job losses were concentrated among workers who tended to have lower earnings, ADP data shows.

Table 1 examines the sector distribution of employment before, during, and after the pandemic. We start by examining the first two columns, which show the share of employment

held by each sector in May 2019 and May 2020. This comparison captures the dramatic shifts of the early pandemic period.

Leisure and hospitality saw the biggest change, contracting from roughly 10 percent of employment in 2019 to about 6 percent in 2020. The sector’s share subsequently rebounded, reaching its prepandemic share in 2022.

Another sector that shrank in the early pandemic period, though less dramatically, was trade, transportation, and utilities, which includes customer-facing retailers.

Table 1 Share of total US employment by sector, percent (May data by year)

Super Sector	2019	2020	2021	2022	2023
Construction	2.7%	3.3%	3.5%	3.5%	3.6%
Education/health services	15.7%	16.6%	16.3%	15.6%	16.1%
Financial activities	8.6%	9.4%	8.3%	7.8%	7.8%
Information	2.9%	2.8%	2.7%	2.6%	2.5%
Leisure/hospitality	9.9%	6.1%	8.7%	9.8%	9.8%
Manufacturing	16.6%	16.7%	15.1%	14.9%	14.6%
Natural resources/mining	1.0%	1.0%	0.9%	0.9%	0.9%
Other services	4.4%	4.3%	4.5%	4.7%	4.8%
Professional/business services	20.2%	22.6%	22.2%	22.6%	22.7%
Trade/transportation/utilities	18.0%	17.2%	17.8%	17.5%	17.2%

Source: ADP payroll data.

In 2019, leisure and hospitality had the lowest average hourly pay, at \$17.81, so the shrinking of this sector alone would be expected to increase average wages in the economy (figure 5). Moreover, within leisure and hospitality, consistent with the rise in average hourly base pay in 2020, the lowest-paid workers were the ones most likely to lose their jobs when the pandemic hit. This intra-industry shift toward higher-paid workers led average hourly pay in leisure and hospitality to jump 22 percent in May 2020 from the year before, an increase of \$3.91.

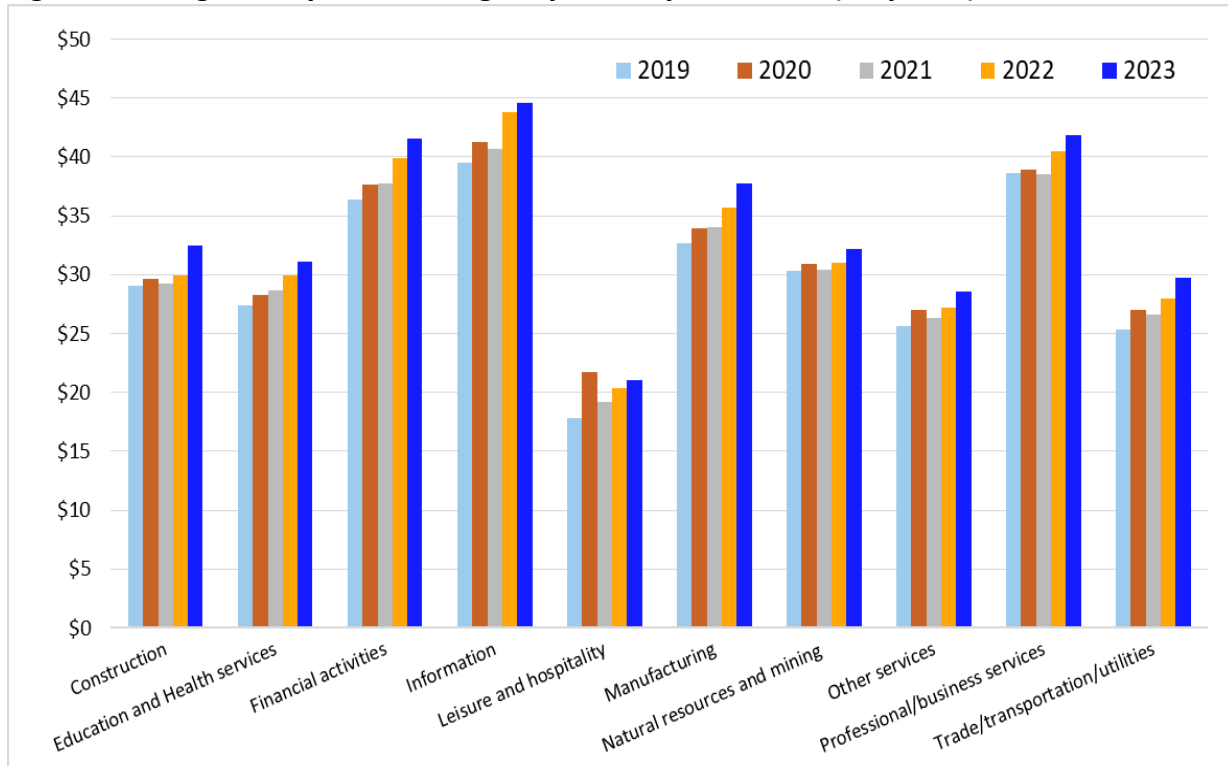
Trade showed a similar but more muted pattern. A loss of its lowest-paid workers led average hourly pay to jump by 6.7 percent in May 2020 from the previous year.

Altogether, shrinking employment in lower-paying sectors, and the compositional shifts within those sectors implied by figure 5, would be expected to boost overall average wages in the early pandemic period.

Insight 2: An employment rebound in lower-paid industries led to a decline in average industry wages as lower-paid workers were rehired.

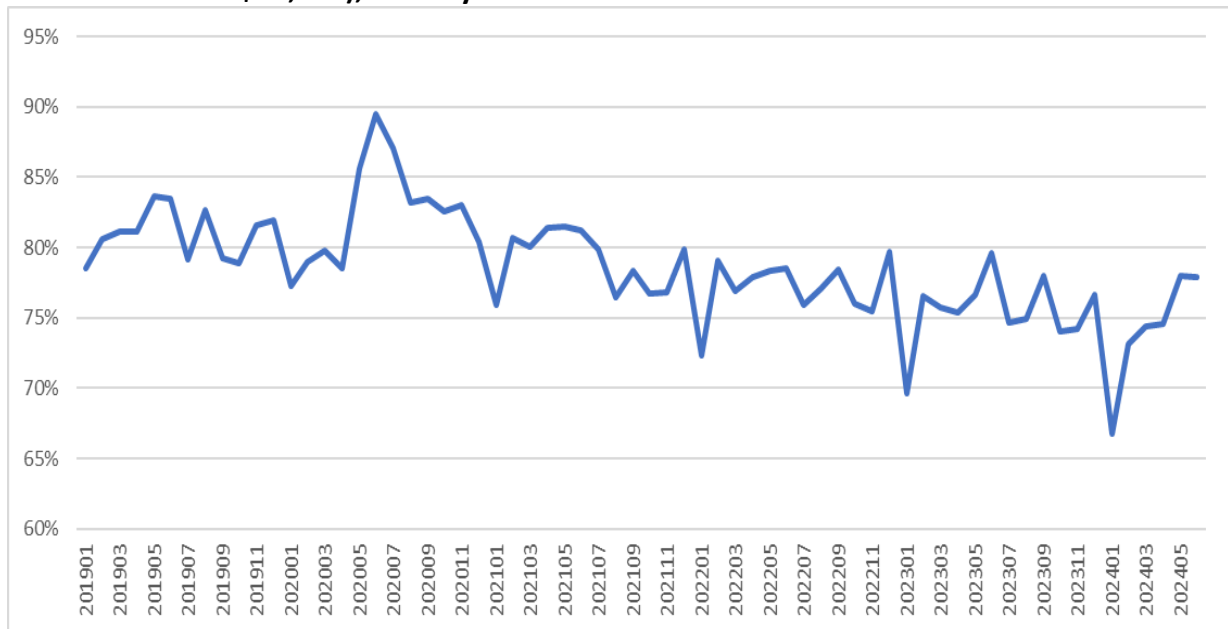
Many low-wage workers in customer-facing industries were temporarily laid off and rehired *en masse* shortly after pandemic-led closures. Figure 6 shows the percent of workers who rejoined their previous employers and who earned less than \$60,000 a year. This income group showed an initial spike and an elevated level of rejoins in the first few months of the pandemic.

Figure 5 Average hourly US base wages by industry, US dollars (May data)



Source: ADP payroll data.

Figure 6 Percentage of US workers rejoining a previous employer (workers with annual salaries less than \$60,000), January 2019 to June 2024



Source: ADP payroll data.

A striking observation is that average wages *fell* in several sectors between May 2020 and May 2021 (figure 5). The decline was most pronounced in leisure and hospitality, where average hourly pay fell 11.8 percent to \$19.17 in May 2021.

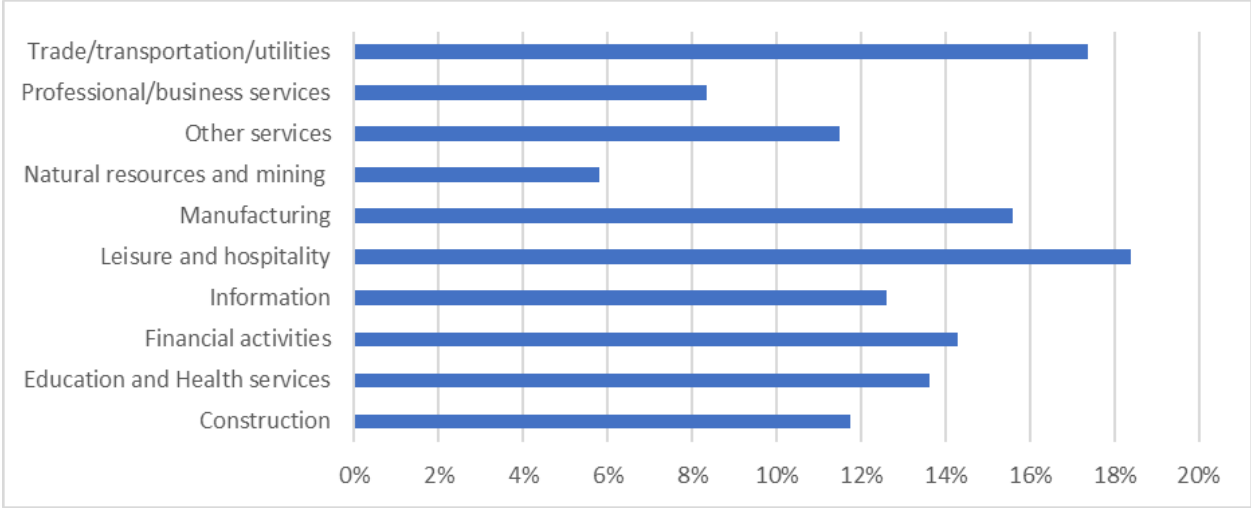
Declines also are seen in construction (-1.3 percent), information (-1.3 percent), natural resources and mining (-1.5 percent), other services (-2.8 percent), professional business services (-1 percent), and trade, transportation, and utilities (-1.5 percent).

These changes aren't a reflection of wage cuts, which would be odd at a time when the economy and labor demand were rebounding. Rather, as we saw in the early months of the pandemic, these swings were driven by compositional differences; the average moved because the composition of the employed population changed.

Insight 3: Upward pressure on wages associated with the 2021 worker shortage proved enduring in leisure and hospitality.

Figure 7 shows cumulative wage changes from May 2019 through May 2023. Industries with the biggest demand-supply mismatches in the immediate aftermath of the pandemic lockdown showed the largest wage gains.

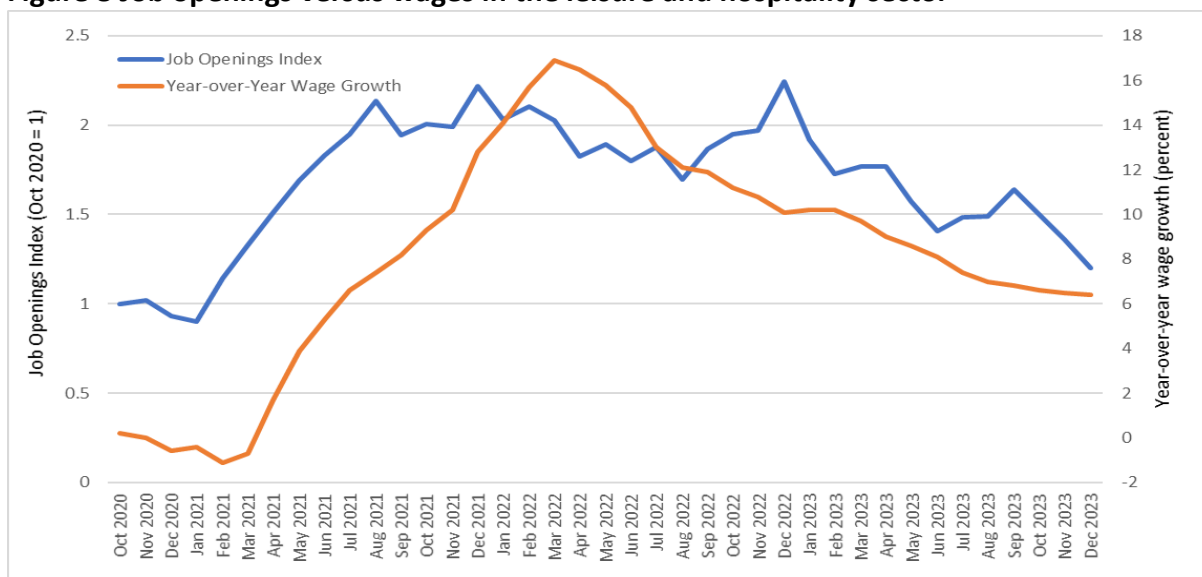
Figure 7 Cumulative change in hourly US base wages, percent, May 2019 to May 2023



Source: ADP payroll data.

As discussed earlier, worker shortages were especially pronounced in leisure and hospitality, which caused wage growth to accelerate faster than for any other industry (see figure 8) The sector's sharp wage acceleration led overall wage growth.

Figure 8 Job openings versus wages in the leisure and hospitality sector



Source: ADP payroll data; Bureau of Labor Statistics, Job Openings and Labor Turnover Survey.

Insight 4: Pay gains for job-changers varied with labor demand during the pandemic.

ADP’s unique dataset allows us to analyze the pay growth of people who change jobs. We track workers who changed employers within the previous 12 months, matching these individuals to both their previous and current jobs.

Annualized pay is calculated at the job level, or the worker and company pair, and pay change is calculated as the difference between the annualized pay of the new and old jobs. Workers are considered job-changers if they have a different employer in month X than they did in month X minus 12.

We track the median change of all matched samples from the base year wage paid by the previous employer.

Job-changing often is associated with pay increases, as workers find employment better suited to their skills and are suitably rewarded. But our analysis reveals that pay changes for job-changers also are sensitive to real-time labor-market conditions. (The full series on pay growth for job-stayers versus job-changers can found in the monthly ADP Research [Pay Insights](#) report.)

Prior to the pandemic (the 12 months ending November 2019), job-changers in construction, financial activities, and professional business services had the strongest year-over-year pay gains, at 14 percent, 10.9 percent, and 10.3 percent, respectively. Job-changers with the lowest pay growth during this period worked in leisure and hospitality and natural resources, both of which recorded 5 percent year-over-year gains.

Pay growth for job-changers slowed across all industries in the 12 months ending in November 2020, but leisure and hospitality workers were the only group who lost ground, with pay falling 1 percent year-over-year.

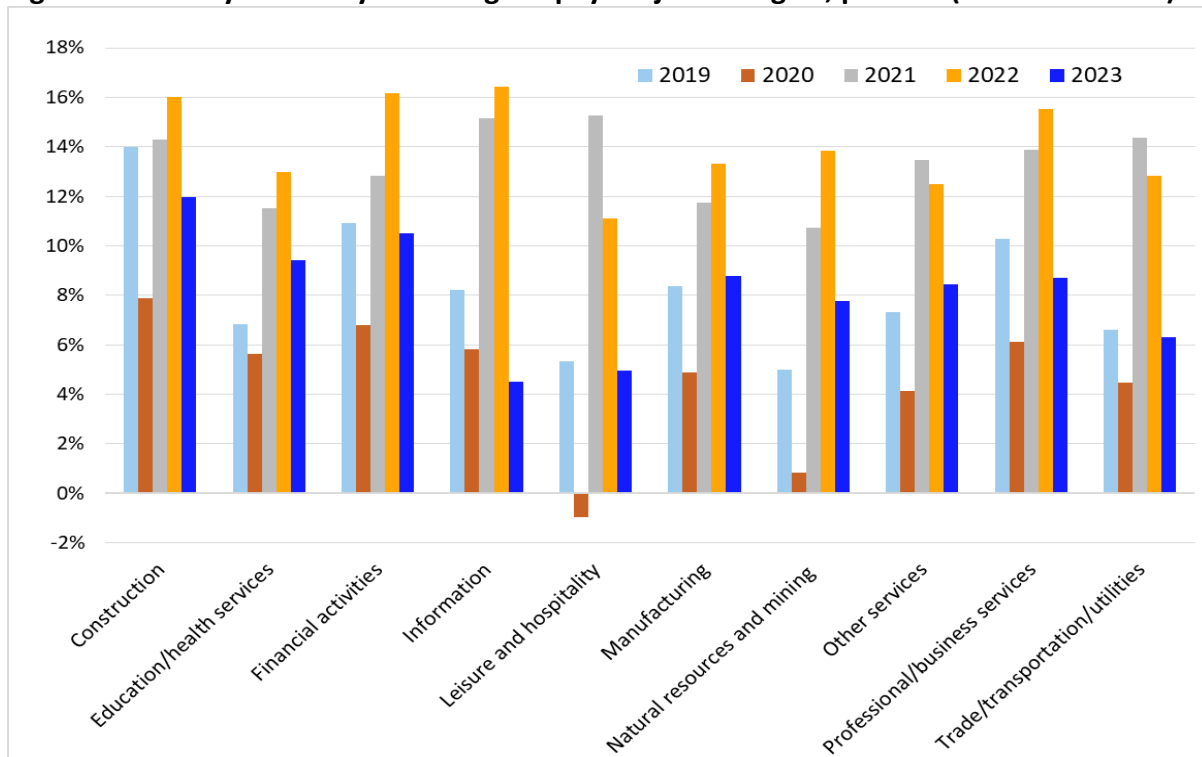
This pattern is consistent with the industry’s prepandemic trends. Leisure and hospitality is the only industry in which median pay growth for job-changers is historically lower than for

job-stayers. This pattern was reversed temporarily due to rapid hiring and competition for workers during the pandemic recovery.

In 2021 and 2022, pay for job-changers rose by more than 10 percent in all sectors, including leisure and hospitality, where year-over-year pay gains were 15.3 percent in 2021 and 11.1 percent in 2022 and where average salaries are the lowest of any sector.

As labor supply and demand came into balance, every sector saw slower pay growth for job-changers in 2023. Pay growth for job-changers in leisure and hospitality slowed to 4.9 percent, lower than the prepandemic growth rate as seen in Figure 9 below.

Figure 9 Annual year-over year change in pay for job-changers, percent (November data)



Source: ADP payroll data.

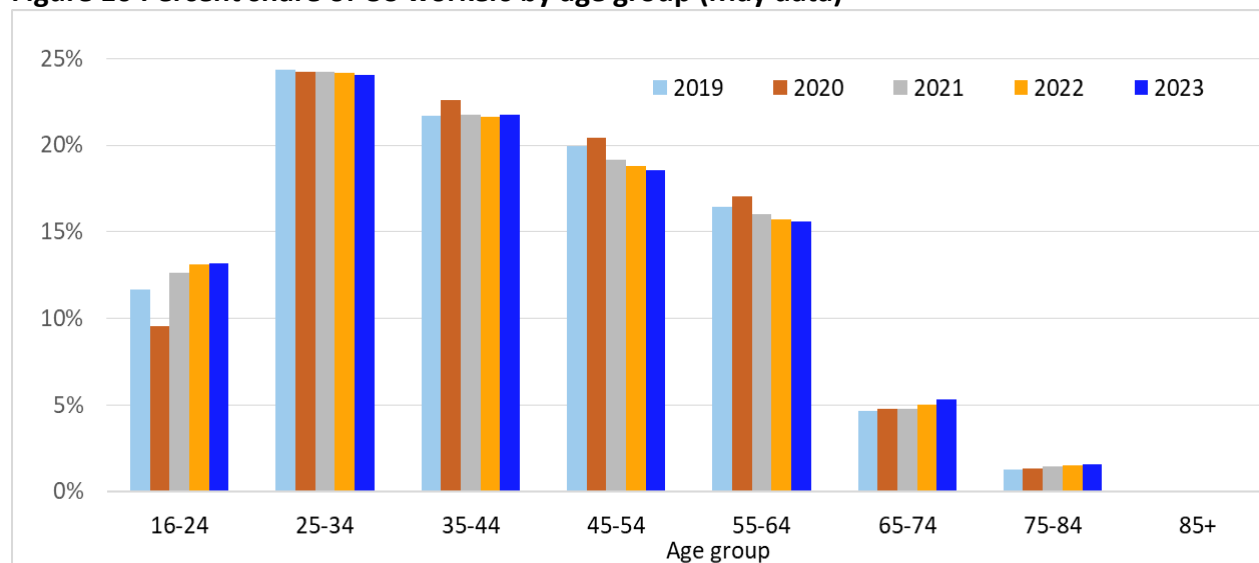
Insight 5: Examining changes in the age structure of employment can shed light on wage growth patterns during the pandemic.

Workforce demographics also saw pandemic-driven fluctuations as well as longer-term changes. Figure 10 shows the percentage of workers by age group from 2019 to 2023. The share of workers aged 16 to 24 shrank between May 2019 and May 2020, sliding more than 2 percentage points from 11.7 percent to 9.6 percent. Shares represented by other age groups increased or were little changed.

Because the youngest workers tend to be lower paid, the sharp decline in their presence at the outset of the pandemic likely is linked to the decline in the average wage. Because leisure and hospitality and trade employ the largest shares of young workers, their shrinking presence likely contributed to the compositional changes that led to stronger gains in average pay in

these sectors. Similarly, the initial pandemic rebound in the share of young workers between May 2020 and May 2021 likely contributed to declining average wages during that period.

Figure 10 Percent share of US workers by age group (May data)



Source: ADP payroll data.

Looking past short-term swings in employment demographics associated with the pandemic and its aftermath, we consider longer-term patterns suggested by shifting employee age cohorts between 2019 and 2023. By 2023, the share of employment represented by the youngest workers had outpaced its share in 2019, topping 13.2 percent.

Young workers aren't the whole story. The share of workers aged 45 to 64 was smaller in 2023 than in 2019. This cohort, which aligns roughly with Generation X, who now are between 44 and 59, saw its share of total US employment fall to 18.5 percent in 2023 from 19.9 percent in 2019. The next-oldest cohort, workers 55 to 64, also lost ground, falling to 15.6 percent of the workforce from 16.4 percent.

The shrinking share of 45- to 64-year-old workers could be the result of a pickup in early retirements or new business formations. More tenured workers had the freedom to quit traditional employment thanks to a strong stock market and rising home prices.

Yet workers 65 to 74 grew their ranks, to 5.3 percent. The share of workers 75 and older also grew, from 1.2 percent of the workforce in 2019 to 1.6 percent in 2023.

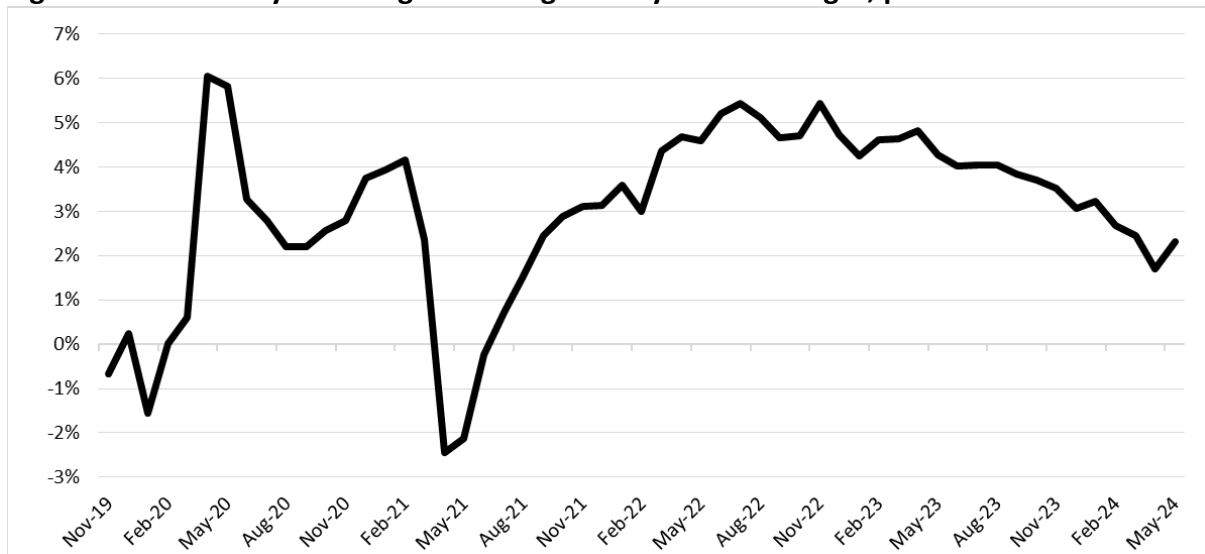
These demographic trends likely reflect various factors. Greater exposure to health risks from COVID and wealth effects from higher asset prices would be expected to reduce participation among the older population. However, all else equal, the overall aging of the US population related to the post-World War II baby boom would be expected to raise the share of the labor market represented by older workers. Older workers might also flow back into the labor market at higher rates due, in part, to social and economic factors that include longer life expectancies and remote work opportunities.

Conclusion

ADP pay data for individual workers goes back to November 2018, giving us an opportunity to calculate annual pay change for a short period prior to the pandemic. Wage growth for this period was consistent with the slow-growth, low-inflation environment that characterized the late-stage expansion.

Average wage growth retreated from its postpandemic highs in the second half of 2022 and 2023 and was little changed in early 2024 at a level higher than before the pandemic, according to ADP data (figure 11). It remains to be seen whether this higher pace will prevail.

Figure 11 Year-over year change in average hourly US base wages, percent



Source: ADP payroll data.

The pandemic's disruption of industry sectors and workers drove large swings in pay growth as lower-wage workers left the labor force in the spring of 2020 and were hired back a year later. It also triggered a shift to larger year-over-year pay gains that so far have endured, albeit with some moderation.

As we document, this acceleration in pay growth was due not just to companies paying workers higher wages. Altered patterns of employment by age and industry left an impression as the distribution of employed workers shifted by sector, pay quartile, and age.



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