



## The Great Reshuffle and Workers Compensation Frequency

### Key Findings

- The Great Reshuffle led to a modest increase in the share of short-tenured workers, a few percentage points in most sectors
- Short-tenured workers in most sectors are close to twice as likely to suffer work injuries than full-tenured workers, but their relative risk is lower in in-person service sectors
- The explosion of remote work during the pandemic put downward pressure on injury frequency, especially in office-based sectors
- The net impact on frequency across multiple sectors, like a state or book of business, will vary based on the changes in industry mix and the frequency metric
- The Great Reshuffle may have contributed to frequency anomalies in 2020 and 2021, but it is likely to cause only small deviations from frequency trends in the coming years

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## Introduction

The Great Reshuffle is reshaping the US labor market. Unemployment is historically low, but labor force participation is still lower than the pre-pandemic rate. Labor shortages have led to wage growth, especially strong among low-wage workers and in sectors like Leisure and Hospitality.

Quit rates jumped in the middle of 2021 and remain high at the time of this writing—about 50 million quits a year, almost 10 million more than pre-pandemic averages. Many workers are new to their jobs. Some of these are moving from one similar job to another, but others are changing industries or occupations. At the same time, there are a large number of new remote workers. Many people left the office at COVID's onset; there has been a trickle back, representing a massive change in the amount of remote work compared to before the pandemic.

How do such large changes in the labor market impact workers compensation injury frequency? The magnitude of these impacts relies on the interaction of three factors:

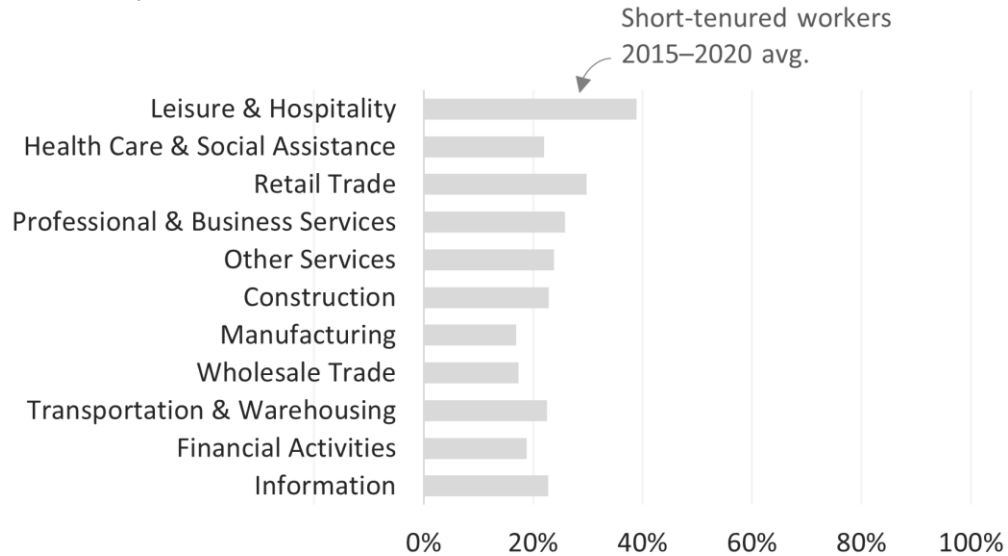
- How much more or less likely are short-tenured or remote workers to be injured than other workers?
- How much has the share of such workers changed?
- How has the sector mix of the workforce changed during the pandemic?

## Short-Tenured Workers

### How many short-tenured workers are there?

The first question to answer is how many short-tenured workers are there in the labor market and in each sector? In the chart below, we show estimates of the share of short-tenured workers (12 months or less with their current employer) for the years immediately preceding the pandemic. Two observations stand out.

**Short-Tenured Workers: How Many and Where?**  
Employment Shares, 2015–2020



Sources: US Bureau of Labor Statistics; IPUMS–CPS; IPUMS–ACS; NCCI

First, there were a lot of short-tenured workers in all sectors, even before the pandemic. Since 2012, the average share of short-tenured workers across all sectors has consistently been between 21–23%. This is not a historical anomaly— the short-tenured share was even higher in the late 1990s and early 2000s before the Great Recession.<sup>1</sup> In other words, there is always a substantial share of workers who are new on the job.

Second, the share of short-tenured workers varies widely by sector, but all sectors have a substantial share of short-tenured workers in any given year. Leisure and Hospitality has the highest share of short-tenured workers, at nearly 40% in the years prior to the pandemic. Retail Trade, around 30%, also has a high share of short-tenured workers. Even in sectors with the lowest shares of short-tenured workers, Manufacturing, Wholesale Trade, and Financial Activities, about 18% of workers are in the first year at their employer.

### What happened during the pandemic and recovery?

We estimate that the share of short-tenured workers increased modestly in 2021. The share of short-tenured workers in Leisure and Hospitality increased from 41% to 48%; in Retail Trade from 30% to 33%; and in Transportation and Warehousing, from 24% to 27%.

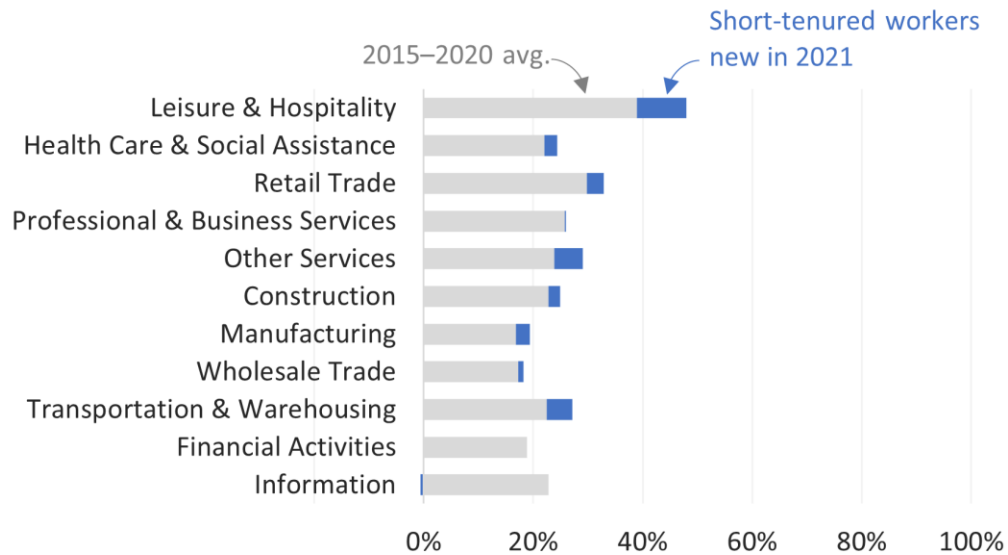
<sup>1</sup> We show this series from 1996 through 2018 in [How Do Recessions Affect Workers Compensation?](#) NCCI, October 16, 2019.

We estimate smaller changes—or even no change—in sectors where hiring rates did not change much—in late 2020 and during 2021—from pre-pandemic norms. These sectors include Professional and Business Services, Financial Activities, Information, Manufacturing, and Wholesale Trade.

The first three of these sectors require relatively little in-person contact with customers and are conducive to remote work, as we will discuss further in the next section. These sectors suffered fewer job losses than average at the pandemic’s onset and less reshuffling of workers during the recovery.

The latter two sectors have relatively high shares of long-tenured workers and experienced less turnover. Some Manufacturing subsectors responded to lower labor demand in 2020 by reducing hours and enacting temporary plant shutdowns.<sup>2</sup> Cutbacks in work hours reduced layoffs. Consequently, manufacturing firms met recovering labor demand in part by restoring work hours rather than new hiring.

### Short-Tenured Workers: How Many and Where? Employment Shares, 2021



Sources: US Bureau of Labor Statistics; IPUMS–CPS; IPUMS–ACS; NCCI

We estimate the change in the share of short-tenured workers during 2021 using a combination of two data sources. The Current Population Survey (CPS) conducts a biennial survey supplement on employee tenure in January of even years. However, the latest published report contains data from January 2020, predating the onset of the pandemic.<sup>3</sup> Thus, we estimate more recent shares of short-tenured workers using the Job Openings and Labor Turnover Survey (JOLTS).

By our definition, short-tenured workers are those who were hired at their current employer in the last 12 months. Therefore, we can get a very good estimate of short-tenured worker share by using average JOLTS

<sup>2</sup> We discuss this for the case of auto manufacturing in our [Supply Chain Disruptions and Their Employment Impacts, With Case Studies for Residential Construction and Auto Manufacturing](#), NCCI, December 13, 2021.

<sup>3</sup> Data based on the January 2022 survey will be released later this year (2022), but even then we will need to rely on estimates created in part from other sources, as there will be no direct data on the share of short-tenured workers between January 2020 and 2022.

hiring rates by sector (new hires/total workers) for the trailing 12 months. Although some new hires will change jobs again or leave the workforce before serving a full year on the job, prior 12-month hiring rate correlates very strongly in all sectors with the share of short-tenured workers as measured by the CPS supplement.

Examining the JOLTS data can illuminate why we estimate only a modest increase in short-tenured workers.

- Private industry hire rates were between 4.0-4.4% every month for over five years before the pandemic's onset.
- After a dip and subsequent spike in the second quarter of 2020, during the initial phase of the COVID-19 pandemic, hire rates have steadily been 4.4-5.0% every month from July 2020 through June 2022.
- Hiring rates have thus increased between 10-15% during the Great Reshuffle, with some variation by sector as reflected in our estimates shown above.

There were over 65 million new hires in 2019, so this increase is large in absolute terms, but it led to a modest increase in the share of short-tenured workers in 2021. Because hiring rates in the first half of 2022 are very close to the 2021 average, we estimate the overall share of short-tenured workers in 2022 to date remains elevated near 2021 levels.

### **What is the relative injury risk for short-tenured workers?**

To measure the effect of an influx of short-tenured workers on frequency, we must know not only how many more short-tenured workers there are, but also how much more likely they are to sustain a workplace injury. Thus, we next estimate the relative injury risk of short-tenured workers and full-tenured<sup>4</sup> workers.

This estimation uses two data sources.

- Historical estimates of short-tenured worker shares taken from the CPS supplement on worker tenure discussed in the last section.
- Annual estimates by sector of the share of injured workers who have less than one year of tenure, published by the Bureau of Labor Statistics' Survey of Occupational Injuries and Illnesses (SOII).<sup>5</sup>

These data allow us to estimate how much more (or less) likely a short-tenured worker is to be injured than a full-tenured worker, assuming the two work similar number of work hours.<sup>6</sup> The results are shown below.

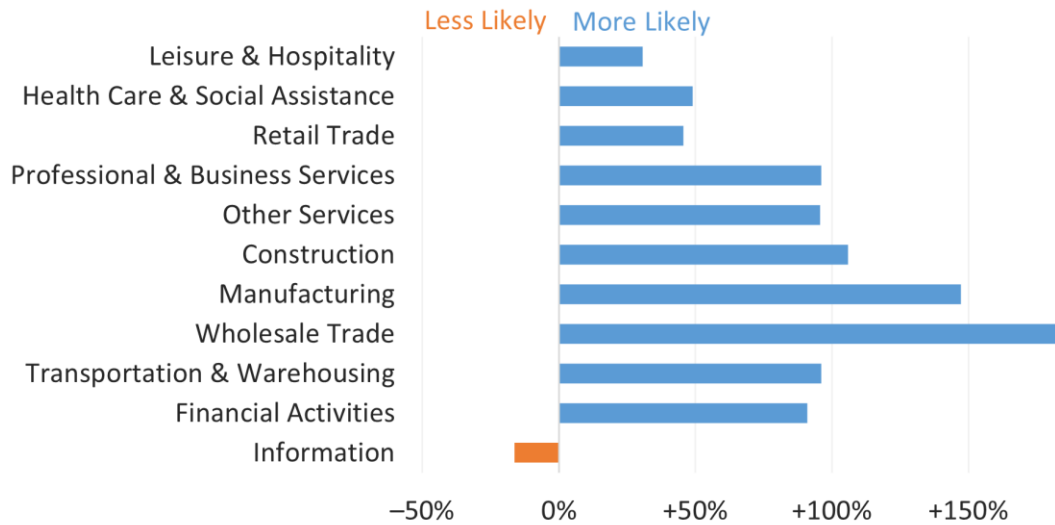
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<sup>4</sup> In this brief, we use the term "full-tenured" to mean all workers with at least one year at their current employer – the opposite of short-tenured.

<sup>5</sup> The relative risks reported here are calculated from 2018 worker shares and injuries by tenure. We did similar calculations for each year from 2011–2020 and found broadly similar relative risks across the whole period in terms of magnitudes and also differentials between different sectors.

<sup>6</sup> We also collect hours worked from the CPS microdata, downloaded from IPUMS-CPS, to put worker shares in terms of full-time equivalent (FTE) workers. This is an important adjustment because short-tenured workers are more likely than full-tenured workers to work part-time.

### Short-Tenured Workers: Comparative Injury Frequency Injury Frequency Relative to Full-Tenured Workers



Sources: US Bureau of Labor Statistics; IPUMS–CPS; IPUMS–ACS; NCCI

Short-tenured workers have a much higher injury frequency than their full-tenured counterparts, approximately twice as high or more in most sectors. Short-tenured workers’ comparative injury frequency is not quite as high in several major in-person service sectors, including Leisure and Hospitality, Health Care and Social Assistance, and Retail Trade. Since these are on a full-time equivalent worker (FTE) basis, these relative risks assume the same number of hours worked per employee.

The difference in relative risks between sectors illustrates an important concept regarding our method. Our relative risk measure is a combination of two components:

- How much more likely is a short-tenured worker to be injured than a full-tenured worker while performing the same task
- How hazardous are short-tenured workers’ versus full-tenured workers’ average job tasks

For in-person service sectors, full-tenured workers are usually doing similar tasks (or at least similarly hazardous tasks) to short-tenured workers. For example, nurses in hospitals and nursing homes and sales associates in retail stores typically perform similar job tasks at both short and full tenure.

Conversely, two sectors stand out in this chart for having very atypical relative risks. These are sectors which have an especially strong relationship between worker tenure and work tasks typically performed by short-tenured versus full-tenured workers.

In Wholesale Trade, short-tenured workers are nearly three times more likely to suffer injury than full-tenured workers. This is strongly related to occupation. The two most common occupations within Wholesale Trade are salespersons and freight and stock movers. Sales activities in Wholesale Trade often require a lot of sector-specific knowledge, thus sales staff in the sector tend to be full-tenured.<sup>7</sup> Movers in Wholesale Trade are more

<sup>7</sup> This is in sharp contrast to retail sales workers, who have the second-highest concentration of short-tenured workers of any sector, behind only Leisure and Hospitality.

likely to be short-tenured and have more physically demanding and hazardous jobs than the higher-tenured salespersons.

Information is the only sector in which short-tenured workers are less likely to suffer injuries than full-tenured workers. Here, the relationship between tenure and hazardous occupations, so pronounced in Wholesale Trade, is reversed.

Information is a mixture of disparate subsectors including publishing, motion pictures, data processing and hosting, and telecommunications. Among these subsectors, telecommunication workers—including equipment repairers and telecom line installers—have the highest median tenure and the highest share of hazardous occupations.

Our relative risk measure comes with two caveats. First, the short-tenured share of injuries versus employment come from different sources, so there is potential for mismatch between the datasets. Second, there is no way to adjust for the fact that short-tenured workers within a sector often have different job tasks than full-tenured workers. Our result represents a combination of differences in injury rate for differing job duties (for workers of a similar tenure), as well as the tenure-driven differences in actual likelihood of injury for the same tasks.

Despite these limitations, these estimates are useful for getting a sense of how much an increase in short-tenured workers may affect frequency. In sectors where short-tenured workers are twice as likely to be injured as full-tenured workers, a percentage point increase in the share of short-tenured workers should be associated with about a percentage point increase in the incidence rates. Any effect will likely be smaller for in-person service sectors, especially Leisure and Hospitality, where the historical relative injury risk is much lower than 100%.

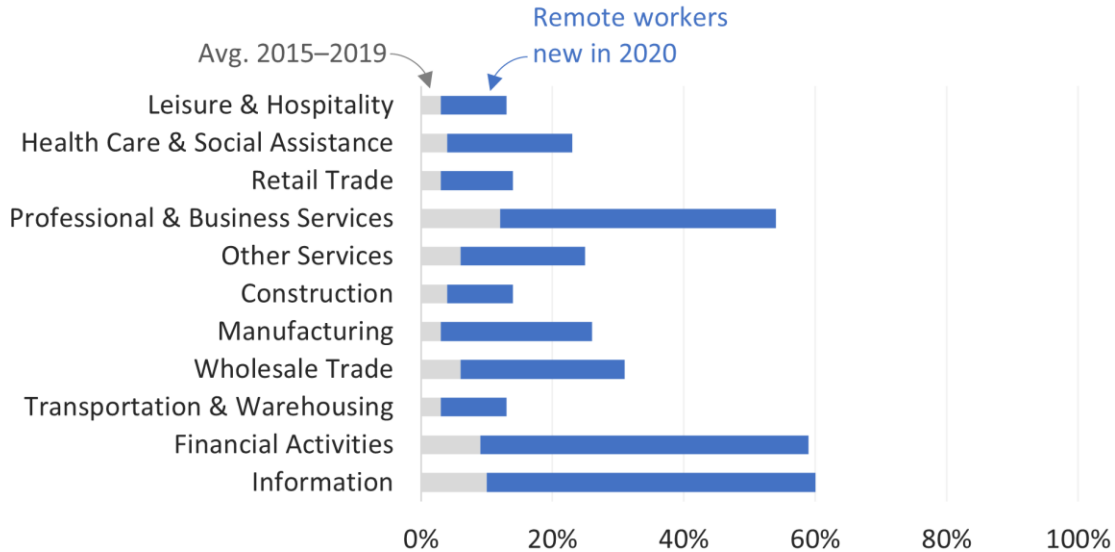
## Remote Workers

### How many remote workers are there?

The story for remote workers is much different than that for short-tenured workers. Short-tenured workers have always accounted for a substantial portion of the labor force and the Great Reshuffle only moderately increased their share. But the share of remote workers exploded during the pandemic.

#### Remote Workers: How Many and Where?

Employment Shares, 2020



Sources: US Bureau of Labor Statistics; IPUMS–CPS; IPUMS–ACS; NCCI

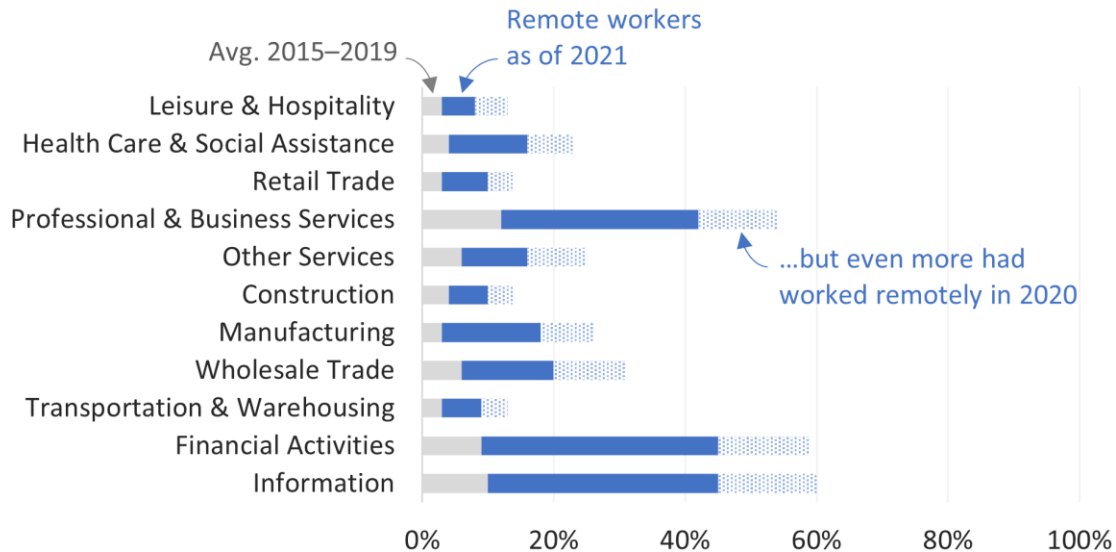
Before the pandemic, only about 6% of workers worked primarily from home.<sup>8</sup> During the pandemic, this percentage grew dramatically. An average of 26% of people employed across all sectors worked from home because of the pandemic in April–December 2020<sup>9</sup> and this figure excludes those who already worked from home.

<sup>8</sup> An in-depth discussion of how remote workers are defined and measured can be found in [Remote Work Before, During, and After the Pandemic](#), NCCI, January 25, 2021.

<sup>9</sup> This is calculated from a COVID-19 Supplement to the Current Population Survey.



## Remote Workers: How Many and Where? Employment Shares, 2021



Sources: US Bureau of Labor Statistics; IPUMS–CPS; IPUMS–ACS; NCCI

Remote worker share pulled back in 2021 to an average of 16% across all sectors. At the pandemic’s onset, virtually anything that could be done remotely was done remotely. As the initial wave of the pandemic passed, and especially once vaccines were introduced, workplaces began to reopen.

While the share of remote workers increased everywhere in 2020, the largest concentration was unsurprisingly in office-based sectors. These sectors are most amenable to working from home. The graph above shows estimated shares of remote workers using sector-level data for both pre-pandemic shares of remote work and pandemic-related remote work in 2020 and 2021. The greatest and most lasting increases came in Professional and Business Services, Financial Activities, and Information. Nearly all of these workers fall into the Office and Clerical workers compensation class codes.

Even these large increases in remote workers due to the pandemic are conservative estimates of the total changes in 2020 and 2021. The question from the CPS survey used to create them asks whether an employee worked remotely *due to the pandemic*. This share will decline as workers return to reopened offices and other worksites. But it may also decline if employers adopt a more permanent work-from-home arrangement. Respondents could still work remotely, but no longer consider the decision tied to the pandemic.

The estimated share of remote workers can vary by survey depending on the exact definitions used, but the general picture that the pandemic supercharged remote work is clear:

- A Pew report from a survey conducted in January 2022 concluded that among those whose job responsibilities can largely be done from home, 59% of workers primarily work remotely; but only 40% of Americans have such jobs.<sup>10</sup>
  - This suggests about a quarter of Americans (59% x 40%) still work remotely, only a little higher than the 22% we estimate for 2021 (16% new remote workers due to the pandemic plus 6% already working from home pre-pandemic).

<sup>10</sup> [COVID-19 Pandemic Continues to Reshape Work in America](#), February 16, 2022, Pew Research Center.

- A Gallup survey reported that 25% of full-time workers worked entirely from home as of September 2021 and a further 20% worked from home at least 10% of the time.<sup>11</sup>
  - The total of 45% is higher than the other survey results, but the Gallup survey includes all hybrid-remote and in-person workers and excludes part-time workers.<sup>12</sup>

We use the estimates from the CPS for two reasons. First, we would like to interpret the share of remote workers on a full-time equivalent basis. But what we can easily measure is the share of workers who do at least *some* of their work remotely. The CPS and Pew survey's conservative estimates of remote workers likely reflect more workers who are fully or primarily remote. Using more expansive estimates, like Gallup's, that include more hybrid workers, without distinguishing primary versus occasional remote workers, could lead us to overstate the amount of remote work being done.

The second reason is practical. The CPS data has excellent data detail by sector. As with short-tenured workers, variation in the amount of remote work being done in different sectors is important to understanding the degree to which incidence rates in each sector are likely to be affected.

### **What is the relative injury risk for remote workers?**

Because remote work was rare until recently, there is very little direct data about the injury frequency of remote workers versus on-site workers. However, for scenario analysis, we must make some estimate of the relative risk of remote versus on-site workers. In this report, we select an estimate of –20% in every sector, meaning fully remote workers have 20% fewer injuries than comparable on-site workers.

This was selected judgmentally based on two sources. The first is SOII incidence rate data by sector for the years 2011 to 2020. We use this sector-level data to estimate the relationship between the change in injury frequency and the change in the share of short-tenured workers and the share of remote workers, as well as a sector-specific long-term trend. The results generated a plausible range of relative risks between about –15% and –30%. Our selection of –20% is within this range.

Remote work was uncommon before the pandemic. Consequently, most of the variation observed in remote work occurred in 2020. As 2020 was a very unusual year in many respects, the estimated range may change with future years of data. For this reason, we look for corroborating evidence that the selection of –20% is reasonable more generally.

NCCI data on loss experience of pre-pandemic remote workers was also analyzed in making the –20% selection. Previous NCCI research, based on limited data, has shown that clerical telecommuting workers (Class Code 8871) have lower average loss costs than clerical office employees (Class Code 8810), \$0.05 to \$0.07.<sup>13</sup> The magnitude of this reduction aligns with our –20% estimate. However, this simple comparison has obvious limitations, most notably, the small size of losses and exposure. Class Code 8871 accounts for only 1% of payroll and 0.4% of premium within the Office and Clerical industry group in Policy Year 2018, as many telecommuters are not eligible for this classification.

<sup>11</sup> [Remote Work Persisting and Trending Permanent](#), October 13, 2021, Gallup.

<sup>12</sup> Part-time workers are more likely to have jobs that require in-person work in sectors such as Leisure and Hospitality or Retail Trade.

<sup>13</sup> [Telecommuting and Workers Compensation: What We Know](#), NCCI, January 25, 2021.

While neither of these measures are perfect, they indicate that the relative risk for remote workers is lower than for on-site workers and that the differential in relative risk between remote and on-site workers is smaller than that between short-tenured and full-tenured workers.

### Scenario Analysis: Frequency Impacts by Sector

What is the net frequency effect of these combined changes? And what will the pressures on frequency be as the share of short-tenured and remote workers continues to evolve? To illustrate these impacts, we present several frequency scenarios for selected sectors.

In each sector, we estimate two long-term frequency trends with data from 2011–2020. In these scenarios, we use BLS incidence rates as our frequency measure, defined as the number of injury and illness cases requiring days away from work per 10,000 FTE workers. We will discuss other frequency metrics in the subsequent section about changes in the mix of workers.

Injury rates have been declining for decades. Any impact of short-tenured or remote workers on injury rates should be measured relative to this long-term trend. Therefore, we first estimate a pure time trend model. Second, we use all the information discussed in this report—the estimated historical share of short-tenured and remote workers, along with the estimated relative risks of such workers—to estimate a long-term frequency trend net of fluctuations in the share of short-tenured and remote workers.

Using the latter method, we then consider two plausible paths for the evolving share of short-tenured or remote workers through 2025. We then plot the implied incidence rates along these two illustrative paths, as well as the path of incidence rates we estimate from the long-term trend that ignores these impacts.

In all cases we use actual BLS incidence rates through 2020 (excluding days away from work cases due to COVID-19)<sup>14</sup> and apply the model estimate for 2021 through 2025. We show paths for Leisure and Hospitality, Transportation and Warehousing, and Professional and Business Services to demonstrate the importance to frequency change of the various factors in our analysis.

#### Leisure and Hospitality

Leisure and Hospitality scenarios are shown in the figure below. Incidence rates for Leisure and Hospitality workers fell sharply in 2020; a return to the long-term trendline (the black dashed line) would result in an increase from 2020 to 2021. Even so, the estimated 2021 incidence rate of about 72 cases per 10,000 FTE workers would be below pre-pandemic levels.

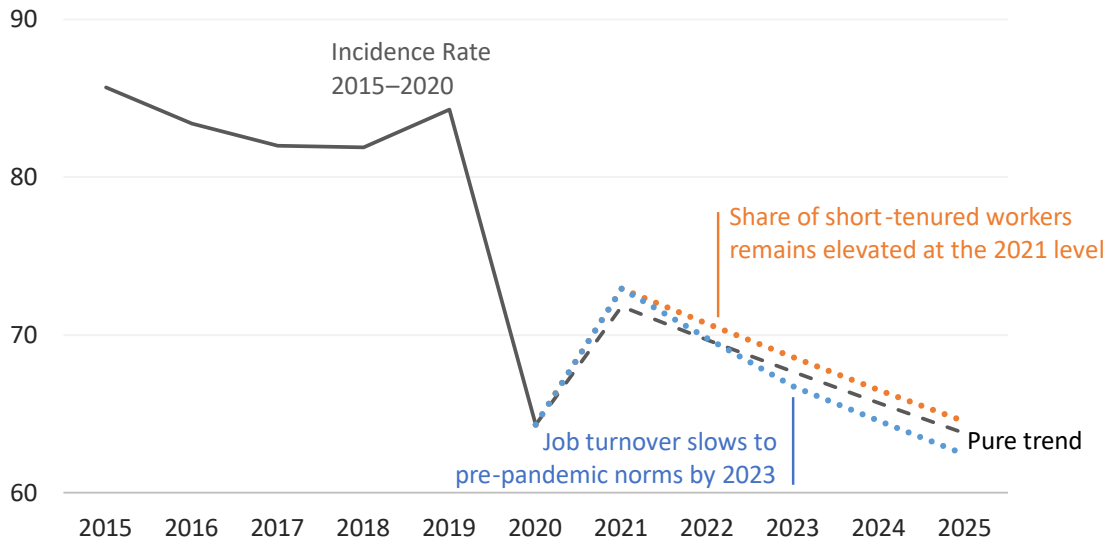
For 2021 and beyond, we consider two scenarios:

- Orange: The share of short-tenured workers in the sector remains at the 2021 level of 48% through 2025
- Blue: The share of short-tenured workers drops by 5 percentage points in 2022 and 2023 and by one additional point in 2024 and 2025, dropping to 36% by 2025

<sup>14</sup> Specifically, we exclude “exposure to harmful substances and environment” cases in all years as a proxy for COVID-19 cases. This category was responsible for only about 4 cases per 10,000 FTE workers in each year from 2011–2019, but 43.5 cases per 10,000 workers in 2020.

## Leisure and Hospitality

BLS Cases per 10,000 FTE Workers



Sources: US Bureau of Labor Statistics (BLS); NCCI

In both scenarios, the estimated 2021 incidence rate is above the pure trend estimate. This is because the pure trend model does not incorporate short-tenured and remote worker shares at all, but the orange and blue scenarios do. Both scenarios show an uptick in 2021 frequency due to the spike in short-tenured workers.<sup>15</sup> They diverge in later years.

In the orange scenario, frequency declines roughly in parallel with the pure trend estimate. However, the frequency remains above the pure trend model because the short-tenured share stays high through 2025. In the blue scenario, the share of short-tenured workers declines over time, reducing expected frequency. Eventually, the benefit of remote work on injury rates becomes the bigger of the two impacts.

Despite significant differences in assumptions, the orange and blue scenario outcomes are not too different. This follows from our estimate of relative risk. Short-tenured workers in Leisure and Hospitality are about one-third more likely to get injured than full-tenured workers, much less than most sectors. Even the dramatic 2021 change in short-tenured workers was only about 8 percentage points, and year-over-year scenario changes are much smaller than that. Scenario changes in short-tenured worker shares matter, but not nearly enough to overwhelm Leisure and Hospitality’s long-term trend.

### Transportation and Warehousing

Short-tenured workers are more impactful to Transportation and Warehousing frequency than Leisure and Hospitality, since in this sector such workers are about twice as likely to suffer a workplace injury than full-tenured workers. And while the 2021 increase in short-tenured worker share in this sector was not as large as in Leisure and Hospitality, it was still significant.

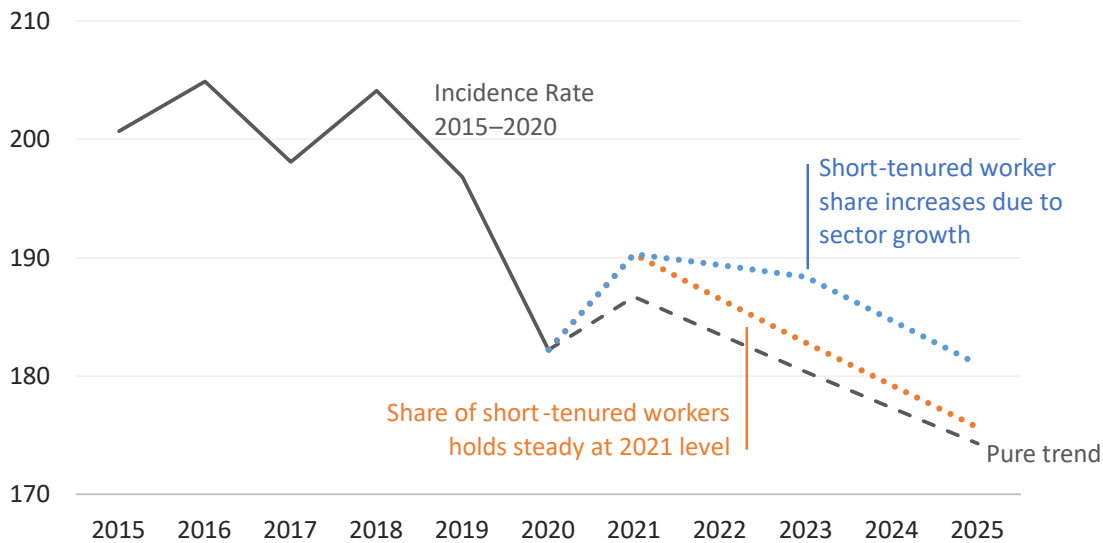
<sup>15</sup> There is slight upward pressure on frequency between 2020 and 2021 from a partial return to office of 2020 remote workers, but since Leisure and Hospitality has a high degree of in-person work and a low share of remote workers, the impact is small. This sector scenario is primarily about short-tenured worker shares.

Furthermore, Transportation and Warehousing has much higher incidence rates than Leisure and Hospitality, so even a similar change in relative risk will have a larger effect on the total number of injuries.

Here, our illustrative scenarios are different:

- Orange: We assume the share of short-tenured workers in the sector remains at the 2021 level of 27% through 2025.
- Blue: We assume that the share of short-tenured workers grows by two percentage points in 2022 and 2023 before leveling off in 2024 and 2025.

**Transportation and Warehousing**  
BLS Cases per 10,000 FTE Workers



Sources: US Bureau of Labor Statistics (BLS); NCCI

The orange scenario is the same as for Leisure and Hospitality: short-tenured share holds steady at 2021 rates. But Transportation and Warehousing was a growing sector pre-pandemic and was in fact one of the only sectors whose share of short-tenured workers had been rising even before 2021. Thus, the blue scenario illustrates continued increases in short-tenured worker share. In both scenarios, higher shares of short-tenured workers lead to higher expected frequency than would be indicated by the pure trend model.<sup>16</sup> In the scenario where Transportation and Warehousing’s short-tenured worker share continues to rise through 2023, incidence rates are much higher and do not fall back to the 2020 low until 2025.

**Professional and Business Services**

The pandemic’s main effect on Professional and Business Services was a dramatic rise in remote work. Our scenarios for this sector focus on changes in the share of remote workers rather than the share of short-tenured workers.

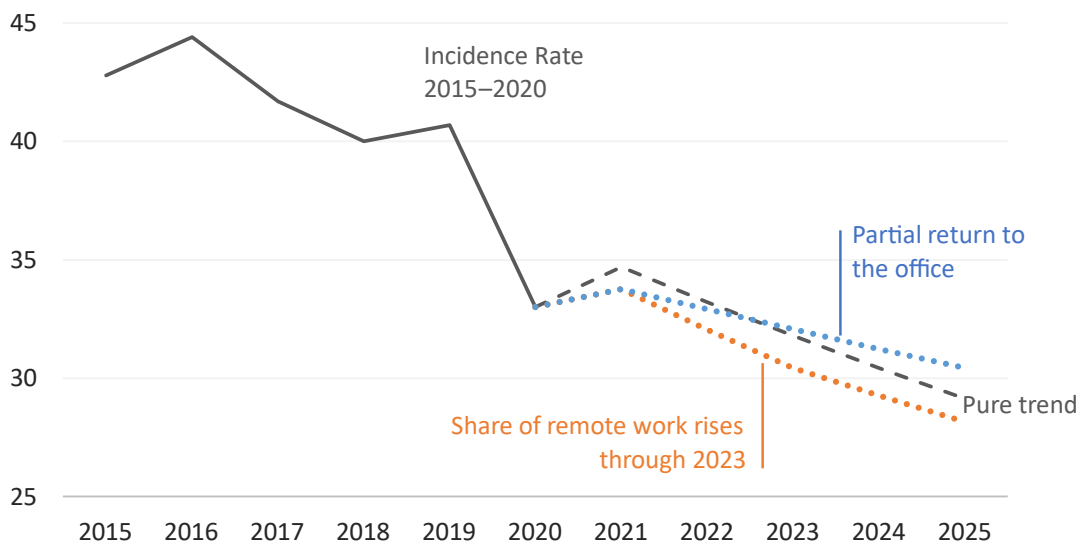
<sup>16</sup> As for Leisure and Hospitality, the 2020 to 2021 change also reflects minor impacts from the changing share of remote workers.

As we have shown, the share of remote work expanded rapidly in 2020 due to the pandemic. While the share partially receded in 2021, it remained dramatically higher than pre-pandemic. It is not clear what to expect going forward, as some companies push for a return to the office and others have made flexible or fully- remote options permanent. Our scenarios allow for the possibility that remote work share may move in either direction in the next few years.

- Orange: The share of remote workers increases from 42% in 2021 to 54% in 2023, which was the 2020 high in remote worker share, and stays at that level in subsequent years.
- Blue: The share of remote workers continues its 2021 decline each year through 2025, although never falling all the way back to pre-pandemic levels.

### Professional and Business Services

BLS Cases per 10,000 FTE Workers



Sources: US Bureau of Labor Statistics (BLS); NCCI

As in the case of Leisure and Hospitality, differences in incidence rates are modest. The orange scenario has about 28 cases per 10,000 FTE workers by 2025, compared to 30 per 10,000 FTE workers in the blue Scenario. Two scenario paths bracket the path for the pure trend model, suggesting that trends in incidence rates for office and clerical workers depend on how many such workers return to on-site work. This industry group accounts for 60% of workers compensation payroll and 11% of premium.

These scenario effects depend on our working estimate of a –20% relative risk for remote workers, which is subject to refinement as we learn more about remote work, and as workers and the workers compensation system adapt to the increased prevalence of the home office.

### Frequency Impacts of Worker Mix Changes

The discussion thus far has focused on the share of short-tenured and remote workers by sector and their relative risks. But another effect of the pandemic was a change in the mix of business. What net frequency effect would we expect to see from all three types of change together—share of short-tenured workers, share of

remote workers, and changing industry mix—at an aggregated level for an entire state or representative book of business?

The first two effects act in opposite directions. Upward pressure on frequency from more short-tenured workers is partially balanced by the downward pressure from more remote work. While the magnitude of each of these effects depends on the mix of business, most states will have similar effects because the industry mix of the labor market is similar in most states.<sup>17</sup> For insurance carriers, either effect may dominate if they primarily write policies in certain sectors of the economy.

But what is the frequency effect from the change in mix itself? We can break this question down into two parts. How did the mix change? And what is the frequency metric being used?<sup>18</sup>

To illustrate why the choice of metric is important, consider the example of roofers. Because roofing is more hazardous than most jobs, it has high injury frequency measured per worker or per payroll. Average injuries are also more severe. Workers compensation losses are determined by the likelihood of injury and the average severity: it takes a smaller number of high-severity injuries to generate the same amount of losses. Loss costs are a component used to determine final premium rates. Thus, high-severity classes have lower frequency *per premium* than low-severity classes, even classes such as roofing that have high frequency per payroll.

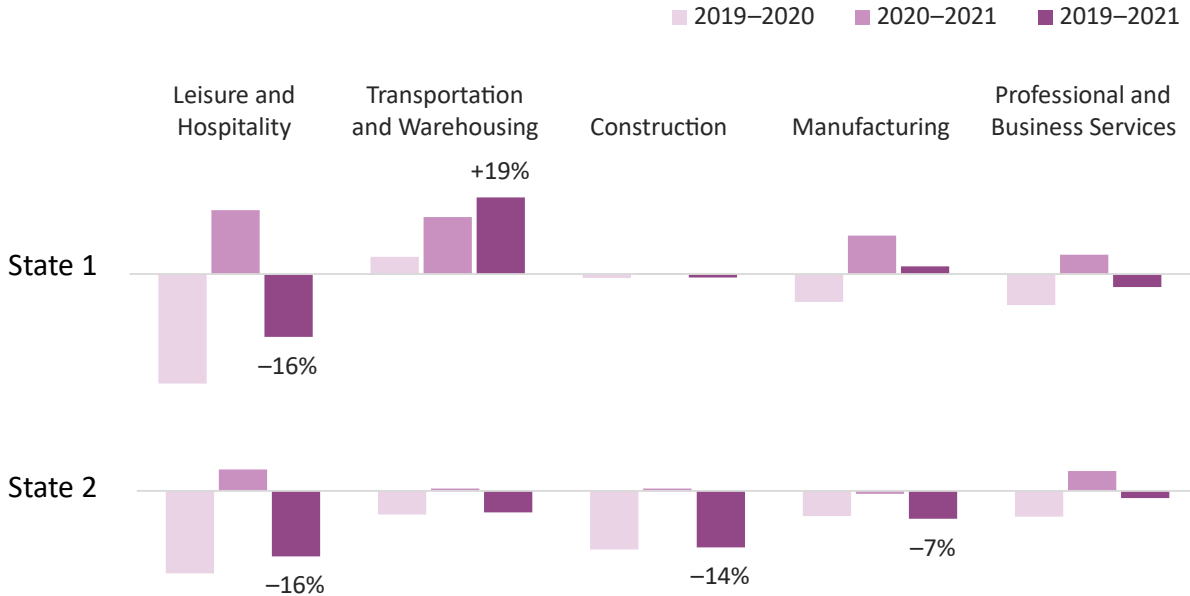
Both the magnitude and the direction of the mix effect on frequency during the pandemic differ depending on these considerations. To demonstrate this, we use 2019 to 2021 employment changes by sector for two sample states and show the estimated effects of changes to the share of short-tenured workers, the share of remote workers, and industry mix on frequency per premium and per payroll.

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<sup>17</sup> We break down pre-pandemic employment by state in our 2019 Q4 *Quarterly Economics Briefing*, [Employment and Wage Growth by State and Economic Sector](#), NCCI, January 9, 2020.

<sup>18</sup> NCCI primarily uses frequency per premium in ratemaking, but frequency is also calculated per payroll or per worker. The choice of frequency metric and differences between the various measures are discussed at length in [NCCI Explains Its Top 3 Frequency Measures](#), NCCI, October 15, 2018.

### Change in Employment by State



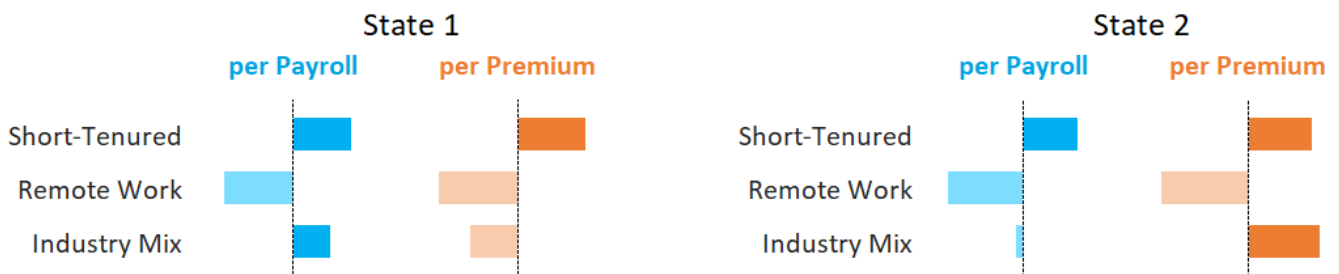
Sources: US Bureau of Labor Statistics (BLS); NCCI

This graph shows the two states’ change in employment. The first two bars for each sector reflect percent change in employment from 2019 to 2020 and 2020 to 2021. The third darker bar shows the cumulative employment change from 2019 to 2021. Over the two-year period:

- State 1 experienced a large net employment loss in Leisure and Hospitality jobs and a large net gain in Transportation and Warehousing.
- State 2 experienced the largest employment losses in Leisure and Hospitality as well as meaningful losses in Construction and Manufacturing.
  - In State 2, Transportation and Warehousing employment was stable rather than increasing.

What was the effect on frequency? In the chart below, we break out impacts on each state from each of the three channels, both on a **per payroll** and **per premium** basis.

### Frequency Change **per Payroll** and **per Premium** by Component 2019 to 2021



Sources: US Bureau of Labor Statistics (BLS); NCCI



The impacts of short-tenured and remote workers are of similar magnitudes in the two states because the states' overall mix of business is broadly similar (in pre-pandemic levels, not in the changes experienced during the pandemic). Thus, we see the size of the blue bar for short-tenured workers for State 1 is similar to the size of the blue bar for short-tenured workers for State 2. The same holds for cross-state comparisons of the two orange bars for short-tenured workers, as well as for both the blue and orange pair of bars for remote workers.

Within each state, the blue and orange bars for short-tenured and remote workers are identical to each other. This occurs because that part of our calculation is meant to isolate the change in incidence rates due to changes in short-tenured or remote workers for the state's pre-pandemic mix of business.

The effect of industry mix is the third element. Here the chart shows that frequency change depends critically on both the state's experience and choice of metric.

The first panel of the chart shows the frequency change for State 1. Here the most important mix shifts were a decline in Leisure and Hospitality employment and an increase in Transportation and Warehousing employment. Recall that Transportation and Warehousing incidence rates per worker are more than twice as high as those in Leisure and Hospitality.

Worker payroll is determined by the number of workers and their average pay. Transportation and Warehousing workers have higher hourly pay than Leisure and Hospitality workers, but not nearly twice as high. Therefore, like incidence rates per FTE worker, injury frequency *per payroll* is much higher in Transportation and Warehousing than Leisure and Hospitality. Thus, the shift in industry mix pushes frequency up. This upward pressure is shown by the blue bar for industry mix.

However, Transportation and Warehousing injuries have higher average severity than those in Leisure and Hospitality. Recall that high severity classes have low frequency *per premium*, whether or not they have high frequency per worker or *per payroll*. Thus, the shift to Transportation and Warehousing (a high-severity class) puts downward pressure on frequency *per premium*, shown by the orange bar.

What happens when we put all three effects together? The impacts of short-tenured workers and remote workers do not depend on the choice of frequency measure. More short-tenured workers will always push frequency up and more remote workers will always push frequency down. Only the impact of mix changes can differ based on the selected metric.

The magnitude of the first two effects depends on our estimates of how many more short-tenured and remote workers there are and on such workers' relative risks. The size of the bars show that in both State 1 and State 2, we estimate the magnitude of the upward pressure from more short-tenured workers is about the same size as the downward pressure from remote workers.

Because these effects are partially offsetting, the impact of mix changes play a large role in our estimate of the total effect on aggregate frequency. In State 1, the growth in Transportation and Warehousing and decline in Leisure and Hospitality leads to a slightly *upwards* total effect on frequency when measured *per payroll*. The combined increase due to short-tenured and sector mix effects is slightly larger than the downward pressure from more remote work. But the net impact on a premium basis is *downwards* because the changing mix toward high severity classes in Transportation and Warehousing puts downward pressure on frequency *per premium*.

In State 2, the large employment decline in the low frequency *per payroll* sector of Leisure and Hospitality roughly offsets the declines in high frequency *per payroll* sectors Construction and Manufacturing. The tiny blue bar indicates a small net impact of mix on frequency *per payroll*. The net impact of all three effects is slightly

*downwards*. However, Construction and Manufacturing are high-severity classes like Transportation and Warehousing, and thus they have low frequency *per premium*. The loss of jobs in these sectors puts significant *upwards* pressure on frequency *per premium*, illustrated by the orange bar for State 2—the opposite sign as in State 1.

These two examples demonstrate the complex nature of the overall frequency impacts of the Great Reshuffle, as well as the need for researchers and practitioners to carefully understand their change in mix relative to their intended measurement before analyzing frequency impacts of mix changes. NCCI will continue to analyze industry mix changes and the impact on frequency and severity.

## Findings and Conclusions

Three aspects of the Great Reshuffle have important implications for workers compensation frequency:

- More short-tenured workers
- More remote workers
- Changing industry mix

### *More short-tenured workers*

The increase in short-tenured workers puts upward pressure on injury frequency. While the increased share of short-tenured workers has been modest, their relative risk compared to full-tenured workers is high. Sectors with both a large increase in short-tenured workers and a high relative risk for such workers experienced the largest impacts, especially Transportation and Warehousing.

Short-tenured worker share grew the most in Leisure and Hospitality, but its impact was muted because short-tenured workers' relative risk in the sector is less than average. In office-based sectors, there has not been much change in short-tenured worker share.

### *More remote workers*

Increased remote work puts downward pressure on injury frequency. The share of remote workers rose dramatically from pre-pandemic levels, but our selected estimate of remote workers' relative risk is not much lower than that for on-site workers. Remote work was widespread at the onset of the pandemic, but the largest and most lasting increases in remote work have been in the office-based sectors Professional and Business Services, Financial Activities, and Information.

### *Changing industry mix*

The impacts from industry mix changes are more varied. In both sign and magnitude, frequency effects from mix change depend critically on both the nature of the changes and the choice of frequency metric. All states lost a lot of Leisure and Hospitality jobs during the pandemic, but the total mix effect on a state (or an insurer's book of business) depends on what happened in other sectors.

For example, a shift from Leisure and Hospitality to Transportation and Warehousing employment puts upward pressure on frequency per worker or *per payroll* but downward pressure on frequency *per premium*. When Construction and Manufacturing employment declines along with Leisure and Hospitality, as in our State 2 example, frequency *per payroll* is barely affected, but there is sharp upward pressure on frequency *per premium*.

## Conclusion

These frequency effects are probably short-term anomalies. The Great Reshuffle is a unique event, following the largest and most sudden decline in employment ever to strike the US labor market. Some industry mix changes are likely to be permanent, such as a lower employment share in Leisure and Hospitality and a greater concentration of remote work. However, the rate of change in short-tenured workers, remote workers, or industry mix will not be as large in 2022 or any future year as the sweeping changes during 2020 and 2021.

Through midyear 2022, new hire rates remain high, indicating that the share of short-tenured workers has stayed near 2021 levels. Eventually, hiring will slow down, but this return to normal will be a gentle decline compared to the huge shocks from pandemic layoffs and subsequent rehiring during the Great Reshuffle. This lesser rate of change will have correspondingly smaller frequency impacts.

Our Transportation and Warehousing scenarios provide examples of how frequency effects can still be substantial in sectors where short-tenured workers have relatively high injury rates and their share continues to rise. This is especially relevant to a book of business that emphasizes new or growing firms.

Remote work will likely never fall back to pre-pandemic levels and no changes in remote work will be as large or rapid as the explosion of remote work in 2020. A large percentage of jobs that are conducive to remote work are now being done remotely and many workers and employers have embraced this flexibility. Remote work will continue to be important to office and clerical sectors, as some firms continue to expand remote or hybrid-work options and others return to the office. It will be important to obtain better estimates of the relative risk of remote and on-site workers as employees, firms, and insurers get used to remote work.

These labor market changes during the Great Reshuffle will continue to impact workers compensation frequency. But any further ripples are expected to come from smaller year-to-year labor market changes than what we have already seen and are unlikely to have major effects on long-term frequency trends.

## Acknowledgements

The author would like to thank Len Herk, Carolyn Wise, Shawn Adcock, Kevin Fernes, Francesco Renna, and Barry Lipton for important contributions to this study.