Photo: JannHuizenga/iStock

Labor Market Recovery During the COVID-19 Pandemic

After most recessions, the labor market recovers slowly.
Was the COVID-19 recession different?

Shigeru Fujita
Economic Advisor
and Economist
FEDERAL RESERVE
BANK OF PHILADELPHIA

*The views expressed
in this article are not
necessarily those of
the Federal Reserve.*

The COVID-19 pandemic caused unprecedented disruptions to economic activities worldwide. The U.S. economy shrank more than 30 percent in the second quarter of 2020 (seasonally adjusted annualized rate), by far the largest decline in the post-WWII period (Figure 1). The labor market responded in kind: The unemployment rate spiked to 14.8 percent in April 2020 from 3.2 percent in February, and the economy shed a total of more than 22 million jobs during March and April.
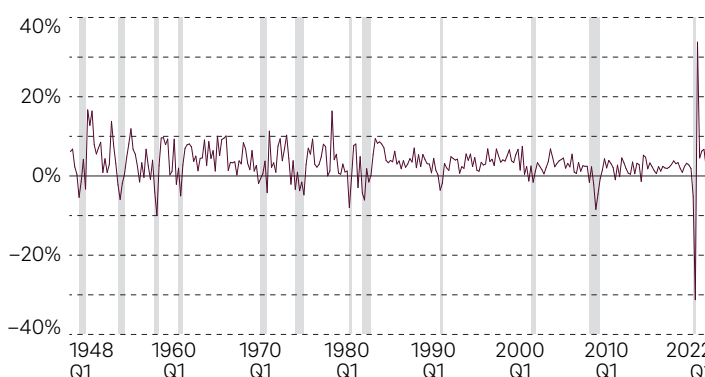
The trajectory of the economy since spring 2020, however, has been stronger than many had initially feared. According

The COVID-19 Pandemic Resulted in a Historic Swing in GDP Growth

GDP contracted at an unprecedented rate early in the pandemic but rebounded quickly afterward.

Real GDP growth (seasonally adjusted annualized rate), 1948–2022, quarterly

Source: Bureau of Economic Analysis (BEA).

Notes: Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).

to the Philadelphia Fed's Survey of Professional Forecasters (SPF) released in the second quarter of 2020, the median forecasts for the unemployment rate for the final quarter of 2020 and the first quarter of 2021 were 11.0 percent and 9.3 percent; the actual values turned out to be 6.8 percent and 6.2 percent, respectively. In the previous three recessions, the unemployment rate declined by about 0.6 percentage point per year after hitting its recession peak. In the recent COVID-19 downturn, however, the unemployment rate fell about 10 percentage points in just the 18-month period from its peak in April 2020.

In this article, I first show that the U.S. labor market responded similarly during previous downturns: Workers faced a significantly higher chance of losing their job and a lower chance of being reemployed after the job loss. What's more, the job-finding rate after the job loss remained low for an extended period of time. I will argue that this persistently low job-finding rate represents the time-consuming and painful nature of labor reallocation, which in turn is associated with the acceleration of job polarization, or the disappearance of middle-class jobs.

The COVID recession was unique in that these traditional characterizations did not apply. As mentioned above, the unemployment rate fell much faster. Although the rate of job loss increased dramatically, it came down quickly, and the job-finding rate, on net, did not drop measurably over the course of the pandemic. Moreover, the pace of job switching without a jobless spell in between (the employer-to-employer transition rate) also held firm. This is unusual: During a typical downturn, the employer-to-employer rate falls significantly.

What made the COVID-19 recession different? And what does it tell us about future recessions? To find out, I describe the key characteristics of previous economic downturns. I first explain how these characteristics have contributed to job polarization. I also look closely at the relationship between preseparation earnings and the job-finding rate. I then explain why the COVID-19 recession differed from previous recessions along these dimensions. I conclude this article with some thoughts on how the COVID-19 recession may have permanently altered the labor market.
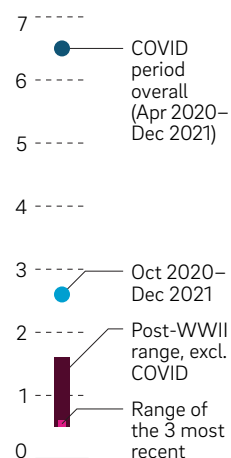
Labor Market Recoveries from Previous Recessions

To understand why the COVID-19 recession was unique, we must first understand how the labor market recovered from previous recessions. For each economic downturn, there's an initial spike in the unemployment rate, followed by a gradual but consistent recovery (Figure 3).[1] During the entire post-WWII period excluding the COVID period, the pace of the recovery in the unemployment rate (expressed as the change per year) after reaching its peak in each recession ranged from 1.6 percentage points to 0.5 percentage point. For the most recent three recessions before COVID-19, the pace of the recovery is even more consistent, at 0.5-0.6 percentage point per year. But for the COVID-19 recession, the unemployment rate, which peaked at 14.8 percent in April 2020, fell by 10.9 percentage points to 3.9 percent over the following 20-month period through the end of 2021.[2] Much of this decline occurred during the initial six-month period between April 2020 and October 2020, when

- COVID period overall (Apr 2020–Dec 2021)
- Oct 2020–Dec 2021
- Post-WWII range, excl. COVID
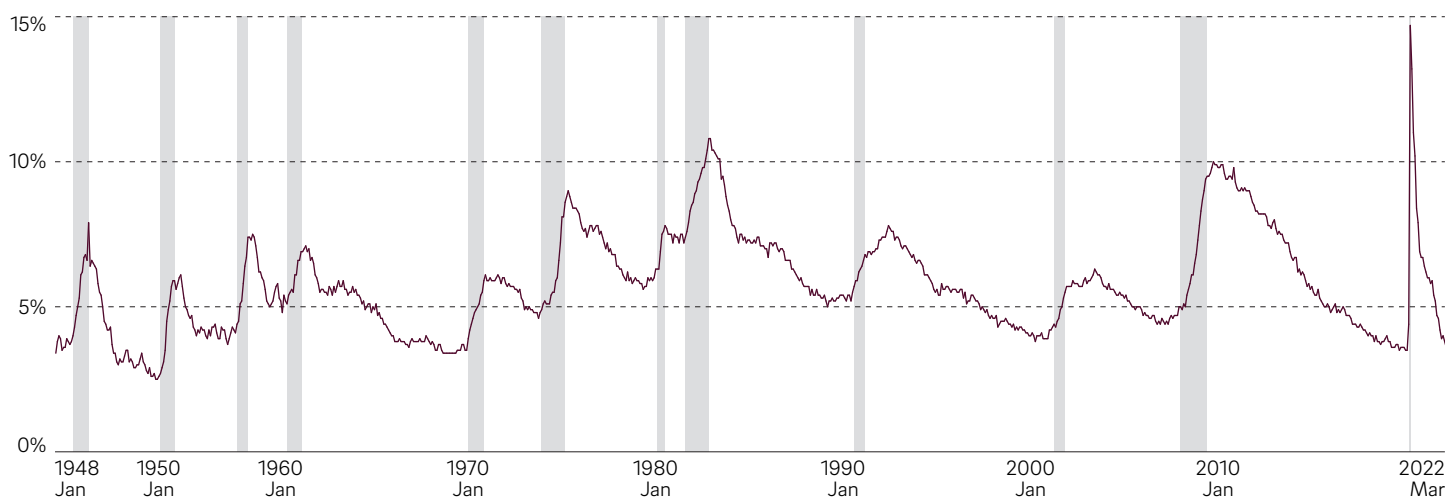- Range of the 3 most recent

Source: Current Population Survey (CPS), U.S. Census Bureau and Bureau of Labor Statistics (BLS).

FIGURE 3

For Each Recession, the Unemployment Rate Spikes and Then Gradually Falls

Unemployment rate, 1948–2022, monthly

Source: Current Population Survey (CPS), U.S. Census Bureau and Bureau of Labor Statistics (BLS).

Notes: Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).

the unemployment rate fell by 7.9 percentage points, from 14.8 percent to 6.9 percent, but the jobless rate dropped an additional 4.3 percentage points through the end of 2021. The decline in this latter period translates into 2.6 percentage points per year, which is the fastest in the post-WWII period (Figure 2).[3]

The unemployment rate fluctuates for various underlying reasons. One way to dig deeper into these underlying reasons is to look at the flow of workers into and out of unemployment. There are three labor market "states" as defined by the Bureau of Labor Statistics (BLS): employed, unemployed, and not in the labor force. The number of people who are unemployed (defined as those who are jobless and looking for work) changes when individuals in the other two states move into the unemployed state and when those in the unemployed state move into one of the other two states. In particular, research about U.S. recessions since the late 1970s shows that transitions between the employed and unemployed states generally play a major role in the cyclical movements in the unemployment rate.[4] I therefore discuss the previous cyclical patterns of these transition rates. This allows me to highlight the peculiarities of the labor market responses during the COVID-19 pandemic.

The transition rate from employment to unemployment, also known as the job-loss rate, represents the rate at which employed workers, on average, lose their jobs and flow into the pool of unemployed workers. Increases in this rate lead to higher unemployment. In every previous recession since the late 1970s, the transition rate exhibited the same pattern: It increased at the onset of the downturn and then fell. Meanwhile, at the start of every downturn, the transition rate from unemployment to employment—that is, the rate at which jobless workers find new

jobs (also known as the job-finding rate)—plummeted and then recovered only gradually. All of the past recessions exhibit this same pattern (Figure 4). In the initial phase of a downturn, the job-loss rate increases and the job-finding rate plummets, whereas in the recovery phase, both of these rates gradually revert to normal levels. Moreover, each rate recovered at a similar pace across recessions. As I discuss later in this article, however, these two transition rates behaved quite differently in the COVID-19 recession.

Now that we understand how the labor market typically responds to a recession, we can recognize how recessions accelerate labor reallocation. During a typical recession, the higher job-loss rate suggests that some of the existing jobs are no longer viable and thus workers in those jobs face a higher risk of job loss. Those workers eventually need to be reallocated to jobs that are still viable. In this sense, the higher job-loss rate during downturns implies that the economy is facing more pressure of labor reallocation. On the other hand, the lower job-finding rate, which means that it takes more time to find a new job, implies that reallocation is more difficult during a downturn. For both of these reasons, the unemployment rate increases, and the gradual recovery of the job-finding rate exemplifies the time-consuming and painful nature of labor reallocation. Although some workers may quickly land a new job that's to their liking, it takes a long time for many other workers to find a new job, and they often end up in a job that pays less, sometimes significantly less, than their previous job. In the following section, I relate the painful experience associated with labor market reallocation to the phenomenon known as job polarization. Doing so will help us evaluate the labor market responses to the COVID-19 recession.

Except for the COVID-19 Recession, the Job-Loss and Job-Finding Rates Have Had Similar Responses During Economic Downturns

In the past, both rates recovered only gradually after sharply responding initially.

Transition rates between employment and unemployment, 1976–2022, quarterly averages of monthly rates
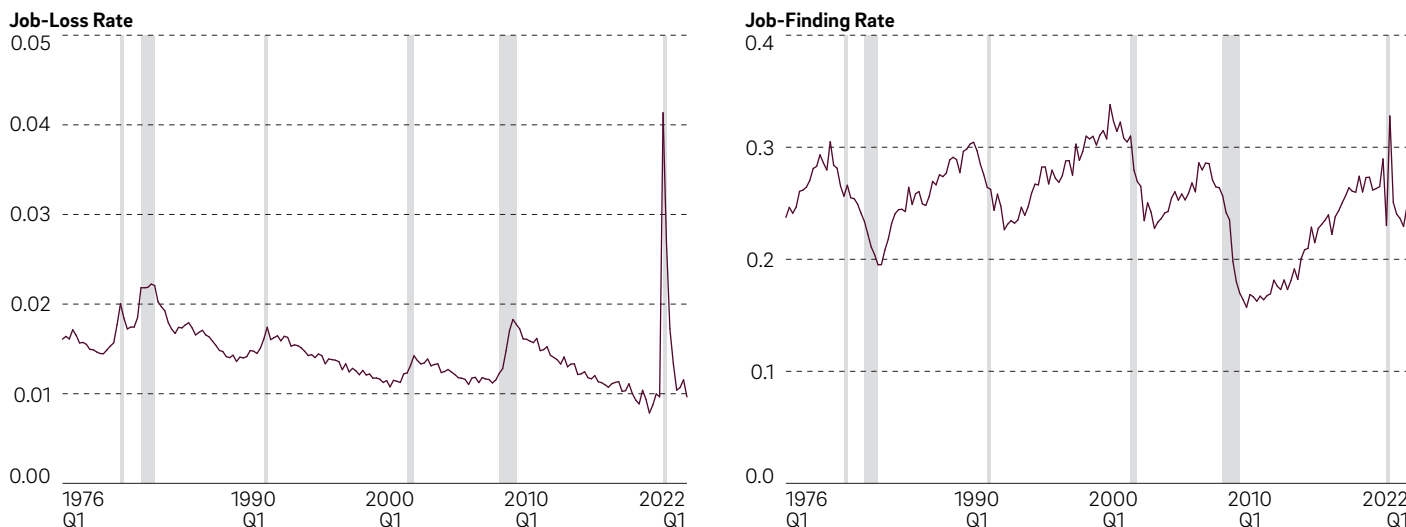
Job-Loss Rate

Job-Finding Rate

Source: Current Population Survey (CPS), U.S. Census Bureau and Bureau of Labor Statistics (BLS), author's calculation from the public-use microdata.

Note: Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).

Job Polarization and Restructuring

According to many economists, an important labor market trend in the past several decades is job polarization, characterized by an increase in the shares of high- and low-wage jobs among the employed, and a declining share of middle-wage jobs.[5]

Economists often divide occupations into four broad categories based on their tasks: routine manual, routine cognitive, nonroutine manual, and nonroutine cognitive. Routine manual occupations include manufacturing and construction jobs. Routine cognitive occupations include sales jobs and administrative support jobs. Nonroutine manual occupations include service jobs in leisure and hospitality industries, which were heavily affected by the pandemic. Nonroutine cognitive occupations include many high-skilled jobs, such as those found in management, engineering, and financial operations. The third and fourth categories on average encompass low- and high-wage occupations, respectively. The first two categories (both of which are routine) encompass middle-wage jobs.
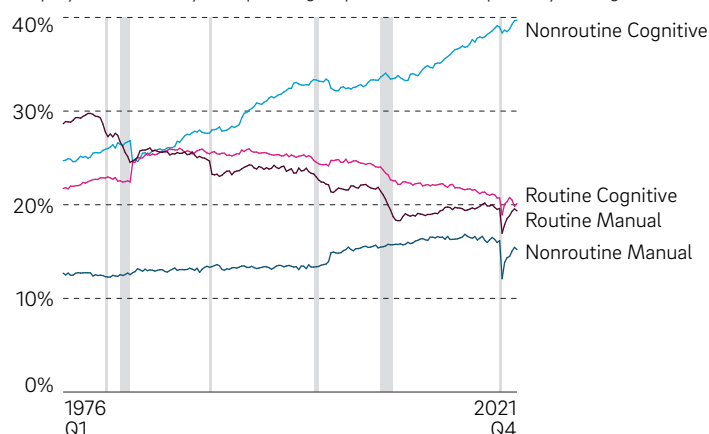
When we plot the employment levels of these four occupation groups over time, we can make several observations that confirm that the labor market has long been characterized by job polarization (Figure 5). First, nonroutine cognitive jobs have been on the rise, though the increase slows occasionally, typically during an economic downturn. Similarly, the other nonroutine jobs, the manual ones, have increased over the last four decades, too. The increase between the mid-2000s and 2019 is particularly noticeable. In contrast, routine jobs have trended downward. The downward trend in routine manual jobs is particularly steep, and that downward trend accelerates in downturns.

Another important pattern emerges when we express the size of each occupation group as the shares within employment and unemployment (Figure 7). Because individuals in the unemployment pool are currently jobless, the count of workers in that pool is based on their occupation in their most recent jobs. Over the last four decades, the shares of routine jobs within employment have been steadily falling, while the shares of nonroutine jobs have been rising. However, the employment shares are quite different from the unemployment shares. For example, at the beginning of the sample period, the employment share of routine manual workers was about 35 percent, whereas, within unemployment, the share was much higher. The opposite pattern holds for nonroutine cognitive workers. These patterns indicate that routine manual workers face a higher risk of job loss and move to different occupations or stay unemployed longer, while nonroutine cognitive workers face a lower risk of job loss and find new jobs more quickly even when they are jobless.

Additionally, the share of routine manual workers in the unemployment pool tends to increase in recession periods, while the share of nonroutine manual workers in unemployment is procyclical. This contrasting pattern indicates that recessions have traditionally been particularly challenging for routine manual workers. This cyclical pattern holds for every recession since the late 1970s, except for the COVID-19 recession, in which nonroutine manual jobs (specifically those in leisure and hospitality industries) were severely impacted, while routine manual occupations fared relatively better.

When we relate these employment/unemployment patterns to each occupation group's average education, nonroutine cognitive

The Labor Market Has Long Been Characterized by Job Polarization

The downward trend in routine manual jobs is particularly steep, and that trend accelerates in downturns.

Employment levels by occupation groups, 1976–2021, quarterly average

Source: Current Population Survey (CPS), U.S. Census Bureau and Bureau of Labor Statistics (BLS), author's calculation from the public-use microdata.
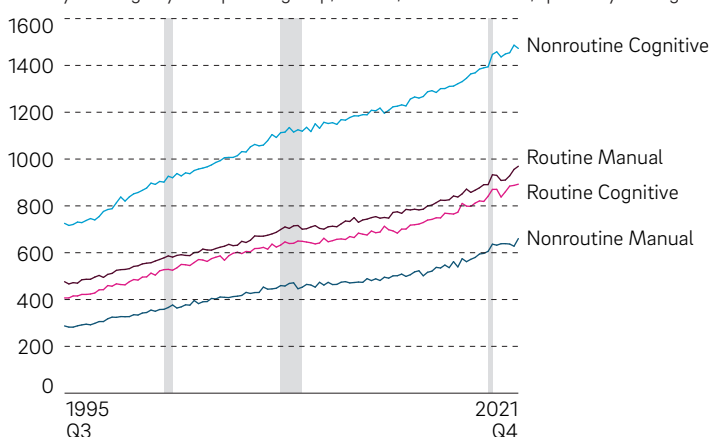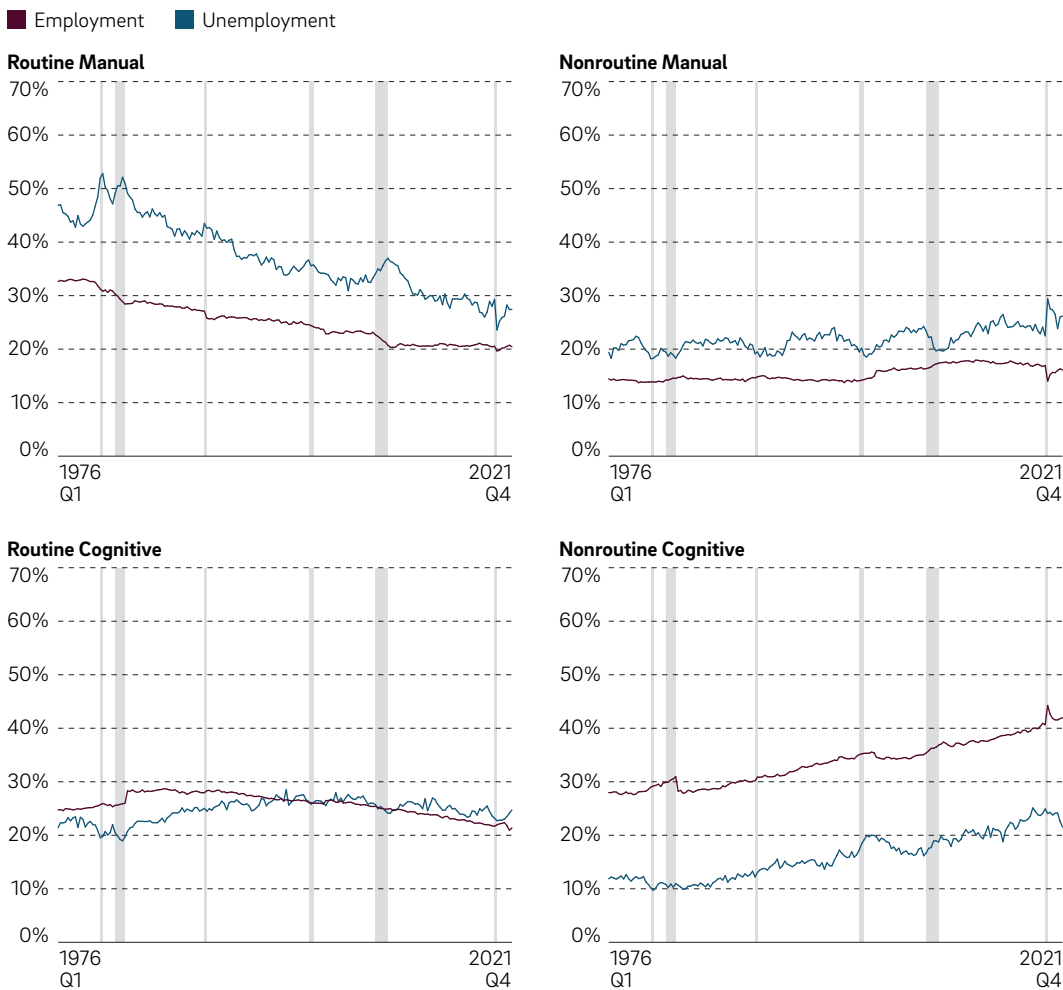
Notes: Expressed as shares of population aged 16 and above. Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).

Routine Manual Workers Earn More on Average Than Nonroutine Manual Workers

But their earnings growth has lagged.

Weekly earnings by occupation group, dollars, 1995Q3–2021, quarterly averages

Source: Current Population Survey (CPS), U.S. Census Bureau and Bureau of Labor Statistics (BLS), author's calculation from the public-use microdata.

Note: Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).

Routine Manual Workers Usually Suffer More During Recessions

By contrast, nonroutine cognitive workers face a lower risk of job loss and find new jobs more quickly even when they are jobless.

Shares of occupation groups within employment and unemployment 1976–2021, quarterly average

■ Employment ■ Unemployment

Source: Current Population Survey (CPS), U.S. Census Bureau and Bureau of Labor Statistics (BLS), author's calculation from the public-use microdata.

Notes: Long-term unemployment includes those who are unemployed 27 weeks or longer. Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).

jobs are, not surprisingly, occupied by the most-educated workers, while routine manual workers are the least educated. Despite having the lowest average education, routine manual workers on average make the second-highest wage earnings, although their earnings have not grown as much over the last few decades (Figure 6).[6]

Earnings and Job-Finding Rates

The previous analysis shows that those who are employed at routine manual jobs have faced particularly challenging conditions, especially during recessions, over the last several decades.

Although, relatively speaking, their earnings prior to job loss tended to be high, job loss for these workers has serious consequences for their lifetime earnings as they "fall off the career ladder." That is, a worker doesn't just lose their income during the jobless spell. Even when they manage to find new employment, they tend to end up on a lower rung of the career ladder, in a job that pays significantly less than their previous job. Furthermore, climbing the ladder again takes a long time. Thus, a job loss can make a significant dent in the worker's lifetime earnings. This empirical pattern is well documented in the literature.[7]

As mentioned above, the slow recovery of the rate at which workers exit the unemployment pool exemplifies the painful nature of labor reallocations during a typical downturn. Considering this pattern, one can imagine a situation where workers who had made middle-class earnings prior to job loss struggle to find a similar job and eventually have to take a lower-paid job.

To find out if there is a relationship between the job-finding rate and workers' earnings level prior to job loss, let's look at how average earnings of the unemployed (prior to job loss) change over the business cycle.[8] The average earnings of recent job losers, expressed as the ratio to the average earnings of all workers, increase in downturns—except during the COVID downturn (Figure 8). This series shows that the earnings of the unemployed tend to be lower than the overall average (as the series always fluctuates below 1), but the ratio is countercyclical, going up to around 0.9 during downturns. This pattern can be understood thusly: Those with lower earnings tend to face a higher risk of job loss on average, but, during the downturn, the risk of job loss expands to those who made higher earnings.[9]

Because the job-finding rate is strongly procyclical, this evidence suggests that the job-finding rate and earnings prior to job loss are negatively related—that is, one rises when the other falls, and vice versa. Does this mean that higher earnings at the previous job somehow causes those workers to find a new job more slowly? Not necessarily. These two series are aggregate statistics, and both could be driven by the economy's overall labor

FIGURE 8

Recessions Are Usually When the Risk of Job Loss Expands to Those Who Earn More

Except for the COVID-19 recession, average earnings of recent job losers increase in downturns.

Preseparation weekly earnings of job losers relative to average of all workers, 1996–2022
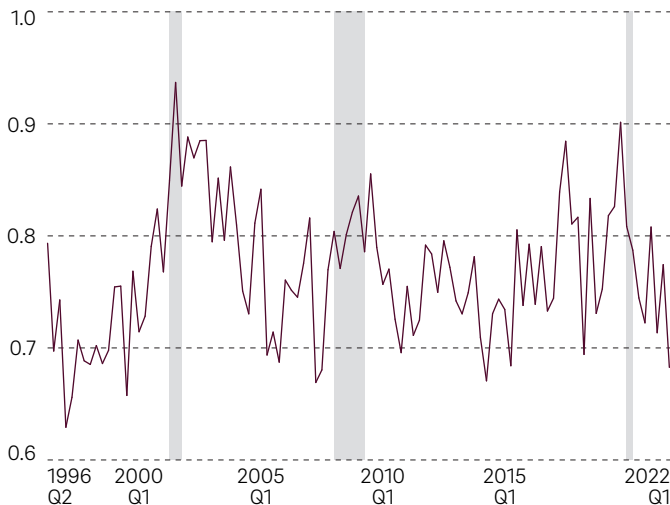
Source: Current Population Survey (CPS), U.S. Census Bureau and Bureau of Labor Statistics (BLS), author's calculation from the public-use microdata.

Notes: Based on weekly earnings of those who are unemployed in their fifth interview and employed in their fourth interview. Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).

demand condition. Indeed, a standard labor search model predicts that these two series are negatively correlated even though the level of an individual's earnings has no predictive power for their subsequent job finding in that model.[10] Nonetheless, one can think of several underlying reasons (absent from the standard model) why individuals who earned more take longer to find a new job. For example, those who make more are likely to be wealthier, giving them the economic cushion they need to spend more time searching for the best possible job. Or maybe these workers were compensated for specific skills; once a high-skilled job is lost, it is difficult to find a job that pays the same for those specific skills.

A statistical tool (regression analysis) allows me to isolate how an individual's preseparation relative earnings affect the individual's job-finding outcome after controlling for the overall macroeconomic conditions. The regression analysis reveals that when the earnings ratio increases by 1 standard deviation, the job-finding rate falls by almost 0.05. The average level of the earnings ratio over the full sample is 0.56, and 1 standard deviation is 0.32. The overall job-finding rate fluctuates around 0.25. Thus, the 0.05 decline implies that the chance of finding a new job declines by about 20 percent (that is, 0.05/0.25).[11]

The regression result indicates that there could be a causal relationship between higher earnings and a lower chance of finding a job. This relationship fits the narrative that those who were paid relatively well before losing their job struggle to find a new job. The regression result does not speak to whether or not these workers end up in a lower-paid job. However, if

they were previously on a higher rung of the ladder, it is more likely that they end up on a lower rung of the ladder. In contrast, if a worker was already being paid minimum wage, their wage, in principle, cannot go any lower. This last point is relevant to an evaluation of the labor market recovery during the COVID-19 pandemic.

The COVID-19 Recession

How did the labor market respond to the pandemic? As we saw above, the pandemic led to a dramatic spike in the job-loss rate, resulting in an equally dramatic increase in the unemployment rate. The job-finding rate, however, was relatively stable, especially early in the pandemic. This pattern is quite different from previous recessions. This peculiarity may not be surprising, given that the huge spike in the job-loss rate was due to the pandemic and the associated government-ordered business closures. Many of these job losses were thus temporary, and in fact a large share of the suspended jobs was subsequently reactivated, and workers were accordingly recalled to their jobs. In fact, a recent paper estimates that the share of recalls in the second quarter of 2020 increased to about 75 percent.[12] Typically, a higher job-loss rate during a downturn implies intensified pressure of labor reallocation, as discussed above. However, at least in the early stage of the pandemic, a higher job-loss rate was not a result of intensified reallocation forces but instead of a temporary suspension of business activities.

And yet, even apart from the first phase of the pandemic, the labor market dynamics differ from previous recessions. Even though the initial wave of recalls was presumably completed by the fall of 2020, the pace of the decline in the unemployment rate thereafter was measurably faster than after previous recessions. The job-finding rate stayed high in the initial phase of the pandemic on net, mainly because a large number of recalls are counted as "job finding." In 2021, this rate declined several percentage points, but it has quickly recovered since then. During the Great Recession (2007-2009), in contrast, the job-finding rate fell by about 12 percentage points from the prerecession peak to its bottom. As noted earlier, the persistently low job-finding rate typically observed in a downturn exemplifies the difficult and painful nature of labor reallocation, but during the COVID pandemic, the pace of reallocation, as measured by the job-finding rate, did not slow down as much as during previous downturns.

One reason for the milder decline in the job-finding rate–and perhaps for the quicker recovery–is that COVID's impact on the labor market was heavily concentrated in nonroutine manual occupations and in a few sectors, such as leisure and hospitality.

To see the implications of this fact, recall that previous recessions were characterized by the accelerated restructuring of routine occupations, and this restructuring process is time-consuming and painful for affected workers, particularly because it often involves falling off the career ladder, resulting in a decline in earnings. But the COVID-19 recession was different. The most severely impacted occupations were nonroutine manual. Nonroutine manual jobs tend to be low wage (in fact, the lowest paid, on average, among the four broad occupation groups).

Even though this made the pandemic even more difficult than it already was, potentially exacerbating income inequality, low-wage workers tended to find jobs more quickly. This is partly because there are fewer skill requirements for those jobs, but also because the pandemic forced the economy to adapt to a new environment, creating new job opportunities. For example, employment at nonstore retailers (such as direct marketers and vending-machine operators) grew strongly after a brief decline early in the pandemic, and some subcategories of the transportation and warehousing industry followed a similar path. These expanding sectors of the economy do not necessarily require more advanced skills, so there was less of a skill mismatch between the unemployed and the available jobs, which was a serious problem in the post-Great Recession period.[13]

As of the end of 2021, the employment levels and the labor force participation rate were still below their prepandemic levels. However, assessing the strength of the labor market under COVID based on these variables is difficult, because there were several factors holding back labor supply, including a fear of contracting COVID-19, expanded unemployment insurance (UI) coverage, and an accelerated flow of retirements.[14] The movement of the unemployment rate is not necessarily immune to the impact of these labor supply constraints, either. But the measurement of the job-finding rate is unlikely to be biased up due to the labor supply factors.

The discussion so far has focused on labor reallocations through a jobless spell, but reallocations can occur without a jobless spell, namely through employer-to-employer (E2E) transitions. In a recent paper, my coauthors and I developed a new measure of the E2E transition rate.[15] This measure, which is also based on the Current Population Survey (CPS),[16] generally moves procyclically. For example, in the post-Great Recession period, it fell about 20 percent, which suggests a significant slowdown of worker reallocations through E2E transitions. But the E2E transition rate declined only briefly early in the pandemic and bounced back in the fall of 2020. The E2E level as of mid-2021 was roughly the same as its prepandemic level (Figure 9).

Note that when a worker moves from one employer to another, the move in itself does not change the overall employment level, whereas the hiring of a jobless worker moves a worker from unemployment to employment, thus contributing to the overall employment level. However, when an E2E transition occurs, the worker tends to earn more and be more productive at a new employer. The transition could also create a new job opening (at the employer that the worker left), which can create a new job opportunity for someone who is currently jobless.

Of course, not all E2E transitions result in productivity increases and wage gains. In particular, a worker, knowing that they will soon be laid off, may decide to move to a new employer, even though the move may not necessarily result in higher earnings or a career progression. This transition is unlikely to create an open position for someone else to fill. Still, even this E2E transition means that the worker avoids joblessness, ensuring that this worker does not contribute to a higher unemployment rate. In any case, the fact that the E2E transition rate remained

FIGURE 9

Unlike During Previous Recessions, the E2E Transition Rate Bounced Back During COVID

This likely contributed to the labor market's resiliency during the pandemic recession.

Employer-to-employer transition rate, quarterly averages of monthly rates, 1995–2022
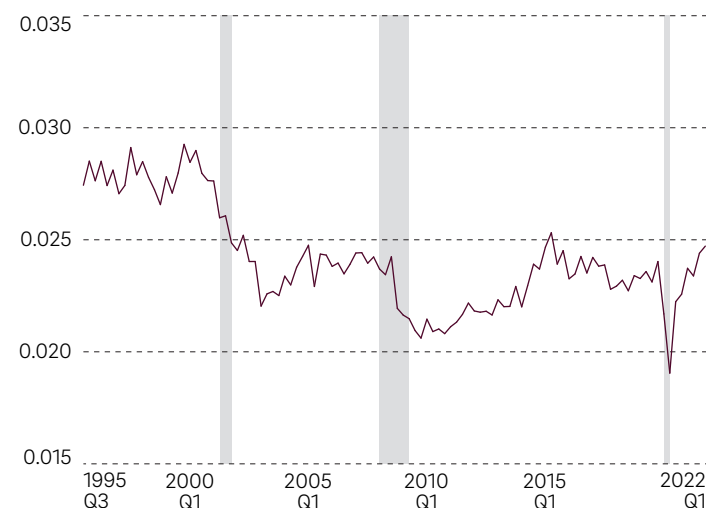
Source: Current Population Survey (CPS), U.S. Census Bureau and Bureau of Labor Statistics (BLS), author's calculation from the public-use microdata.
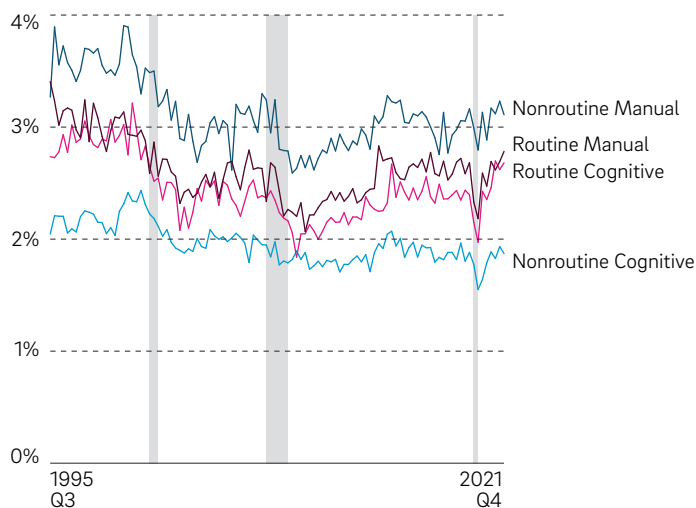
Notes: See Fujita et al. (2021) for data construction details. Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).

FIGURE 10

The E2E Transition Rate Recovered Quickly for All Occupation Groups During COVID

Nonroutine manual occupations have the highest E2E rate. It has not been affected much by the pandemic.

Employer-to-employer transition rate by occupation group, 1995–2021

Source: Current Population Survey (CPS), U.S. Census Bureau and Bureau of Labor Statistics (BLS), author's calculation from the public-use microdata.

Notes: See Fujita et al. (2021) for data construction details. Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).

firm indicates that the labor market remained resilient during the COVID-19 downturn.

For each of the four broad occupation groups, the E2E transition rate remained firm throughout the pandemic, although it initially fell for all groups (Figure 10). In addition, there are two important patterns to these rates. First, nonroutine manual occupations, which on average pay the lowest wages, almost always have the highest E2E transition rate, while nonroutine cognitive occupations, which on average pay the highest wages, have the lowest E2E transition rate. The other two (routine) categories have similar E2E rates; their earnings levels are not far apart either, as shown earlier. These relationships are consistent with the relationship between the job-finding rate from unemployment and the earnings levels–that is, it is harder to move to a new job when you're looking for a job with more specific skill requirements. Second, the E2E transition rate of workers in nonroutine manual occupations, many of which are contact-intensive, appears to have been least affected by the pandemic. This is notable because that group was most severely affected by the pandemic. The strength of E2E transitions from these occupations implies that at least some of these workers were able to avoid job losses, albeit most likely by moving to other low-wage jobs.[17]

Summary and Implications

The U.S. labor market has recovered from past downturns at a consistent but gradual pace. This gradual recovery of the labor market is a manifestation of the slow pace at which jobless workers are reallocated to different jobs. Moreover, the reallocation process tends to be exacerbated by the long-term declining trend in middle-class jobs.

The COVID-19 recession is different in that nonroutine manual service jobs, which have become more prevalent over the past few decades, were the ones most severely affected, while the manufacturing sector, which employs a large number of routine manual jobs, performed relatively well. The fact that low-wage jobs were more adversely affected made the COVID-19 recession even more painful, potentially exacerbating income inequality. But the same fact suggests that there will be a quicker recovery of the labor market, especially when new job opportunities for unskilled workers arise in other parts of the economy. Consistent with this prediction is the behavior of both the E2E transition rate and the job-finding rate from the unemployment pool during the pandemic.

However, the labor market is likely to be permanently different even after the current public health crisis is over. Although new job opportunities are popping up in various economic sectors, overall labor demand for low-wage jobs may turn out to be insufficient, and thus some workers may find it difficult to find even a low-wage job. For example, "telepresence" could significantly reduce demand for personal and business services.[18] The new trend could further encourage investment in labor-saving technology, reducing overall labor demand even in low-wage service industries. Thus, policymakers still need to pursue economic policies that support workers' skill development and education. ◨

Notes

1 See Hall and Kudlyak (2021) for the consistent pace of the labor market recoveries from the previous recessions.

2 This amounts to an annualized pace of 6.5 percentage points.

3 The U.S. Bureau of Labor Statistics reported in the early months of the pandemic that some workers were misclassified as employed instead of unemployed, underestimating the true unemployment rate. This measurement problem gradually faded over the following several months. Thus, using the "true" measure only accelerates the pace of the recovery.

4 See, for example, Fujita and Ramey (2009) and Shimer (2012).

5 See Autor et al. (2006) and Autor (2010) for general discussions on job polarization.

6 When we rescale the earnings levels plotted in Figure 5 by normalizing them at 100 as of 1995, we see that the earnings growth of routine manual workers lagged behind. In contrast, average earnings among nonroutine manual workers have increased much more, even more than nonroutine cognitive occupations, at least over the last 25 years.

7 See, for example, Jacobson et al. (1993) and Davis and Von Wachter (2011).

8 The series is calculated from the Current Population Survey (CPS). The survey structure does not allow me to observe earnings immediately prior to the job loss. The series is instead based on the earnings of those who are reported to be unemployed in their fifth month of the survey and employed nine months prior to the fifth survey.

9 This empirical pattern has been known since Mueller (2017).

10 See Mortensen and Pissarides (1994).

11 A 1 standard deviation increase means that the earnings ratio increases from the 50th percentile to the 84th percentile in the distribution of the relative earnings ratios.

12 See Ganong et al. (2021). In Fujita and Moscarini (2017), we show that recalls are actually common: On average, more than 40 percent of

hires from unemployment can be recalls. But the share of recalls during the pandemic was particularly high.

13 For example, Kocherlakota (2010) emphasizes the role of mismatch—in terms of geography, skills, and demographics—in keeping the unemployment rate from falling.

14 Ganong et al. (2020) report that between April and July 2020, 76 percent of workers who were eligible for the regular Unemployment Compensation program were entitled to receive benefits that exceeded lost wages. This calculation includes the Federal Pandemic Unemployment Compensation (FPUC) supplement, which amounted to $600 per week. The supplement was then reduced to $300 per week until it expired in September 2021. Even after the amount was reduced, it is likely that the share remained substantial.

15 See Fujita et al. (2021).

16 Fallick and Fleischman (2004) originally developed a measure of E2E transitions based on a survey question in the CPS that asks whether or not a worker moved to a new employer. In our paper, however, we show that their measure is biased downward due to missing answers to the survey question. We propose a methodology that corrects the bias. The series is updated monthly and available at https://sites.google.com/view/shigeru-fujita/data.

17 Another interesting development unique to the COVID downturn, as reported by Haltiwanger (2021), is that there was a large increase in new business applications. This increase sharply contrasts with the pattern in the Great Recession, when new business applications declined sharply and persistently. In line with this observation is the increase in the share of self-employment in 2020–2021.

18 Autor and Reynolds (2020) discuss various possibilities in this regard.

References

Autor, David. "The Polarization of Job Opportunities in the U.S. Labor Market," The Center for American Progress and The Hamilton Project (2010).

Autor, David, and Elisabeth Reynolds. "The Nature of Work After the COVID Crisis: Too Few Low-Wage Jobs," *The Hamilton Project Essay 2020-14* (2020).

Autor, David, Lawrence Katz, and Melissa Kearney. "The Polarization of the U.S. Labor Market," *American Economic Review Papers and Proceedings*, 96:2 (2006), pp. 189–194.

Davis, Steven, and Till von Wachter. "Recessions and the Costs of Job Loss," *Brookings Papers on Economic Activity* (fall 2011), pp. 1–72.

Fallick, Bruce, and Charles Fleischman. "Employer-to-Employer Flows in the U.S. Labor Market: The Complete Picture of Gross Worker Flows," Federal Reserve Board Finance and Economics Discussion Series 2004-34 (2004).

Fujita, Shigeru, and Garey Ramey. "The Cyclicality of Separation and Job Finding Rates," *International Economic Review*, 50:2 (2009), pp. 415–430, https://doi.org/10.1111/j.1468-2354.2009.00535.x.

Fujita, Shigeru, and Giuseppe Moscarini. "Recall and Unemployment," *American Economic Review*, 107:12 (2017), pp. 3875–3916, https://doi.org/10.1257/aer.20131496.

Fujita, Shigeru, Giuseppe Moscarini, and Fabien Postel-Vinay. "Measuring Employer-to-Employer Reallocation," Federal Reserve Bank of Philadelphia Working Paper 21-22 (2021), https://doi.org/10.21799/frbp.wp.2021.22.

Ganong, Peter, Fiona Greig, Max Liebeskind, et al. "Spending and Job Search Impacts of Expanded Unemployment Benefits: Evidence from Administrative Micro Data," Becker Friedman Institute Working Paper 2021-19 (2021).

Ganong, Peter, Pascal Noel, and Joseph Vavra. "U.S. Unemployment Insurance Replacement Rates During the Pandemic," *Journal of Public Economics*, 191 (2020), p. 1–12, https://doi.org/10.1016/j.jpubeco.2020.104273.

Hall, Robert, and Marianna Kudlyak. "Why Has the U.S. Economy Recovered So Consistently from Every Recession in the Past 70 Years?" in Martin S. Eichenbaum and Erik Hurst, eds., *NBER Macroeconomics Annual 2021*, University of Chicago Press, 2021, pp. 1–55.

Haltiwanger, John. "Entrepreneurship During the COVID-19 Pandemic: Evidence from the Business Formation Statistics," National Bureau of Economic Research Working Paper 28912 (2021), https://doi.org/10.3386/w28912.

Jacobson, Louis, Robert LaLonde, and Daniel Sullivan. "Earnings Losses of Displaced Workers," *American Economic Review*, 83:4 (1993), pp. 685–709.

Kocherlakota, Narayana. "Back Inside the FOMC," speech given in Missoula, Minnesota, September 8, 2010.

Mortensen, Dale, and Christopher Pissarides. "Job Creation and Job Destruction in the Theory of Unemployment," *Review of Economic Studies*, 61:3 (1994), pp. 397–415, https://doi.org/10.2307/2297896.

Mueller, Andreas. "Separations, Sorting, and Cyclical Unemployment," *American Economic Review*, 107:7 (2017), pp. 2081–2107, https://doi.org/10.1257/aer.20121186.

Shimer, Robert. "Reassessing the Ins and Outs of Unemployment," *Review of Economic Dynamics*, 15:2 (2012), pp. 127–148, https://doi.org/10.1016/j.red.2012.02.001.