Earnings Losses of Job Losers During the 2001 Economic Downturn*

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Job losses may involve not only lost earnings during unemployment but also declines in earnings at subsequent jobs. After a time-consuming job search, workers may need to restart their careers from scratch, accepting a lower wage. Workers may also need time to acquire new skills, and total earnings lost during such a period of re-adjustment can be considerable. But experiences may vary widely. In this article, using a novel data set, Shigeru Fujita and Vilas Rao provide evidence on earnings losses after unemployment. Although the usefulness of the evidence is limited by the short sample period, the data set allows us to ask some important questions, the answers to which may help inform us about important macroeconomic issues such as the cost of business-cycle fluctuations and the benefits of policies intended to avoid such fluctuations.

During economic downturns, more workers become unemployed and finding a new job becomes harder. Consequently, unemployment rises. Higher unemployment also means that there is a more intensive reallocation of workers from one job to another during downturns.[1]

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The main reason policymakers and economists are concerned about job losses is that job losses may involve not only lost earnings during the period of unemployment but also declines in earnings at subsequent jobs. It is conceivable that the experiences of job losers are painful and costly. After a time-consuming job search, the worker may need to restart his or her career from scratch in a new job, accepting a lower wage. Furthermore, working in a new environment might involve acquiring new skills, establishing a new personal network of business associates, and so on, all of which may take a significant amount of time to accomplish. This re-adjustment period can be quite long, and thus total earnings lost can be considerable.

This painful story would be relevant for at least some workers. But experiences may vary widely across individuals. In contrast to the example above, it is possible to imagine a situation in which workers make the same amount of money (or more) after a short unemployment spell or one where workers make less at the new job initially, but the losses are recovered quickly as a result of subsequent earnings growth. In these cases, earnings losses associated with the job loss are minor relative to one's lifetime earnings, and unemployment may not be as costly and painful as the previous example suggests.[2]

*The views expressed here are those of the authors and do not necessarily represent the views of the Federal Reserve Bank of Philadelphia or the Federal Reserve System.

[1] See the 2007 *Business Review* article by Shigeru Fujita.

[2] The process of destroying less productive jobs and replacing them with more productive jobs is important for long-run economic growth and provides the opportunity for workers to find higher paying jobs. See the 2008 *Business Review* article by Shigeru Fujita.

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This article provides evidence on earnings losses after unemployment, using a novel data set that traces the labor market experiences of a large number of workers over a three-year period that encompasses the recession in 2001. Although the usefulness of the evidence is limited by the short sample period, the data set allows us to ask important questions such as: What is the average individual loss (or gain) due to unemployment? Who loses the most? What are the sources of earnings losses? While not definitive, the answers to these questions may, in turn, help inform us about important macroeconomic issues such as the cost of business-cycle fluctuations and the benefits of policies intended to avoid such fluctuations.

A PANEL DATA SET ON EARNINGS LOSSES (OR GAINS) FOLLOWING UNEMPLOYMENT

To obtain information on earnings losses due to unemployment, it is necessary to trace the earnings history of a large number of workers over some length of time. Furthermore, since workers may lose and find new jobs within a relatively short period of time (say, within months), this history needs to be collected frequently, say, monthly.

Fortunately, the Census Bureau maintains a data set called the Survey of Income and Program Participation (SIPP) that satisfies these requirements. The SIPP 2001 panel keeps track of labor market experiences of a nationally representative sample of 73,205 workers over the roughly three-year period from October 2000 through December 2003.

With this data set in hand, we can look at workers' experiences during the U.S. economic downturn of 2001. We select the events in which a worker moves from one job to a new job with an unemployment spell in between. The data set includes 1,380 such cases. (For details of the sample selection, see *The SIPP and Other Data Sets Used in Previous Studies*.)

MONTHLY EARNINGS DROP IMMEDIATELY AFTER UNEMPLOYMENT

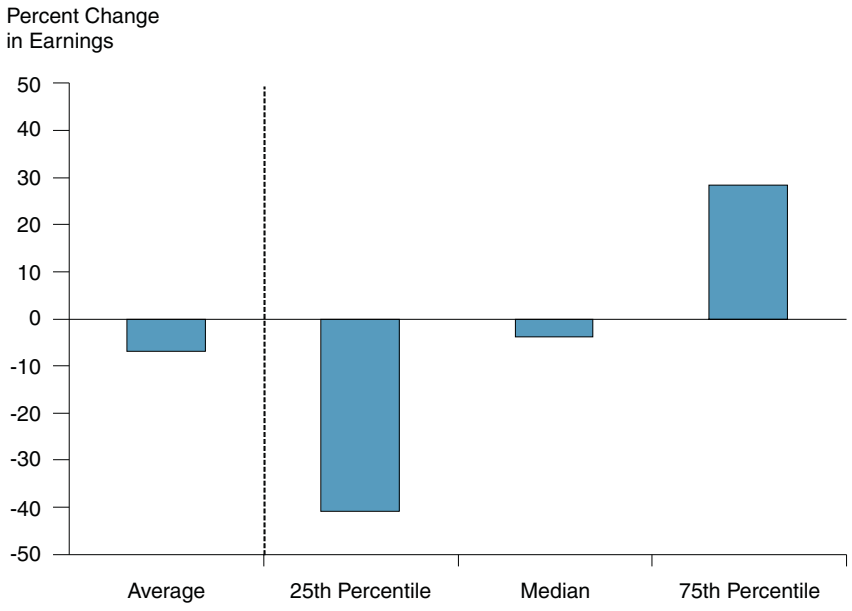
Figure 1 presents the distribution of earnings losses after unemployment in the early 2000s. It shows that, on average, a worker's monthly earnings immediately after unemployment drop roughly 7 percent compared with the monthly earnings immediately before unemployment.[3] The three bars next to the average correspond respectively to 25th percentile, median, and 75th percentile of the sample of employees in our sample.

We can make a couple of important observations here. First, there is a huge variation across individual workers in terms of changes in earnings after unemployment. Related to this are a large number of workers whose incomes actually increase after unemployment. The earnings gains can occur for two reasons. First, the outcome of a job search is affected by luck. That is, some workers are simply lucky to find an employer that is a "good match." Second, some workers become

[3] All calculations using the SIPP are based on the comparison of average monthly earnings over the three-month periods before and after the unemployment spell. Earnings include only salary from the main job and do not include benefits.

FIGURE 1

Changes in Earnings After an Unemployment Spell



Notes: Based on 2001 SIPP panel. Sample is restricted to workers who have been employed for three months continuously before and after an unemployment spell and switch firms after unemployment. A total of 1,380 unemployment experiences are included. This chart gives the distribution of earnings losses across unemployment experiences in our sample.

The SIPP and Other Data Sets Used in Previous Studies

The Survey of Income and Program Participation (SIPP) is a monthly survey conducted by the U.S. Census Bureau that follows the participation of individuals and households in income maintenance programs. Using a nationally representative sample of individuals 15 years of age and older from the civilian noninstitutionalized population, the SIPP gathers a variety of information: demographic characteristics, labor force participation, amounts and types of earned and unearned income, government program benefits, assets, and health insurance.

As a panel survey, the SIPP tracks the same individuals over a period of time. For this study, we used the 2001 SIPP panel, which tracked the labor market experiences of a nationally representative sample of 73,205 workers over the roughly three-year period from October 2000 through December 2003. Sample members who move to a new address are interviewed at their new address. This characteristic of the SIPP makes it a useful vehicle for exploring unemployment's impact on earnings, since we are able to comprehensively track an individual's earnings and employment status for an extended period of time.

We use each individual's labor force status after the second week of each month as his or her labor status for that month. Unemployment is defined as either not having a job but looking for work or having a job and on layoff or absent from work. Individuals who do not have a job and are not looking are considered not in the labor force. Individuals with a job who are not on layoff are considered employed. The same definitions are used in the BLS's Current Population Survey, which is the official source of the national unemployment rate, the employment population ratio, etc.

For this study, we restrict the sample in a few significant ways. First, only individuals 25 and older are included in our analysis. We look only at the primary job of individuals with multiple jobs, and we exclude workers who returned to the same job after unemployment.* Finally, we require that a worker be employed for at least three months on either end of his or her unemployment spell. Our analysis is based on 1,380 events that satisfy all requirements.

A handful of papers study earnings losses using different data sets covering different time periods, but our data set has many unique features that are absent from other data sets used in other studies. Previous studies have used the Displaced Worker Survey (DWS), a supplement to the Current Population Survey that has been administered every two years since 1984. The DWS collects relevant information on the experience of job losers, such as changes in earnings. However, it asks only about a single job loss in the past three years due to business decisions such as a plant closing or the abolition of a job position. While the information gathered is quite useful, it may not represent the experience of the average unemployed worker.

Other studies have used the data set called Panel Study of Income Dynamics (PSID). This data set also provides useful pieces of information on the experience of job losers. However, the interview is conducted only once a year, and thus it possibly misses many job-loss experiences that occurred between the two interview dates. One advantage of the PSID over the SIPP is that the PSID traces workers over a much longer time than the SIPP. This feature allows researchers to examine the long-run effects of job loss. See the discussion in the text on page 7, under the heading Long-Lasting Effects of Job Loss.

* In fact, quite a few workers return to the same employer after unemployment. In our 2001 SIPP sample, 46 percent of workers returned to the same employer.

unemployed because they chose to quit their previous job in order to look for a better one. This result implies that the overly pessimistic view about "unemployment" may not necessarily be an accurate description of the reality.

At the same time, despite the fact that some workers experience earnings gains after unemployment, it is true that unemployment is, *on average*, accompanied by a drop in earnings. Furthermore, Figure 1 shows that the average change is below the median change (2 percent drop), implying that

the distribution of the earnings losses is skewed to the left. That is, some of the losses experienced are very large. For example, 25 percent of the workers have earnings losses of more than 40 percent.[4]

The average drop in earnings here appears smaller than that reported in previous studies. For instance, an article by Henry Farber reports that the average earnings losses that occurred between 2001 and 2003 were more than 13 percent. A plausible reason behind this difference is that Farber uses the Displaced Worker Survey (DWS), which focuses on a certain type of job separation, namely, displacement. (See *The SIPP and Other Data Sets Used in Previous Studies* for further explanation of the DWS.) In the DWS, "displacement" is defined as job separations associated with business decisions such as a plant closing or the abolition of a job position. The sample in our study, on the other hand, is selected based on whether workers experience unemployment regardless of underlying reasons and thus is broader than the DWS. The displacement events in the DWS are likely to correspond to the ones on the left-hand side of the distribution, i.e., ones with large earnings losses.

There are a few caveats to remember in our calculation. First, our calculations ignore the forgone earnings of job losers. That is, the job loser might have enjoyed growth in earnings had he not lost his job. But this part of the losses is likely to be small in our sample because we compare earnings between two dates that are relatively close, and thus potential growth during that short period of time would be relatively small.[5] Second, the SIPP 2001 data set keeps track of individual workers for only about three years, and thus, it is difficult to assess whether the initial losses are recovered later and, if they are, how long it takes. The past literature suggests that the loss is persistent. We will come back to this issue later. Finally, we know that the size of earnings losses varies across the business cycle. Farber's article presents the average earnings losses for different time periods and shows that they increase significantly during recessions and decrease significantly during booms and that the deeper recessions tend to result in larger earnings losses. The latter fact implies that earnings losses in the current downturn may be significantly larger than those for the mild recession in 2001.[6]

With these caveats in mind, we will explore sources of earnings losses using the SIPP 2001 panel. Looking at how worker characteristics are correlated with their earnings losses is useful for this purpose.

NO CLEAR RELATIONSHIP WITH EDUCATION OR RACE

Are there any differences in earnings losses across different educational or racial groups? While we know that earnings levels are strongly correlated with these worker characteristics, there is a priori no reason to believe that the size of earnings losses is related to these worker characteristics because these characteristics do not change before and after the unemployment spell.

Figure 2 confirms this prediction: While there are some variations in the size of earnings losses across races and educational levels, it is not the case that workers with a lower level of earnings lost more in percentage terms.[7] In fact, the reality is quite the opposite. If we simply look at the relationship between the level of earnings at the pre-unemployment job and the size of earnings losses (in percentage terms), we find a strong positive correlation between the two.[8]

DURATION OF UNEMPLOYMENT WAS POSITIVELY RELATED TO EARNINGS LOSSES

One way to identify the sources of earnings loss is to look at the differences in worker characteristics before and after unemployment. First, let's see whether the length of unemployment has any relationship to earnings losses. If we assume that staying on the job plays an important role in the growth of earnings, say, reflecting the accumulation of human capital, we can expect that as unemployment duration becomes longer, human capital depreciates more and hence earnings losses become larger.[9]

[4] Of course, drops in earnings that many individual workers experience may again simply be due to luck. However, the facts that the average change in earnings is negative and that the distribution is skewed to the left imply that luck cannot be the only reason.

[5] In our data, almost 80 percent of workers found new jobs within six months.

[6] We also find the same pattern in the SIPP. The average earnings losses in the SIPP 1996 panel, which traces workers from the end of 1995 through late 2000, a period of economic expansion, are quite small (-1.7 percent), whereas the SIPP 1990 panel, which covers the three-year period encompassing the recession in the early 1990s, shows average earnings losses of -15.3 percent.

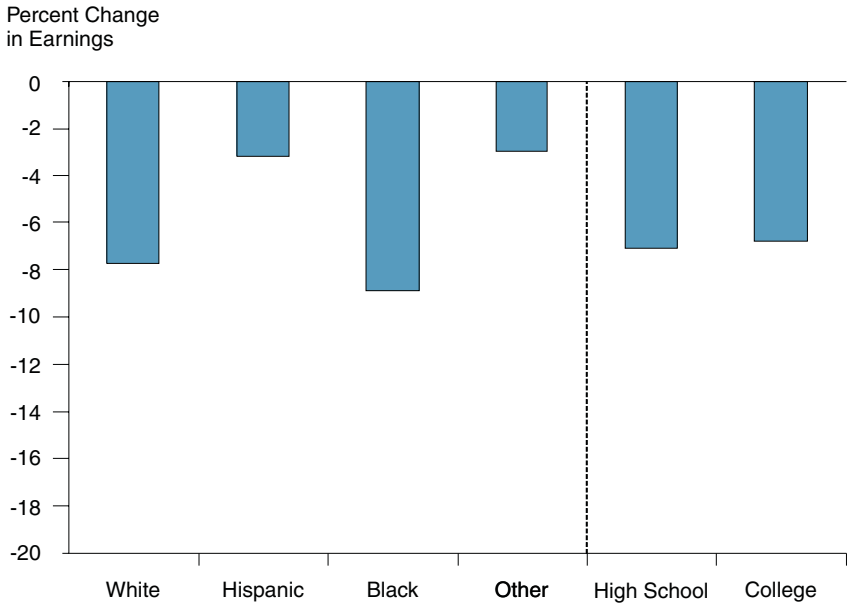
[7] In Figure 2, the losses of high school graduates and college graduates are roughly the same. Similarly, the average earnings losses of white workers are roughly the same as that of black workers, although white workers, on average, make considerably more than black workers.

[8] The correlation coefficient is 0.46.

[9] Of course, another possibility is that unemployed workers run down their wealth over time and thus are less selective about their jobs, and consequently, they accept jobs that pay less. But whether this story is important or not, it does not appear to change our overall conclusion below.

FIGURE 2

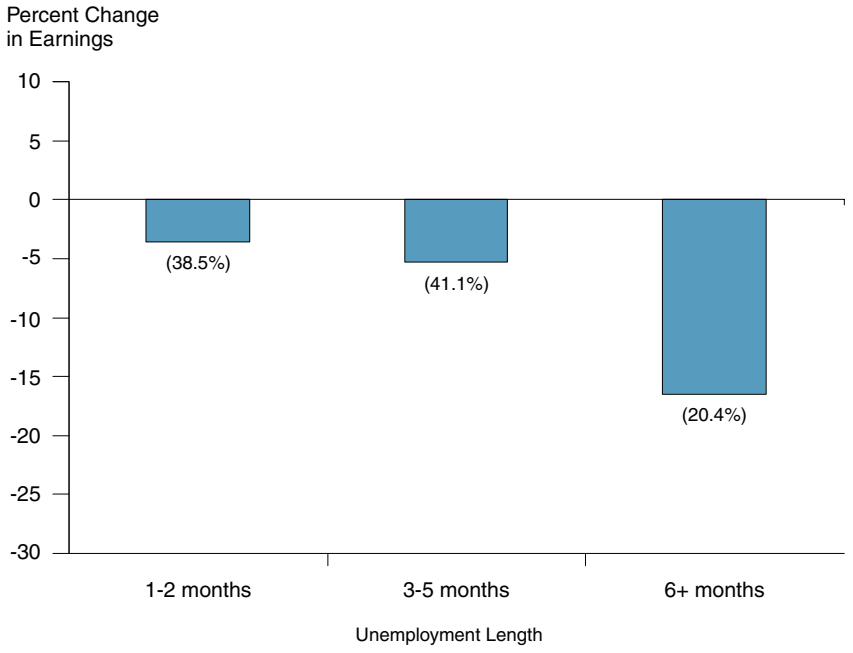
Changes in Earnings by Race and Education



Notes: Based on 2001 SIPP panel. Sample is restricted to workers who have been employed for three months continuously before and after an unemployment spell and switch firms after unemployment. A total of 1,380 unemployment experiences are included. "High School" includes those with education up to a high school diploma. "College" includes those with some college experience, a college degree, or postgraduate study.

FIGURE 3

Changes in Earnings by Unemployment Duration



Notes: Based on 2001 SIPP panel. Sample is restricted to workers who have been employed for three months continuously before and after an unemployment spell and switch firms after unemployment. A total of 1,380 unemployment experiences are included. The numbers in parentheses indicate fractions of workers in each duration category.

Figure 3 presents earnings losses for workers with the following unemployment durations: one to two months, three to five months, and six months or more. The numbers below each bar represent the fraction of workers for each duration of unemployment.[10] First, note that the distribution of workers over the duration of unemployment implies that the average worker found a job fairly quickly during the sample period. This is consistent with the evidence found elsewhere.[11] For those who found a job within two months, earnings losses tended to be smaller than the average loss of 7 percent reported above. However, earnings losses increased with duration of unemployment. In particular, when workers were unemployed for six months or more, the average loss was more than 15 percent. This finding is consistent with the notion that workers who are unemployed for a longer time experience a larger decline in their stock of human capital. But what kind of human capital has the worker lost? Is it human capital that is useful in any job? Or is it human capital that is useful only for a certain firm or certain occupation?

To answer these questions, note that if human capital is tied entirely to a particular firm, there is no reason to expect a positive relationship between earnings losses and unemployment duration, given that workers are not returning to the same firm, as is the case in our sample. Therefore, the

[10] Note that our data miss those workers who became unemployed in the sample period but could not find a new job. This censoring problem causes downward bias to our results. However, the bias is likely to be small given that, in our sample, 80 percent of these unemployed workers found a new job within five months, as shown in Figure 3.

[11] See the 2007 *Business Review* article by Shigeru Fujita.

evidence above does not appear to support the idea that firm-specific skills played a dominant role in earnings losses.

One way to assess the importance of occupation-specific human capital is to split the sample used in Figure 3 into those who stayed in the same occupation and those who switched occupations after unemployment.[12] The result, which is shown in Figure 4, is quite striking. The correlation between the duration of unemployment and earnings losses above was largely accounted for by those who switched occupations. For example, earnings losses for those who stayed in the same occupation were actually smaller than the average earnings losses of all job losers, and thus overall earnings losses of those who were unemployed more than six months were entirely accounted for by those who switched occupations. We will now investigate the robustness of this result further by slicing the data differently.

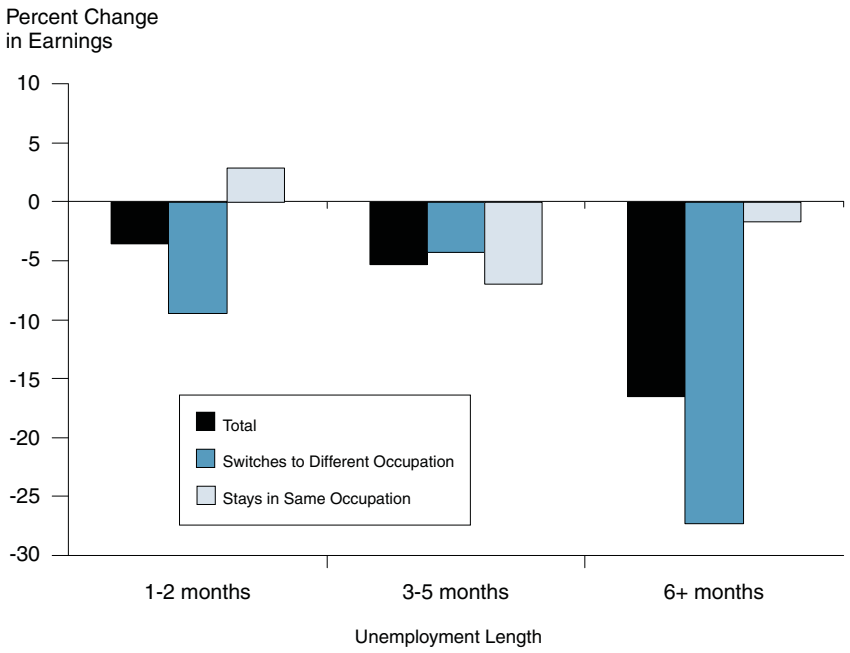
HIGH-TENURE WORKERS WHO SWITCHED OCCUPATIONS HAD LARGER EARNINGS LOSSES

If occupation-specific human capital is the dominant determinant of earnings, a larger drop in earnings is expected to follow when a worker is forced to switch occupations after a long career in a certain occupation. Unfortunately, we were unable to obtain information on occupation-specific tenure from the SIPP. However, the SIPP contains information on how many years workers have worked for a particular firm. To the extent that the firm-specific tenure is correlated with occupation-specific tenure, this information can be useful to further infer the importance of occupation-specific human capital.[13]

First, let's look at earnings losses for workers with different firm tenures (Figure 5). The figure shows that those who had longer tenure (five years or more) lost much more (19 percent) than those who had shorter tenure (2.5 percent). This evidence by itself appears to suggest the importance of firm-specific human capital in determining earnings. However, this correlation between firm tenures and the size of earnings losses disappears when we split the sample of high-tenure workers into those who stayed in the same occupation and those who switched occupations. The results are displayed in Figure 6. The large decline in earnings among high-tenure workers is accounted for by the even larger decline in earnings (more than

FIGURE 4

Changes in Earnings with Occupation Switch (By Unemployment Duration)



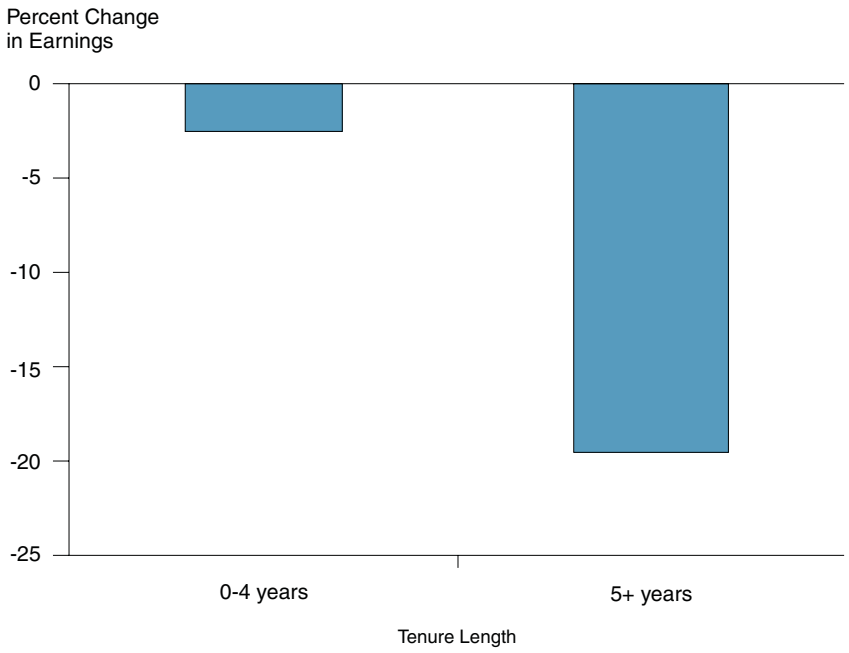
Notes: Based on 2001 SIPP panel. Sample is restricted to workers who have been employed for three months continuously before and after an unemployment spell and switch firms after unemployment. A total of 1,380 unemployment experiences are included. Jobs are divided into 14 occupation groups.

[12] Occupations are divided based on the two-digit census codes that include categories such as professional specialty, sales, administrative support, and so forth. We also considered the case with finer occupational codes (three-digit census codes) and the results are similar.

[13] The assumption regarding the correlation between firm-specific tenure and occupation-specific tenure seems plausible. For example, using monthly data from the Current Population Survey over the period 1994 to 2006, Giuseppe Moscarini and Kaj Thomsson show that of those who stay at the same firm from the previous month, only 1.3 percent, on average, experience a change in their occupation (see Table 9 of their article).

FIGURE 5

Changes in Earnings by Firm Tenure



Notes: Based on 2001 SIPP panel. Sample is restricted to workers who have been employed for three months continuously before and after an unemployment spell and switch firms after unemployment. A total of 1,380 unemployment experiences are included.

35 percent) among those who switched occupations. On the other hand, those who stayed in the same occupation experienced much smaller earnings losses, suggesting the relevance of occupation-specific human capital instead of firm-specific human capital.

The result here conforms to the conclusions in previous studies. Using DWS data on displaced workers in the 1980s, Derek Neal shows that earnings losses are strongly associated with industry tenure as opposed to firm tenure. While Neal emphasizes the role of industry-specific human capital, the subsequent research has shifted emphasis to the occupational specificity of human capital.[14] For example, Gueorgui Kambourov and Iourii Manovskii estimate regression models of earnings growth using the Panel Study of Income Dynamics (PSID) and find that once occupation tenure is included in the regression, neither firm tenure nor industry tenure remains significant, while occupation tenure is highly significant.[15]

[14] Daniel Parent obtained results similar to Neal's using the PSID.

[15] Note that Kambourov and Manovskii's approach is different from looking at earnings losses of job losers in that they directly estimate the return to experience in a certain occupation by considering workers who are employed throughout the sample period.

LONG-LASTING EFFECTS OF JOB LOSS

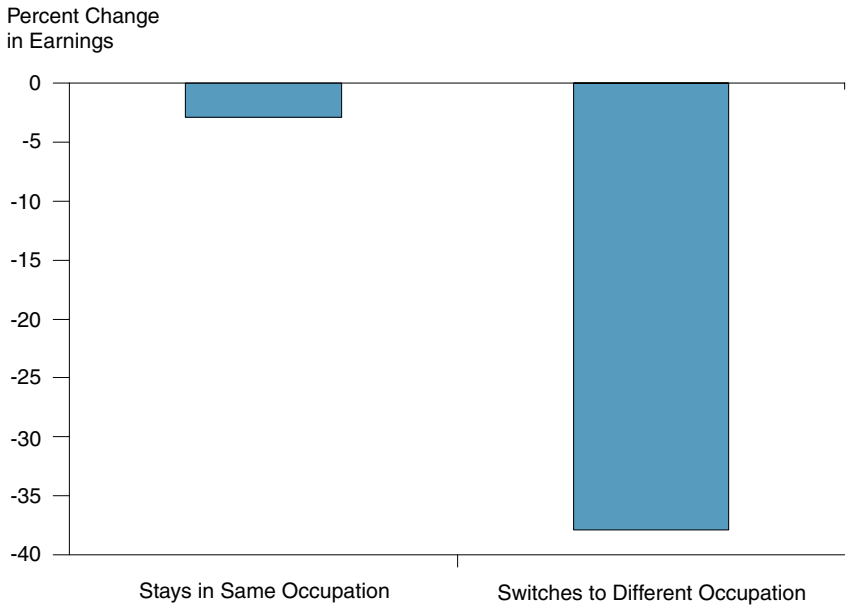
As we mentioned before, the SIPP 2001 panel covers only the three-year period 2001 through 2003, and thus, it is difficult to assess how persistent the effect of job loss is. The question is whether the lower earnings level immediately after unemployment recovers quickly and, if not, how long it takes to regain earnings. Christopher Ruhm considered this issue by using the PSID, which allows him to trace workers from 1969 through 1982. He found that even four years after displacement, job losers make 10 to 13 percent less than their nondisplaced counterparts.[16]

An important point to note here is that the persistence can take two forms. First, it may take a long time to regain earnings after an unemployment spell even if the worker keeps his or her new job for a long time. Second, the initial unemployment spell may raise the risk of subsequent job losses. The latter may happen because new workers are the ones who tend to get laid off when a firm runs into difficult times. A study by Ann Huff Stevens attempts to sort out the two effects. She traces workers' labor market experience from 1968 through 1988 using the PSID and shows that much of the persistence of earnings losses is actually explained by the latter

[16] Louis Jacobson, Robert LaLonde, and Daniel Sullivan, who use a unique comprehensive data set derived from administrative records of the state of Pennsylvania, have done influential research in this area. While their study has important limitations — for example, their results are based on high-tenure workers (with firm tenure of more than six years) in Pennsylvania who were displaced during the early and mid-1980s — their data set offers important advantages in the form of very large sample sizes and detailed information on workers' predisplacement employers. They also find that job losers in their sample experienced large initial earnings losses followed by very slow recovery of the earnings.

FIGURE 6

Changes in Earnings With and Without Occupation Switch for High-Tenure Workers



Notes: Based on 2001 SIPP panel. Sample is restricted to workers who have been employed for three months continuously before and after an unemployment spell and switch firms after unemployment. A total of 1,380 unemployment experiences are included. "High Tenure" is defined as five years with a firm or longer.

effect, i.e., an increased likelihood of multiple job losses. Specifically, her study shows that six or more years after job loss, earnings of job losers remain approximately 9 percent below those of their nondisplaced counterparts, but workers who avoid additional displacements have earnings losses of only 1 to 4 percent six or more years after job loss.

Note that the persistence found in the literature may not apply to all unemployed workers. In particular, the PSID is an annual survey and thus may possibly miss the majority of unemployment spells that occur within a year. As we noted above, one of the advantages of the SIPP is that it provides high-frequency data that include short-term unemployment. But the findings in the earlier studies do suggest that the earnings of at least some workers are affected even in the long run.

CONCLUSION

This article has summarized the experience of unemployed workers during and after the 2001 recession, focusing on changes in earnings following a period of unemployment. We found that most of the workers experienced earnings losses after unemployment. This is consistent with earlier findings in the literature, even though our data set focuses on a short period of time. Further, larger earnings losses were associated with loss of occupation-specific human capital, a finding that is also consistent with the results of earlier studies. While the SIPP does not allow us to assess the long-term effects of job loss, the literature suggests that job loss can have a significant long-term impact on workers' earnings and that the long-term impact takes the form of an increased likelihood of further job losses.

From an individual worker's point of view, the human capital "specificity" particularly linked to the worker's occupation represents the "human capital risk." For instance, in a rapidly changing economic environment, a seemingly secure job may not be secure five years from now. At that point, workers may be forced to find a job in a different occupation, in which case they may need to accept a much lower wage.

From a macroeconomic point of view, the presence of significant earnings losses and "specificity" of human capital implies that increased intensity of worker reallocation during economic downturns is not simply a reshuffling of workers between employers. For many workers, reallocation involves a costly and time-consuming re-building of human capital.

Despite the evidence presented in this article and elsewhere, the costly and time-consuming nature of worker reallocation is often ignored in the typical macroeconomic models often used in monetary or fiscal policy analysis. One of the few recent attempts includes the work by Tom Krebs. His study focuses on quantifying the cost of economic fluctuations when workers face the risk of earnings losses, such as those discussed in

this article, and finds that business-cycle fluctuations can be quite costly once earnings losses associated with job losses are incorporated into the analysis, which implies a potentially large benefit of macroeconomic stabilization policies.

Note, however, that there is an important caveat regarding the potential benefit of stabilization policies: Although stabilization policies may improve the welfare of the economy *in the short run* by avoiding the costly job reallocation process, they could potentially interfere with long-run economic growth. For example, another branch of the literature finds that labor market policies that impose costs on firing workers may potentially have a large negative impact on long-run growth because such restrictions allow firms to retain less profitable jobs.[17] It is important that this consideration also be an integral part of the discussion.

[17] See, for example, the article by Hugo Hopenhayn and Richard Rogerson.

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