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Lost Jobs

THE LOSS of a job can be a significant economic event. When an employer discharges a worker permanently, the worker may take many months to find a new job. The new job often pays lower wages, and the worker faces a much higher likelihood of discharge from a new job than from an established job. It may take several years for a worker to be back on the career path interrupted by the original discharge. However, many job losses are routine. They occur, for example, when a construction project is completed and the workers disperse to look for new projects.

This paper takes a broad look at the economics of job loss and the many sources of data that expose different aspects of the flows of workers out of jobs and back into them. One major goal is to describe the incidence and consequences of job loss. It also builds the analytical case that brief, sharp episodes of primary job loss are followed by long periods of slowly rebuilding employment relationships over the business cycle. Although the case is far from complete, I believe that these events in the labor market play an important part in the persistence of high unemployment and low output long after the initial shock that triggers a recession.

The paper begins with a discussion of the economic fundamentals of job loss. The analysis focuses on two polar cases. In the first, all job losses are efficient. A discharge occurs because the employer and worker, considered jointly, are better off if the worker finds another job. In other words, the employment relation terminates because the worker's marginal product in another job is enough higher than in the current job to pay for a period of job search. In the model of efficient

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employment relationships, the wage is the way that the two parties split the joint value from the relationship; it plays no role in terminating the job. In the second case, by contrast, the contractual wage does matter—termination is governed by calculations made by both parties involving a predetermined wage. The employer discharges the worker if the discharge raises the employer's own value; that is, if the worker's marginal product is below the contracted wage. A discharge that reduces joint value will occur if the contract wage exceeds the worker's marginal product at the firm but the best alternative job pays less than that marginal product. In the second case, institutions and practices have succeeded in suppressing the renegotiation of employment terms that seemingly ought to occur when an inefficient termination looms. A model of the labor market with suppressed renegotiation appears to be the best way to describe what macroeconomists have loosely called wage rigidity.

A labor market with suppressed renegotiation will have larger flows of workers out of jobs than does a market with ideal, efficient employment relationships. Although I strongly suspect that the high rates of job termination in the United States and similar economies are the result of suppression of renegotiation, it would be an overstatement to suggest that the evidence in this paper proves that hypothesis.

The empirical issues relating to job loss fall naturally into two categories: the incidence of job loss and its consequences. I look at a number of direct and indirect measures of the incidence, that is, the flow of terminated workers, and focus on an informal reconciliation of the extreme differences in termination rates in the various measures. Comprehensive data on flows including the briefest jobs reveal flows of permanent layoffs at quarterly rates of 17 percent. Data on gross reductions in employment by establishment show quarterly flows of almost 6 percent. On the other hand, retrospective data from the Census Bureau's survey of displaced workers on the incidence of job loss in the preceding three years show rates of about 0.6 percent per quarter. The discrepancies appear to come from a small number of workers and occupations with intrinsically high turnover (such as the construction example noted earlier), together with the different interpretations that respondents gave to the questions in the displaced workers survey relative to those in the establishment survey.

On the consequences of job loss, I draw on the extensive literature

on postdischarge unemployment and earnings histories. The data reveal large amounts of job search for job losers. Most of the consequences of job loss on workers' earnings in the first year come from lost work rather than reduced earnings. Although job losers are almost back to their normal annual weeks of work two or more years after a job loss, for four years or more their wage rates remain below the levels of their counterparts who have not suffered job loss.

There is a conspicuous trade-off between the definition of incidence and the measure of consequences. If a broad definition of job loss is used—for example, any worker who is counted as unemployed because of a permanent layoff—the average consequence of job loss will be relatively small because the flow of job losses includes so many cases of the normal termination of intrinsically short jobs. On the other hand, with a more stringent definition of job loss, such as the type of loss reported in the Panel Study of Income Dynamics (PSID), the consequence of each loss is much larger. To put it differently, it appears that the stringent displaced workers concept used by the Census Bureau captures most of the total earnings loss even though it captures only a small fraction of the incidence of loss. The omitted job losses are the ones with smaller consequences.

I am careful to refer to the consequences of job loss, not the costs. Identifying avoidable job losses is challenging. This paper provides the tools for measuring the costs of the extra job losses that go with an avoidable recession, if there is such a thing. The costs of suppressed renegotiation, that is, the extra unemployment and earnings loss associated with inefficient job loss, might also be measured. But there is a presumption that the suppression of renegotiation has offsetting benefits in employment relationships.

The paper next turns to the aggregate implications of the microeconomic findings about the experiences of job losers. I make inferences about the aggregate importance of job search within a model where labor demand is stable and highly wage-elastic. The initial shock that causes a burst of primary job loss may involve a transitory shift in demand, but I hypothesize that demand returns to normal soon after. In this setting, the downstream pattern of job search will explain the dynamics of employment following a shock. Traditional macroeconomics has made the opposite assumption—that labor demand remains below normal for several years after an adverse shock and, in effect, is not wage-elastic. In

that case, findings about the dynamics of labor supply would be irrelevant to the dynamics of employment. Slumps would be periods of job scarcity, and employment would track demand.

I make the working assumption that bursts of primary job losses—the initial loss of longer-term jobs—can be measured by gross employment reductions. I document the timing of the downstream effects of primary job losses in the labor market by showing the distributed lag relationship between primary losses and the onset of unemployment spells. New spells of unemployment are at abnormal levels as much as two years after the burst of primary losses. Losses of explicitly temporary jobs and the failure of new job matches appear to be major factors in the downstream effects.

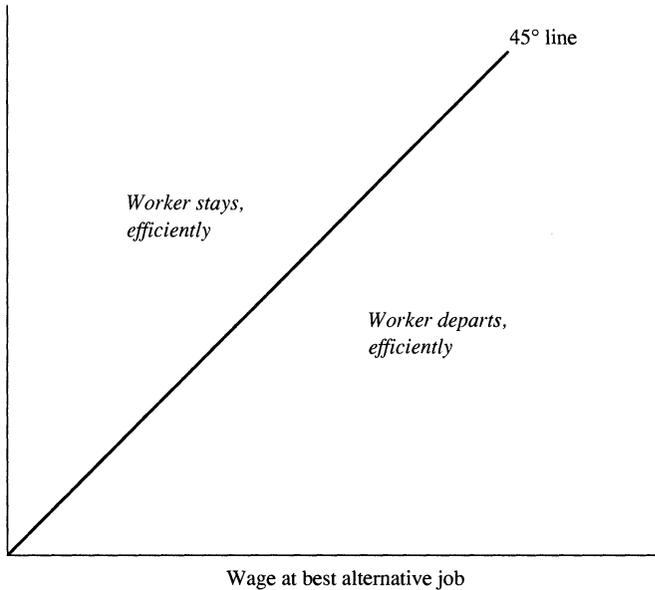
Simple Markoff-style models of labor market transitions fail to capture the lingering effects of a burst of primary job losses. Average job-finding rates are so high that a simple Markoff model returns to its stochastic equilibrium much too quickly to help explain the persistence of high unemployment following a recession. I explore how much of the persistence can be explained in a more elaborate model that is faithful to most of what is known about the duration of employment.

The data appear to support a general picture of the role of the employment relationship in aggregate fluctuations. During cyclical contractions there is a sharp burst of primary job losses. Data on gross employment reductions show that plant closings and other sources of primary job loss reach sharp peaks in recessions. The after-effects of the job losses are seen in the labor market and the economy as a whole for several years. Much time is spent reassembling productive, long-term uses for the talents of the workers who lost their jobs in the initial burst.

I conclude by constructing a time series for the value associated with significant job loss on the conceptual basis of the PSID, using the flow data from the gross employment reductions. It remains an unresolved question whether stabilization policies could avoid the costs of job losses that are concentrated in recessions. Some of the plants or units shut down might remain open permanently absent a recession, but others might need to be closed at another time, anyway. Some of the worker-job matches might be preserved with different employment arrangements, but others might be terminated under almost any reasonable arrangement.

Figure 1. Efficient Retention and Separation

Marginal product at firm



Theory of Termination

The basics of the theory of job termination are well developed in labor economics.¹ A core question is the *efficiency* of terminations—efficiency, as usual, means the maximization of joint value. Figure 1 displays the analysis of efficient terminations. The horizontal axis shows earnings available from the next-best job in the open market, net of search costs. The vertical axis shows the worker's marginal product with the current employer. Separation should occur below the 45° line. Whether the separation is initiated by the worker as a quit or by the employer as a layoff depends on the details of the employment arrangement.²

1. See, for example, Hashimoto and Yu (1980), Hall and Lazear (1984), and McLaughlin (1991).

2. See McLaughlin (1991).

Efficient separations would be likely if the variables in figure 1 were observed by the employer and the worker. For example, if the worker can locate the best possible outside wage offer costlessly, and the employer can verify the offer, then the employer will match the offer and retain the worker if the offer is below the worker's marginal product, and let the worker accept the offer otherwise. This arrangement does not require the marginal product to be observable.³

When neither party can verify the other's data, efficiency is more of a challenge. Any provision in the employment contract granting the employer the right to lower compensation after a worker has accepted employment and made job-specific investments will invite opportunistic wage cuts. Even when demand has truly fallen and renegotiation of the terms of employment is appropriate to retain the worker efficiently, the worker will not be able to verify that the employer is not trying to deprive the worker of job-specific rents. Suppression of renegotiation may be an important feature of employment arrangements.

Choice of Form of Employment Governance in a Free Market

Absent legal prohibitions of certain types of employment governance, the employment relationship would be expected to evolve to maximize the joint value achieved by employers and workers. In principle, this proposition should apply whether the employer or the employee, or both, have market power. Maximization of joint value will occur subject to the constraints of limited abilities to observe or verify key measures, and the inability of many workers to borrow against future earnings.

The simplest form of employment arrangement is a term job. The employer pays a wage and the worker provides services, both specified in advance. Once the term has expired, the job is over and termination occurs automatically. The evidence in the next section suggests that many jobs take this form, although only a small minority of workers are employed this way. Term employment maximizes joint value when work effort is observable by the employer, and when there is no job-specific capital.

3. Hall and Lilien (1979) discuss efficient employment arrangements with unilateral information, private to employers.

Most jobs do have specific capital. Workers develop skills related to the employer's particular way of doing business. They develop personal relationships with their coworkers. They may choose places to live, and particular houses, based on their employer's location. Firms accumulate valuable knowledge about their workers' skills. More subtle employment practices may be needed to protect investments in specific capital.

Still, a simple term contract of adequate length may be enough to protect the specific capital of a job match. When there is little chance that conditions will change in a way that makes the match inefficient, the parties may simply agree that the job will last until retirement, with a predetermined wage. The worker receives the appropriate incentives to make many of the job-specific investments just listed, and the employer earns the return on any training or other investment. Without additional contingencies, the term contract cannot provide an incentive to the worker to make job-specific investments after starting work.

When the efficiency of continuing the match is a live issue, protection of specific investments becomes a serious challenge. In that case, some kind of joint or unilateral procedure is needed to determine if a match should continue. If either party has the power to end the job (the worker to quit, or the employer to terminate), one party can use that power to deprive the other of the expected return to its investment. For example, an employer might attract a worker to make an expensive move by offering a high salary. A year later, the employer might approach the worker and say that the worker would be terminated unless the worker accepted a much lower salary. The worker would accept the reduction as long as the salary remained above the value of the next-best job, which might involve another expensive move. An employment arrangement can include severance pay to limit this type of opportunistic behavior by employers.

The fullest elaboration of the theory of the employment relationship along the lines of this discussion is found in the work of Charles Kahn and Gur Huberman.⁴ In their model, the worker's productivity is observed only by the employer, but depends on an investment in specific capital observed only by the worker. Absent both of these information limitations, simple contracts would give the first-best outcome. If pro-

4. Kahn and Huberman (1988).

ductivity were verifiable, then the wage would be contingent on actual productivity, and the worker would have the right incentive to make the investment. If the investment itself were observable, the employer would reward the worker for making it. But in the presence of these limitations, the following more complicated contract delivers the efficient outcome: the parties agree in advance on a wage to be paid after the investment is made. Upon observing the worker's productivity, the employer can either keep the worker and pay the wage, or discharge the worker. The worker does in fact make the investment and is retained, which is the efficient outcome.

Although Kahn and Huberman do not stress the point, suppression of renegotiation is central to the success of their contract. After the worker has made the firm-specific investment, the employer could say, "If I have to pay you the wage we agreed upon, I won't keep you. But if you agree to a lower wage, I will keep you." There is no violation of the contract in this offer. But if the worker anticipates that the employer is free to make this offer, the worker will not make the investment and the scheme will fail.

Considered as a game played only once, the Kahn-Huberman contract fails the test of credibility (it is not subgame perfect). Suppression of renegotiation requires the employer to commit not to take a step that would be rational later and is permitted under the terms of the contract. The problem is the same as the one studied extensively by monetary economists (a central bank needs some way to commit not to create a monetary surprise, even if such a surprise would be rational later) and in public finance (tax authorities need some way to commit not to levy a capital tax, even if such a tax is the ideal, neutral lump-sum tax later).⁵

The concept of reputation is one promising way to make the suppression of renegotiation credible. If an employer is expected to remain in business permanently, it will pay for it to develop a reputation for adhering to policies of not renegotiating. This concept can be explained in models of games of repeated play and other frameworks.⁶

Suppression of renegotiation also seems to be an important part of the cultural norms of the labor market. The offer to retain an employee by changing previously announced standards of compensation is seen as

5. See Fischer (1980). On the general issue of the value of commitment in games, see Fudenberg and Tirole (1991, pp. 74–77).

6. See Carmichael (1984).

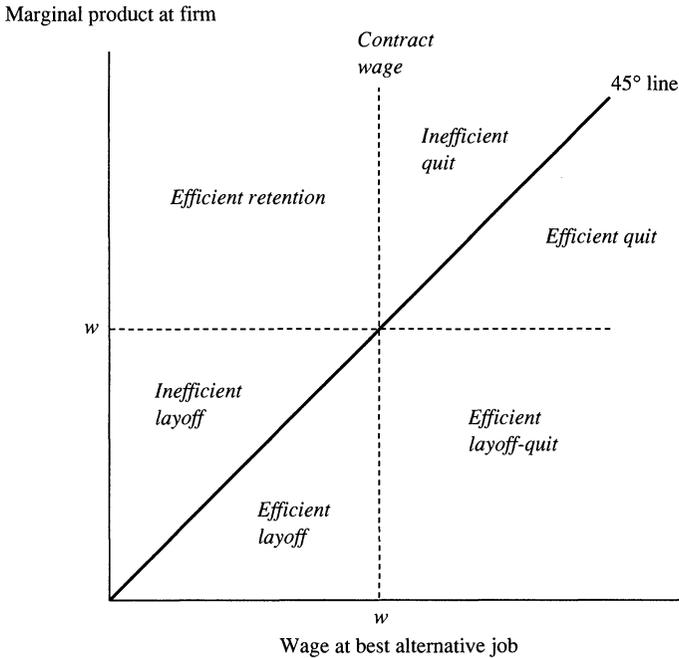
morally wrong. Standards of ethical conduct support up-or-out rules in universities and professional practices. It is wrong to extend a non-tenured faculty member's appointment after denial of tenure, even though both sides might favor it.⁷

Truman Bewley's extensive field study of employment relationships in a depressed local labor market documents the absence of renegotiation.⁸ By far the most common reason given by employers and their advisers for not rewriting employment arrangements in order to preserve jobs is that lowering wages would destroy morale. In other words, workers see a departure from established compensation patterns as a violation of the rules of the workplace. They endorse the principle that employers unwilling to pay promised levels of compensation should discharge their workers.

Suppression of renegotiation has some of the implications of the types of wage rigidity considered in macroeconomics. But it does not explain any failure of the labor market to clear. Since it puts no restriction on the terms under which new workers are hired, it is completely consistent with market clearing in the market for new hires. Figure 2 shows that suppression of renegotiation results in excess, inefficient separations. Suppose that the worker was hired with the understanding that the wage would be w . The firm has the right to terminate the worker if the wage falls below w , and the worker has the right to quit if there is an alternative job paying more than w . The standard for efficiency remains as in figure 1 and does not involve the contract wage. Figure 2 shows that a separation will always occur if the match has become inefficient. In the area below the 45° line, where employment is inefficient, either a quit will occur (the triangle at the top right) or a layoff will occur (the triangle at the lower left), or both quits and layoffs will occur (the lower right quadrant). The suppression of renegotiation also permits the destruction of efficient matches, however. When conditions are good in the outside market, relative to the contract wage, but are even better at this employer (the triangle at the upper right above the 45° line), the worker quits even though the two parties could renegotiate to mutual

7. Gilson and Mnookin (1990) argue that the up-or-out rule common in law firms is the result of suppression of renegotiation. In order to induce associates to make firm-specific investments, the firm promises not to offer the associate a salary just above the best outside salary. Instead, at a predetermined time, the firm chooses between offering partnership or terminating the associate.

8. Bewley (1994).

Figure 2. Wage Contract with Suppression of Renegotiation

advantage—there is a wage that will keep employment profitable for the employer and also exceed the worker's best alternative wage.

At the far lower left in figure 2 is the case of greatest interest to this paper. An inefficient layoff occurs when conditions are bad at the firm but even worse in the outside market. The parties fail to renegotiate a wage reduction, even though a mutually beneficial one is available. Finally, the upper left quadrant describes a success for the contract; retention is efficient and it actually happens.

Government Intervention

The employment arrangement is, in many respects, a contract interpreted within the appropriate law established by the government. One of the constraints under which joint value-maximizing employment arrangements evolve is contract law and enforcement, as applied to labor

contracts. For example, rarely would a country's laws require that a worker continue to work for an employer against the worker's will.

The modern theory of the employment arrangement emphasizes the value-enhancing role of granting the employer the unilateral right to terminate the employment relationship. Yet in many countries, including those of continental Europe, the law dramatically limits the employer's right to terminate. Either termination is simply forbidden, or large severance payments are prescribed. Theory suggests that these restrictions lower joint value and thus lower productivity. In addition, the restrictions probably reduce the flow of terminated workers through the labor market. As far as I know, in the United States the only nationwide limitation on termination is a recent federal law requiring advance notice of plant closings.⁹

In the United States there has been a growing tendency to interpret unwritten employment arrangements as if they were formal contracts. A terminated worker may be entitled to compensation for damages in the same way as is a supplier of goods and services when a purchaser breaches a contract. Under certain conditions, the standard legal rules for calculating damages lead to efficient breaches, so the movement to formalize labor contracts is not inefficient on its face.¹⁰ However, as a general matter the employment arrangement does not satisfy the conditions for efficient breach.¹¹ The long-run effect of granting terminated workers the right to sue their employers is probably no more than to cause employers to provide a more detailed written statement of employment policies when the workers are hired. In California, the courts have held that a written agreement making employment "at will" is enough to recreate the standard traditional arrangement under which the employer has the free right to terminate. In this setting, the written employment policy should evolve to maximize joint value in the same way as would occur in other markets. I conclude that trends in government intervention in the U.S. labor market are not likely to have much effect on observed flows of job losses.

9. Discriminatory terminations are illegal as well, of course.

10. See Polinsky (1983) for a lucid discussion of efficient breaches.

11. In the vocabulary of contract economics, as in Polinsky (1983), protection of match-specific capital calls for damages on the basis of *reliance*, while efficient separation calls for damages on the basis of *expectation*. The two measures cannot be combined, as a general matter.

Table 1. Alternative Measures of Job Loss, Quarterly Rates

<i>Measures</i>	<i>Rate of job loss</i>
Permanent separations, UI system data ^a	17.23
CPS tenure survey, 1981 ^b	10.04
All separations, CPS ^c	8.29
Gross employment reductions ^d	5.66
Permanent layoffs, PSID, 1985 ^e	1.81
Displaced Workers Survey, all workers, 1991–93 ^f	0.61
Displaced Workers Survey, workers on the job for at least 3 years, 1991–93 ^g	0.59

Sources:

- a. Anderson and Meyer (1994, table 2). Measured directly from unemployment insurance records.
- b. Bureau of Labor Statistics (1983, table 1, p. 1). Fraction of workers on the job for six months or less, stated at quarterly rate (unadjusted rate is 18.2 percent per six months).
- c. Blanchard and Diamond (1990, figure 1). Average monthly flows out of employment, 1968–86, divided by civilian labor force for 1977 (*Economic Report of the President*, 1995, table B-33), stated at quarterly rate (unadjusted rate is 2.7 percent per month).
- d. Davis, Haltiwanger, and Schuh (1995, table 2.1) using the Longitudinal Research Database (LRD). Quarterly flow of “job destruction” in manufacturing, with adjustment for compounding (unadjusted rate is 5.5 percent per quarter).
- e. Topel (1990, figure 1). Annual frequency of job loss from employer going out of business, layoff or firing, and completion of job reported in PSID, stated at quarterly rate (unadjusted rate is 7.0 percent per year).
- f. Bureau of Labor Statistics (1994, table 8). Total number of workers displaced between January 1991 and December 1993, divided by the civilian labor force for 1992 (*Economic Report of the President*, 1995, table B-33), stated at quarterly rate (unadjusted rate is 7.1 percent per three years).
- g. Bureau of Labor Statistics (1994, table 1). Number of workers with tenure of at least three years displaced between January 1991 and December 1993, divided by the civilian labor force for 1992 (*Economic Report of the President*, 1995, table B-33), divided by the fraction of the labor force with tenure of at least three years (51.5 percent) (Bureau of Labor Statistics, 1983, table 1, p. 1), stated at quarterly rate (unadjusted rate is 6.8 percent per three years).

Incidence and Consequences of Job Loss

Many different measures of the incidence of job loss are available, spanning a wide range of rates of loss. Table 1 presents a selection of the measures, arranged with the highest rates first. Almost all of the differences in the rates result from conceptual differences, not from measurement error. All of the measures are standardized at quarterly rates with adjustments for compounding (if the original rate is s , measured over T quarters, the standardized measure is $-1/T \log(1-s)$). The standardized measure is interpreted as the instantaneous flow rate of separation, stated at a quarterly rate.

The administrative records of state unemployment insurance systems provide one of the most comprehensive measures of job loss.¹²

12. Anderson and Meyer (1994). All separations are measured, so the rate is instantaneous and no adjustment is needed for compounding.

Losses of permanent jobs can be distinguished from losses of temporary ones, but no distinction is made between quits and layoffs. Each quarter, the total number of departures from jobs is 17 percent of employment. People whose work intrinsically involves frequent movements among employers contribute large numbers of separations. These include day workers, whose jobs last only a single day. Thus a large fraction of the 17 percent are not losses with the large and durable consequences of the loss of a long-term job.

One of the cleanest ways to measure rates of job loss is to ask a random sample of workers when they started their current jobs. In stochastic equilibrium, inflows equal outflows, so this measure of inflows must also measure outflows. The second line of table 1 shows that the quarterly separation rate is about 10 percent according to the tenure supplement to the Current Population Survey (CPS).¹³ Because the survey asks about the beginning of employment, presumably temporary separations are generally excluded from this measure of turnover. Although I do not know of any detailed reconciliation, I believe that very short jobs account for the difference between the 17 percent turnover rate from unemployment insurance records and the 10 percent rate from the tenure survey. To put it differently, if the tenure survey had asked whether workers had started their current jobs in the past week, the number answering yes would be much greater than one-thirteenth of the quarterly rate.

The CPS also provides another, rather different way to measure separation rates.¹⁴ The survey determines the labor force status of workers in successive months; if it changes from employment to something else, a separation has occurred. Olivier Jean Blanchard and Peter Diamond adjusted the raw flows to take account of measurement errors. The adjusted separation rate, shown on the third line of table 1, is about 8 percent per quarter, only a little below the rate from the tenure survey. Part of the difference arises from movements from one job to another. In the opposite direction, the monthly frequency of the CPS should pick up more of the short-job churning that makes the separation rate from unemployment insurance data so high.

The fourth estimate in table 1 is the gross rate of employment reduc-

13. Bureau of Labor Statistics (1983).

14. Blanchard and Diamond (1990).

tions in manufacturing.¹⁵ This estimate is constructed from quarterly data on employment at individual plants using the Longitudinal Research Database (LRD). When the number of workers at a plant is less in one quarter than it was in an earlier quarter, there must have been at least that many separations of workers. Although temporary layoffs could be part of the story, Steven Davis, John Haltiwanger, and Scott Schuh show that the majority of employment reductions are persistent. Most employment reductions across all plants in a given quarter, in fact, arise from large cutbacks in small numbers of plants. About 12 percent of all reductions are the result of shutdowns of entire plants, 56 percent of all reductions are at plants where total employment falls by at least 25 percent, and over 80 percent of all reductions are at plants where total employment falls by at least 10 percent.¹⁶

Gross employment reductions average almost 6 percent per quarter, which appears completely consistent with the total separation rates of 8 or 10 percent per quarter from the two CPS sources. The differences arise from separations that are replaced within the same quarter, leaving no net change in employment.¹⁷ Large cuts in plant-level employment account for around half the total separations in the sense measured in the CPS.

The remaining measures of job loss in table 1 relate to displacement from jobs, rather than total separations. The PSID interviews a panel of families once a year.¹⁸ The quarterly frequency of job loss resulting from an employer going out of business, a layoff or firing, or the completion of a job is a little under 2 percent. Part of the difference from the other results arises from the elimination of quits, part from the annual nature of the interview (which means that a worker with several job losses in the past year is counted only once), and part from a tendency not to attribute a past job loss to displacement.

Finally, the last two lines of table 1 report job-loss rates from the Displaced Workers Survey, a supplement to the CPS. The most recent survey was carried out in February 1994 and asked if respondents had lost a job in the period 1991 through 1993 because a plant or company had

15. Davis, Haltiwanger, and Schuh (1995).

16. Davis, Haltiwanger, and Schuh (1995, figure 2.3).

17. There is a small offsetting factor—workers can be transferred between plants, generating gross employment reductions without separations.

18. See Topel (1990).

Table 2. Job Loss with Subsequent Unemployment, Quarterly Rate Percent

<i>Reason for separation</i>	<i>Frequency</i>
Permanent layoff	2.10
Temporary layoff	1.44
Quit	1.14
Total	4.68

Source: Averages of monthly data from the Bureau of Labor Statistics, Current Population Survey for the period June 1976 to April 1993, unemployment by duration and by reason. Unemployed less than five weeks, stated as a fraction of the civilian labor force and multiplied by three.

closed or moved, the worker's position or shift was abolished, there was insufficient work, or for "a similar reason." The rates are published for workers with three or more years of tenure, and for all workers. When stated at quarterly rates, the incidence of displacement is much lower than for any other measure of job loss, about 0.6 percent per quarter. As with the PSID, part of the difference arises from the exclusion of multiple job losses over the period, as well as the fact that respondents often do not characterize a past separation as a displacement, even though it would be classified as a layoff in contemporaneous data.

In the Displaced Workers Survey, low-tenure workers have essentially the same quarterly probability of displacement as high-tenure workers, even though separation rates are much higher for the low-tenure workers. This finding would appear to support the hypothesis that a separation is more likely to be considered a displacement in a retrospective survey if it has larger personal consequences.

Table 2 shows quarterly frequencies of transitions from employment to unemployment by reason. The total quarterly frequency is a little under 5 percent, which appears to be consistent with the other CPS data. Somewhat less than half of the flow into unemployment is from permanent layoffs. Temporary layoffs are about a third of the flow, and quits are about a quarter. Permanent layoffs are a larger fraction of total unemployment because the departure rate from unemployment is much higher for workers who are on temporary layoff or who quit their previous jobs.

To summarize the findings on the incidence of job loss: Gross turnover in the labor market is high, because many jobs last only briefly. Putting aside the briefest jobs, around 8 or 10 percent of workers separate from their employers each quarter. About a quarter of these separations

are voluntary quits and others are temporary layoffs. Probably around 4 percent of workers lose jobs permanently each quarter. Something like half of these permanent, involuntary losses are sufficiently burdensome that a worker will identify the experience retrospectively as a displacement. And about 0.6 percent of workers suffer a job loss each quarter so painful that it is remembered as a displacement as much as three years later in the Displaced Workers Survey. As the next section shows, the consequences of these job losses are severe in terms of unemployment and depressed earnings.

Experience after Job Loss

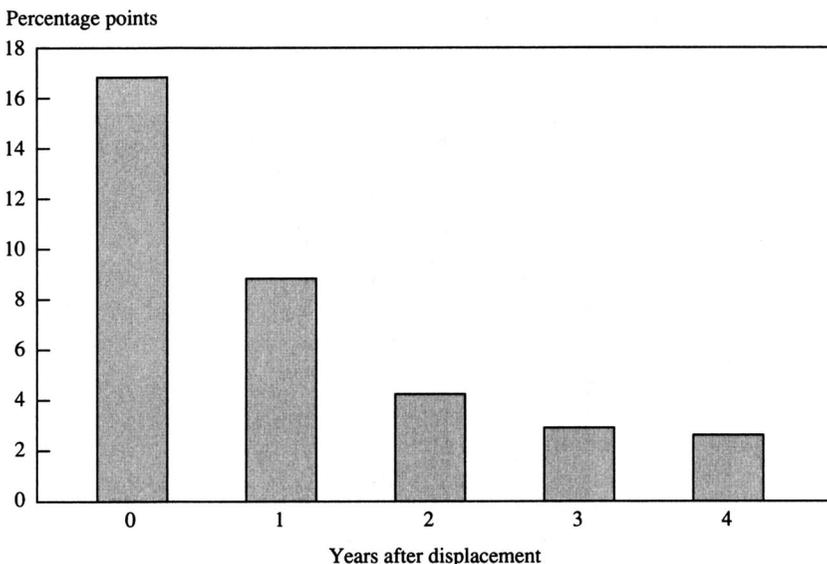
There is a huge literature in labor economics on the employment levels and earnings of workers who have lost jobs. This section will focus on studies of the postdisplacement experiences of workers surveyed in the Displaced Workers Survey and the PSID.

Even the simplest tabulation of the Displaced Workers Survey shows large differences between workers who were displaced during the three-year window considered by the survey and workers in general. As of February 1994, only 68 percent of the workers who had been displaced at some time during the window were employed; 19 percent were unemployed and 13 percent remained out of the labor force that month.¹⁹ The appropriate comparison group would be workers who did not get displaced but whose personal characteristics and earlier work histories were similar to those of the displaced workers. Unfortunately, no researcher has made this kind of a comparison tabulation, but it is obvious that much lower employment would be found among displaced workers than among the comparison group for an extended period after displacement. Henry Farber has tabulated data that help to make this point, although without the use of the appropriate comparison group. For 1988, Farber finds unemployment rates of 31 percent among men who had been displaced within two years of the survey, in comparison to 4.3 percent among men who had not been displaced. The numbers are similar for women: 27 percent and 4.5 percent, respectively.²⁰

By far the most useful study of postdisplacement experience for the

19. Bureau of Labor Statistics (1994, table 4).

20. Farber (1993, table 3).

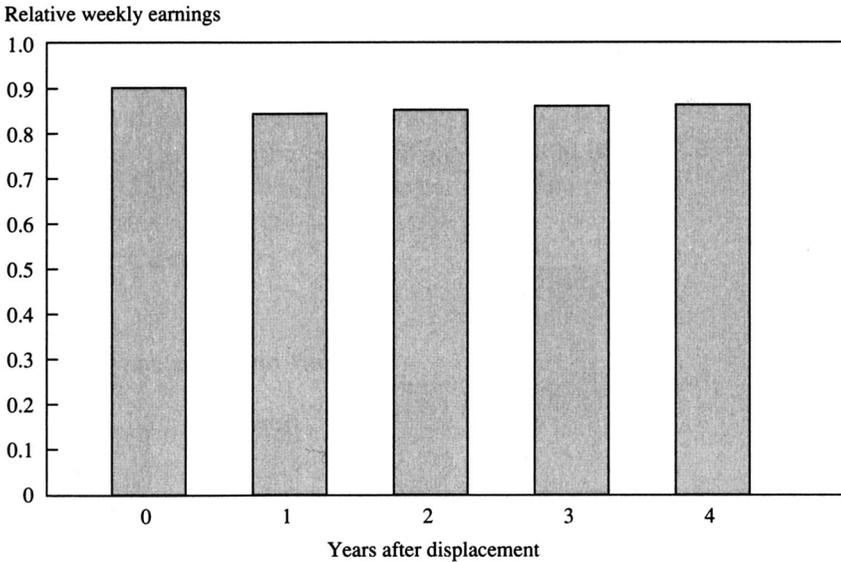
Figure 3. Increase in Unemployment Due to Prior Job Displacement

Source: Author's calculations from Ruhm (1991, table 1, column a), using data from the PSID.

purposes of this paper is that conducted by Christopher Ruhm, using data from the PSID.²¹ Ruhm estimates equations for annual weeks of unemployment and weekly earnings for all workers in the PSID. He includes dummy variables for a displacement in the year of the survey and in each of the four preceding years. He interprets the coefficients as measures of the difference between the experience of workers with and without earlier displacement. He investigates the possibility that displacement is correlated with determinants of unemployment and hours that are not included in his regressions. The evidence suggests that these effects are small.

Figure 3 shows Ruhm's findings for unemployment. In the year of displacement a worker has, on the average, about 17 extra percentage points of unemployment. In the year after displacement extra unemployment is about 9 percentage points, and there is still an important amount of extra unemployment two, three, and four years after displacement. Figure 4 shows the corresponding estimates for weekly earnings. For weeks actually worked in the year of displacement, earnings

21. Ruhm (1991).

Figure 4. Loss in Earnings Due to Job Displacement

Source: Author's calculations from Ruhm (1991, table 1, column a), using data from the PSID.

are about 90 percent of those of comparable nondisplaced workers in the same year. In the year after displacement the ratio falls below 85 percent. Even after four years, earnings are still almost 15 percent below the level of comparable nondisplaced workers.

Ruhm's findings can be summarized in terms of the capitalized value of the lost earnings, considering both increased unemployment and decreased weekly earnings. I fitted a linear trend to the log of the combined effect following a displacement and found that it crossed zero after eight years. At a discount rate of 3 percent per year, the present discounted value of the nine-year stream of reduced earnings is about 1.2 years of earnings. Thus the financial consequence of a job loss counted as a displacement is about 120 percent of a worker's annual earnings. This figure is sensitive to the definition of a displacement. The consequence would be smaller, for example, under the CPS definition of a separation as illustrated in table 1, and larger under the Displaced Workers Survey definition of a displacement.

Aggregate Implications

The findings for experiences of individual workers fit into the broader picture of the behavior of the aggregate economy in rather different ways, depending on other features of the aggregate economy. One polar view is that labor demand is highly wage-elastic, so the level of employment accommodates shifts of the labor supply schedule. The top panel of figure 5 illustrates this view. The labor supply schedule on the right applies in normal times and shows the volume of work net of normal amounts of job search. The supply schedule on the left applies after a one-time shock has perturbed the labor market. As a result of a burst of primary job loss, workers find it necessary to spend more time looking for work and less time working. Because labor demand is elastic, the dynamics of employment are controlled largely by the labor supply choice between working and looking for work.

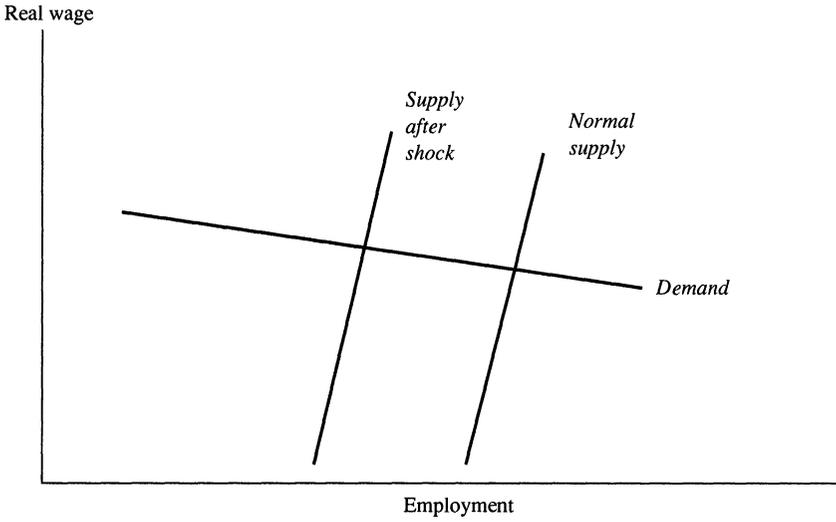
The bottom panel of figure 5 shows the opposite polar case. Labor demand is inelastic and labor supply is highly elastic. Some economists rationalize elastic supply as the consequence of wage rigidity; others believe that the elasticity of substitution of work with future work or with nonwork activities is high. The shock that caused the burst of primary job loss persists as a leftward shift of labor demand. Elastic labor supply accommodates the decline in demand. Employment dynamics are controlled by labor demand. Findings about unemployment in the aftermath of the adverse shock tell us how the economy allocates scarce jobs.

The rest of this paper will explore the first case. I interpret the data as showing that a burst of primary job loss causes an extended increase in job search in place of employment. Although a transitory decline in demand is presumably part of the source of the burst of primary job loss, I hypothesize that there is no continuing shortfall of demand. The persistence of movements of employment can be completely accounted for by the dynamics of rebuilding employment relationships after the shock.

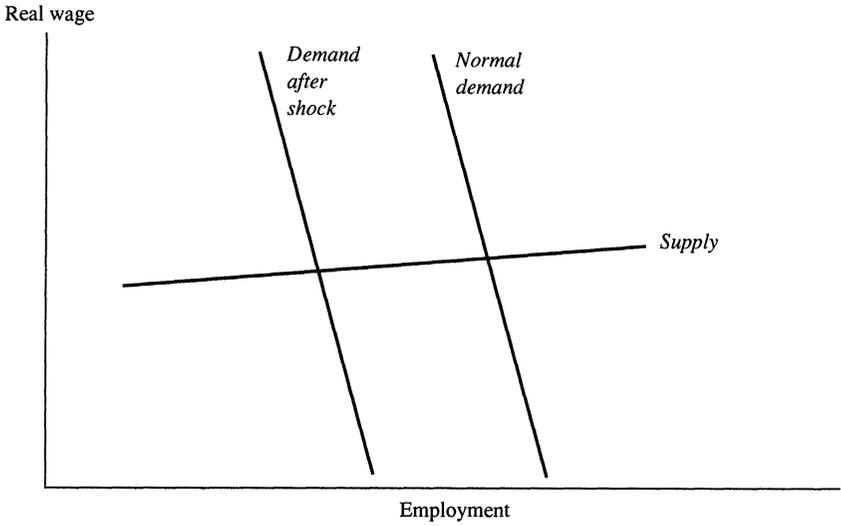
The main reason for my position that persistent shifts of labor do not play an important role in the business cycle is a standard one: in a simple model, labor demand is just the marginal product of labor. The only possible source of a persistent adverse shift in labor demand is a persistent decline in productivity. I remain skeptical that technical regress is an important part of the story of lingering slumps in the economy.

Figure 5. Alternative Views of the Labor Market

Shift in labor supply with elastic labor demand



Shift in labor demand with elastic labor supply



The economy may not be so simple. For example, if sellers have market power, and this increases after an adverse shock, the labor demand schedule would shift to the left for as long as the increase persists. And product markets may operate in more complicated ways than simple supply-and-demand or simple monopoly. In particular, product price rigidity may lead to a labor market analysis similar to the bottom panel of figure 5. Further, the truth may lie somewhere between the two polar cases shown in figure 5. One interesting possibility is that both labor demand and labor supply are highly elastic. In that case, equilibrium in the labor market may be close to indeterminate—persistent movements in unemployment may be explained by many factors beyond labor supply dynamics.²²

The experiences of individuals in the labor market are governed by probabilities. The findings on the incidence of job loss in table 1 are stated explicitly as quarterly probabilities, and the findings about post-displacement unemployment and earnings losses discussed above are implicitly statements about probabilities distilled from the widely varying experiences of individuals. Aggregate conditions affect the probabilities facing individuals. The magnitudes of these effects are different under alternative views on general-equilibrium macroeconomic issues. In particular, in some versions of the view shown in the bottom panel of figure 5, job-finding probabilities would be higher when demand is strong than when it is weak. If the higher unemployment during slumps is primarily congestion resulting from many workers pursuing few jobs, then job-finding rates must fall during periods of high unemployment. The evidence on the cyclical behavior of the job-finding rate is mixed; there is some indication of congestion effects, but the rate is surprisingly stable.²³ Davis, Haltiwanger, and Schuh show that the job-creation rate reaches a strong maximum in the early part of a recovery.²⁴ Some other probabilities, such as the quit rate or the rate of departure from the labor force, clearly vary over the cycle.

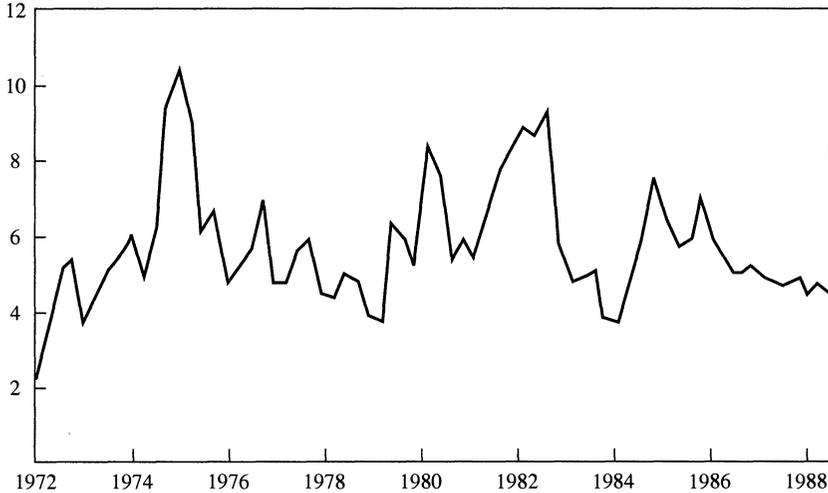
Both the empirical results and the probability model discussed in the following sections are based on the hypothesis that the transition probabilities are roughly constant over the cycle. The only exception is the probability of primary job loss, which is taken as data and shows occa-

22. See Hall (1991).

23. See Hall (1991).

24. Davis, Haltiwanger, and Schuh (1995).

Figure 6. Gross Employment Reduction Rate in Manufacturing, Quarterly, 1972–88^a
Percent



Source: Davis, Haltiwanger, and Schuh (1995, data appendix). Tics at first quarter of year shown.

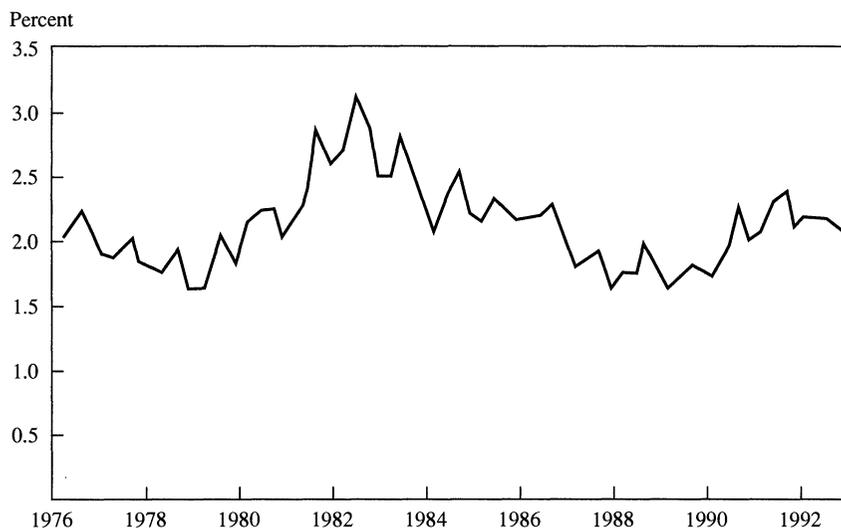
a. Total reduction in employment at plants where employment fell from one quarter to the next, as a percent of total employment.

sional bursts to levels far above normal. The analysis should be seen as an attempt to find out how far labor market dynamics can be explained with only a single source of cyclical variation, the rate of primary job loss.

Evidence on Labor Market Dynamics

Figure 6 shows quarterly data on gross employment reductions in manufacturing, taken from the work of Davis, Haltiwanger, and Schuh.²⁵ As noted earlier, these reductions are measured at the level of individual plants. The series shows the total reduction in employment at plants where employment fell from one quarter to the next, as a percent of total employment. Gross employment reductions appear to be the best available measure of the immediate effect of adverse macroeconomic events on the labor market. In particular, as figure 6 shows, recess-

25. Davis, Haltiwanger, and Schuh (1995). The data will be available shortly from the Bureau of the Census Internet FTP. The original data are not seasonally adjusted; I have subtracted seasonal means.

Figure 7. New Permanent Layoff Unemployment, Quarterly, 1976–93^a

Source: Current Population Survey, from Bureau of Labor Statistics, *Employment and Earnings*. Tics at first quarter of year shown.

a. Percentage of the labor force unemployed (less than five weeks) due to permanent layoffs.

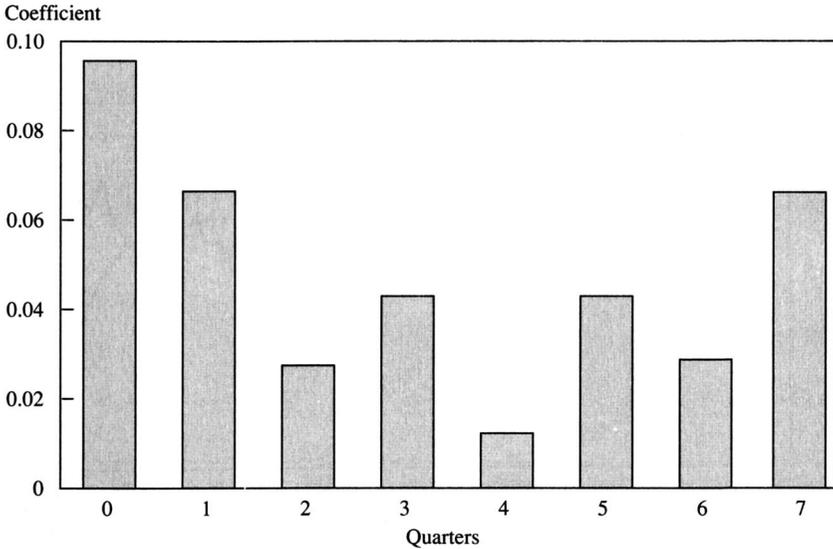
sions start off with large bursts of employment reductions. The flow of gross employment reductions is not persistent; during the extended slump after a sharp contraction, gross employment reductions are at normal levels.²⁶ Persistence in unemployment and employment appears to come from other sources.

Data on the flow of workers into unemployment provide another, quite different view of the dynamics of job loss. The best data for this purpose show the flow from permanent layoffs alone, as distinct from temporary layoffs, quits, new entrants, and reentrants. Figure 7 shows these data since they first became available, in 1976.²⁷ New permanent layoffs are much more persistent than gross job reductions. A burst of job reductions, as in 1982, is followed by several years of higher levels

26. As Davis, Haltiwanger, and Schuh note, plant-level employment is highly persistent; it is essentially a random walk. Hence the flow of reductions is close to white noise.

27. The data come from the Current Population Survey and are published in Bureau of Labor Statistics, *Employment and Earnings*. They refer to workers who became unemployed as a result of permanent layoff, whose unemployment began within five weeks of the survey.

Figure 8. Distributed Lag Coefficients for New Permanent Layoff Unemployment on Gross Employment Reductions



Source: Regression coefficients from second column of table 3.

of new permanent layoffs. The data have a strong distributed lag relationship, as is shown in figure 8.²⁸

A number of factors combine to explain the lag from employment reductions to new unemployment. First, employment reductions are measured only in manufacturing, whereas new unemployment is measured economywide.²⁹ A systematic lag of nonmanufacturing behind manufacturing would explain some part of the lag shown in figure 8. Second, many workers who lose their jobs do not become unemployed—they move immediately to other jobs or leave the labor force. During the period of slack labor markets following a burst of employment reductions,

28. This and other distributed lags embody the hypothesis, noted earlier, that the transition probabilities do not vary over the cycle. If there is some variation, the estimated lags should approximate the average relation over the cycle. In addition, the use of regression depends on the assumption that the disturbances in the lag relation are uncorrelated with gross employment reductions. That is, a burst of primary job loss does not shift the lag relation; and, a random jump in unemployment does not cause primary job losses.

29. In principle, data on new permanent-layoff unemployment among workers previously employed in manufacturing could be tabulated from the CPS, but it would require processing all of the monthly tapes. I do not believe that this has yet been done.

Table 3. Distributed Lag Regressions of New Unemployment by Reason on Gross Employment Reduction, 1978–88^a

<i>Lags on gross employment reductions</i>	<i>Dependent variable</i>					
	<i>Permanent layoff</i>	<i>Temporary layoff</i>	<i>Left job</i>	<i>Reentrant</i>	<i>New entrant</i>	<i>Total</i>
0	0.0943	0.1258	-0.0025	0.0511	0.0233	0.2921
1	0.0649	0.0323	-0.0275	-0.0078	0.0024	0.0643
2	0.0259	0.0202	-0.0207	0.0137	0.0227	0.0618
3	0.0412	0.0621	-0.0186	0.0193	0.0113	0.1152
4	0.0110	-0.0460	-0.0061	-0.0023	-0.0008	-0.0443
5	0.0420	-0.0026	-0.0131	0.0123	0.0106	0.0492
6	0.0281	0.0359	-0.0016	0.0081	0.0120	0.0826
7	0.0643	0.0208	-0.0125	-0.0020	0.0181	0.0888
Sum	0.3718 (0.0543)	0.2484 (0.0970)	-0.1025 (0.0400)	0.0925 (0.0623)	0.0997 (0.0997)	0.7097

Summary statistics

Mean	2.99	1.70	3.04	1.78	3.32	2.42
R ²	0.897	0.925	0.826	0.863	0.950	
SER	0.136	0.142	0.092	0.109	0.078	
rho	0.560	0.809	0.636	0.802	0.487	

Sources: Author's regressions based on the Bureau of Labor Statistics, Current Population Survey and Davis, Haltiwanger, and Schuh (1995).

a. Dependent variables are workers unemployed less than five weeks, as a fraction of the civilian labor force. Independent variables are current and seven quarterly lagged values of gross employment reductions in manufacturing as a fraction of the civilian labor force, plus seasonal dummies. Estimation includes correction for first-order serial correlation of disturbances. The regressions cover 1978, first quarter, through 1988, fourth quarter (forty-four observations). Standard errors are in parentheses.

a larger fraction of job-losers become unemployed. Third, permanent job loss has important delayed effects. Many of the workers who move quickly to other jobs have taken temporary work, jobs with either predetermined short terms or naturally high turnover. Also, those who left the labor force upon loss of a long-term job often reenter the labor force later.

Table 3 gives a fuller picture of the lagged effects of bursts of employment reductions in the labor market. It shows distributed lag regressions of the five types of new unemployment on current and seven quarterly lagged values of gross employment reductions. The second column shows the long stream of induced permanent layoffs over the two-year period (despite the large size of the 7-quarter lag coefficient, longer lagged effects were found to be small). The third column shows that temporary layoffs are an important means of achieving immediate employ-

ment reductions, and that there are some downstream induced temporary layoffs. But a much larger fraction of the total amount of temporary layoffs induced by a given gross reduction in employment occurs contemporaneously than for permanent layoffs (0.1258/0.2484 for temporary layoffs and 0.0943/0.3718 for permanent layoffs).

The fourth column of table 3 shows the reductions in the flow of job-quitters into unemployment following a burst of employment reductions. Slacker conditions in the labor market reduce the frequency of quits. Although this finding is consistent with the suppressed renegotiation model of the employment relationship, it is also consistent with efficient employment relationships. Note that the negative effect of employment reductions on quits is spread over the eight quarters—it appears to be a response to the persistent slack conditions in the market, not to the burst of employment reductions that start the process.

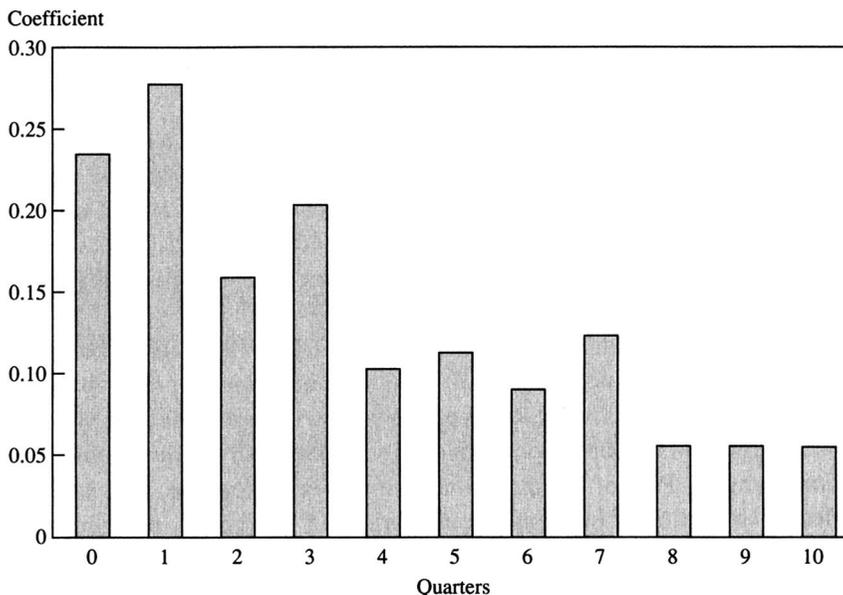
The fifth column of table 3 shows the pattern of reentrant unemployment in the labor force induced by a burst of gross employment reductions, and the sixth column does the same for new entrants. In principle, the process set in motion by employment reductions could induce reentrance. Workers who lose jobs often spend some time out of the labor force. However, the reentrant coefficients and the new entrant coefficients are similar, given sampling variation, so most of the effect shown probably comes from weaker conditions in the labor market, which make unemployment more likely for a given flow of reentrants and new entrants.

Table 3 shows the pattern of the onset of spells of unemployment after a burst of primary job losses. In each category, job-seekers take time to find new work or leave the labor force. Figure 9 shows the lag coefficients on gross employment reductions for total unemployment in all duration categories. Because this lag includes both the lag from primary job loss to induced job loss and the subsequent search time, it is appreciably longer than in figure 8 or table 3.

A Model of Labor Market Dynamics

This section describes a probability model of the processes that are set in motion by a burst of primary job losses. Although the model is loosely calibrated to various sources of labor market data, its purpose

Figure 9. Distributed Lag Coefficients for Total Unemployment on Gross Employment Reductions, 1975–88*



Source: Davis, Haltiwanger, and Schuh (1995).

a. Bars show regression coefficients with total unemployment as a percent of the labor force as dependent variable, and current and eleven quarterly lagged values of gross employment reductions in manufacturing as independent variables. Sum of lag coefficients: 1.45; standard error of the regression: 0.25; R^2 : 0.975; serial correlation of disturbances: 0.88. The standard errors of the lag coefficients are all very close to 0.03.

here is illustrative—its relation to the U.S. labor market is similar to the relation of a real business cycle model to the U.S. economy.

Both the microeconomic and the macroeconomic evidence strongly suggests that terminations beget later terminations. When an event breaks a set of long-term employment relationships, the workers released into the labor market will form new relationships, many of which will prove to be short-lived. First, it may make sense for an individual to take a temporary job while looking for a new permanent job. Second, a worker long out of the market may experiment with alternative types of work before finding a good long-term match. Third, employers may have explicit policies of hiring many candidates and keeping only the fraction who prove to be well matched. Fourth, immediately after being hired, the typical worker will be close to the margin for discharge, either by the standards of the efficient separation model or of the model of suppressed

renegotiation. Neither the systematic accumulation of match-specific capital nor the random accumulation of rent will have had much time to occur. Low-tenure workers are the logical candidates for separation—last hired, first fired is the rational separation rule under broad conditions.

Induced subsequent job losses seem to be a promising explanation of persistence. Following a single adverse shock, employment will be depressed and unemployment elevated by subsequent rounds of adjustment in the labor market. The model presented in this section illustrates how persistent unemployment and employment result from lagged responses to earlier shocks.

A glance at the data shows that a simple model of transitions between jobs and search cannot be faithful to even the most conspicuous features of the market's dynamics. Rates of separation from jobs decline sharply with tenure on the job, and job-finding rates fall with the duration of unemployment. Part of the duration dependence is genuine, and part reflects the sorting of heterogeneous workers.³⁰ Moreover, previous history appears to influence transition rates. For example, it appears that workers terminated from long-term jobs have lower job-finding rates than other searchers, are more likely to lose subsequent jobs than other short-tenure workers, and have even lower job-finding rates in subsequent spells of unemployment.³¹

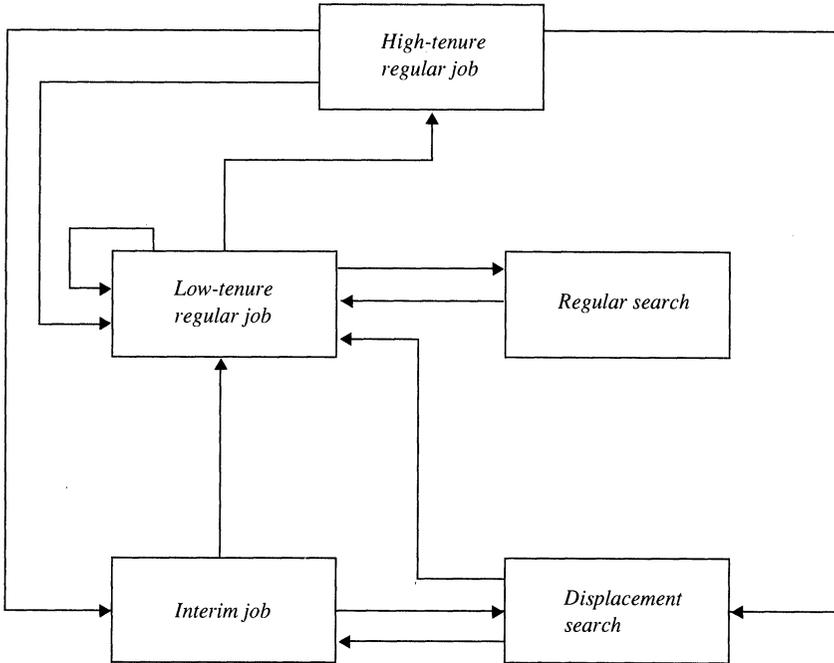
To characterize the way that job losers eventually make their way back into long-term jobs, I have set up a more elaborate model. Figure 10 shows the major concepts and flows. Low-tenure regular jobs are further broken into four tenure categories: less than six months, six months to one year, one to two years, and two to three years. High-tenure regular jobs are broken into eight tenure categories: the category of three to five years, six categories of five-year width, and the category of more than thirty-five years. Regular job search and displacement search are broken into three categories: less than one quarter, one to two quarters, and more than two quarters. Interim jobs are not broken down by duration.

Displacement is defined in the model as the loss of a job with three

30. See Heckman and Singer (1985) and Devine and Kiefer (1991).

31. See Farber (1993). Farber was not able to measure each of these effects separately, but the magnitude of the subsequent employment reductions suggests that all of them are at work.

Figure 10. States and Transitions in Turnover Model

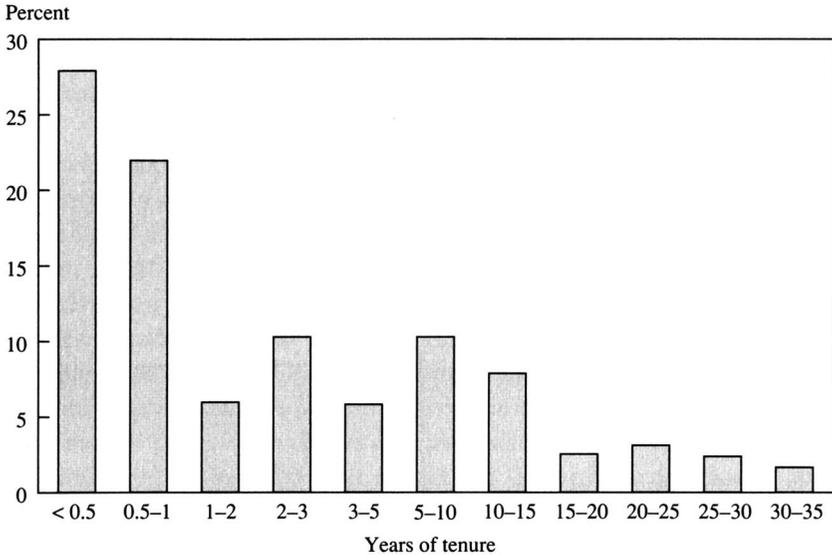


years or more of tenure. A displaced worker may move immediately to a regular job or to an interim job, or may enter displacement search. From there, the worker may find an interim job or a regular job. Workers in regular jobs either advance in tenure, eventually crossing to high-tenure jobs, or they lose a job and start over at zero tenure, or go through a period of regular search. The apparatus of displacement search and interim jobs is not intended to suggest a fundamental distinction, but simply to capture the adverse experiences of some workers who lose high-tenure jobs.

To measure departure rates from jobs, I rely on data on job tenure.³² The cross-sectional distribution of workers by tenure reveals total separations by tenure as 1 minus the ratio of the number of workers in one tenure category to the number in the earlier category.³³ Figure 11 shows

32. Bureau of Labor Statistics (1983).

33. A spreadsheet is available from the author providing the details of the calculation, including adjustments for the width of the tenure categories and the sizes of the cohorts.

Figure 11. Quarterly Separation Rates by Tenure

Source: Author's calculations from Bureau of Labor Statistics (1983).

quarterly separation rates by tenure. More than 25 percent of workers who have been on the job for less than half a year separate from their jobs each calendar quarter. The rate drops to 5 to 10 percent per quarter through tenure of fifteen years, and then drops to 2 to 3 percent per quarter for the most senior workers. The data include both quits and layoffs, without making any distinction between them.

The measurement of job-finding rates is much more of a challenge. Although data on unemployment by duration could be processed in exactly the same way as data on employment by tenure, the results would reveal departure rates for unemployment, not job-finding rates. First, data on unemployment cannot say anything about job losers who find new work without becoming unemployed. Second, many job-seekers spend periods out of the labor force when they are not actively looking for work, and so are not counted as unemployed. Kim Clark and Lawrence Summers have established that job seekers often have long spells between jobs, despite the low incidence of long-term unemployment.³⁴

Table 4 shows the transition probabilities other than those for separa-

34. See Clark and Summers (1979).

Table 4. Job Search Transition Probabilities

<i>Years</i>	<i>From regular job search</i>	<i>From displacement job search</i>	
	<i>Find regular job</i>	<i>Find interim job</i>	<i>Find regular job</i>
0-1	0.70	0.70	0.10
1-2	0.50	0.50	0.05
2<	0.30	0.40	0.02
Probability of unemployment while in interim job			0.50
Probability of unemployment after loss of low-tenure regular job			0.05
Probability of unemployment after loss of high-tenure regular job			0.04
Probability of interim job after loss of high-tenure regular job			0.08

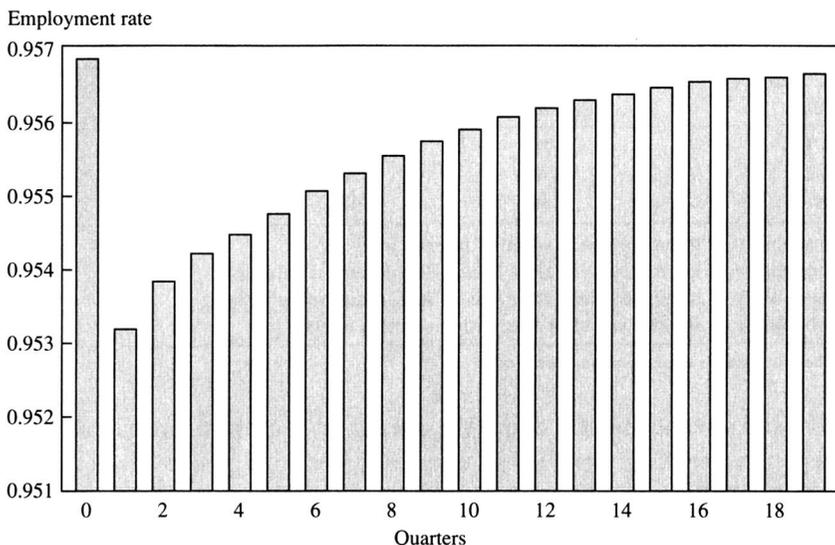
Source: Author's calculations described in text.

tion and advancement. I chose the overall level of these probabilities to generate a realistic equilibrium unemployment rate; the levels of the individual probabilities are informed guesswork. The top panel shows the quarterly job-finding rates for the two kinds of search; these decline with the duration of search. The first three lines of the bottom panel show the probabilities of becoming unemployed while holding an interim job or just after losing a regular job. Given the quarterly time period used in the model, these probabilities are much lower than the probability of a small amount of job search, such as a week. The last line shows the probability of going directly to an interim job after losing a high-tenure regular job.

The model is a nineteen-state Markoff process. Its stochastic equilibrium can be calculated directly from the transition probabilities.³⁵ The equilibrium distribution across tenure categories mirrors the CPS tenure data. The equilibrium unemployment rate is 4.3 percent, of which 3.5 percent is displacement unemployment. The unemployment rate is well below the average U.S. unemployment rate of about 6 percent because the model does not deal with unemployment associated with very brief jobs and with new entrants.

To characterize a burst of primary job losses, I created a special version of the model's transition matrix in which the separation rate in all tenure categories was raised by 10 percentage points. This shock simulates the shutdown of 10 percent of the economy. It shifts the balance of job-seekers toward those in displacement search, and increases the fraction of workers in interim jobs. I apply this transition matrix once to

35. The model is available from the author in the form of an Excel spreadsheet.

Figure 12. Employment Response to Shock

Source: Author's calculations based on model described in text.

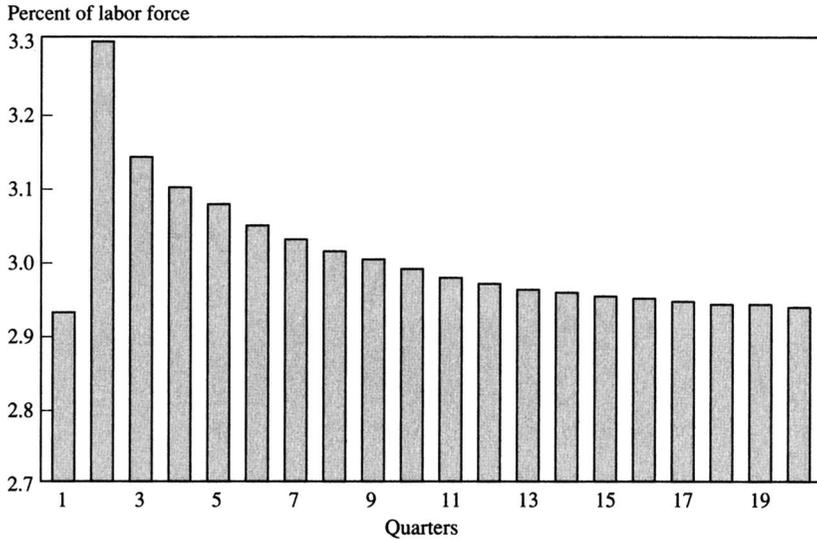
the equilibrium distribution. The result shows the predicted state of the labor market immediately after the shock; there are far more than the usual number of displaced job-seekers. Then I apply the standard transition matrix for twenty quarters, giving the market enough time to return to its original equilibrium.

Figure 12 shows the level of employment before and after the one-time shock.³⁶ The majority of workers, including the high-tenure displaced workers, find new work within the quarter of the shock. In the second quarter after the shock, employment closes almost one-fifth of the distance back to equilibrium. Many of the extra job-seekers caused by the shock are still in the productive early phase of job search. In subsequent quarters, the return to equilibrium slows down because the remaining extra job-seekers are the ones who are hard to match.

In the model, workers are either working or looking for work. Hence

36. The actual shock causes 10 percent of workers to lose their jobs instantly, but the reduction in employment is much smaller by the next quarter. In the quarterly model, a large fraction of job losers do not become unemployed (see table 4). It is a topic for further research to determine if a constant-transition-probability model can imitate the observed relation between primary job loss and subsequent unemployment. The quarterly model clearly does not, but much of the failure may be the result of too coarse a time unit.

Figure 13. Flow of New Job Seekers



Source: Author's calculations based on model described in text.

the time path of unemployment is just the inverse of the employment time path of figure 12. There is reasonable agreement between the model's dynamics in figure 12 and the corresponding finding for U.S. data in figure 9. Bursts of primary job loss appear to cause reduced utilization of labor services for two years and more while the displaced workers make their way back into durable job matches.

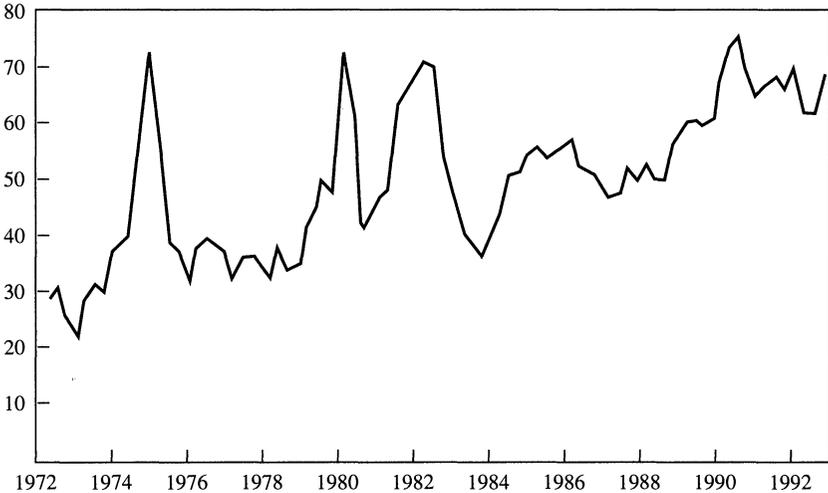
The model also captures the induced lagged flow into unemployment. Figure 8 showed how important these induced lagged effects are in the U.S. labor market; figure 13 is its counterpart for the model. A single burst of primary job loss results in many spells of unemployment that start as late as two years after the burst. The speed with which one job-seeker finds a job greatly overstates the speed of recovery of the labor market to normal conditions.

The Aggregate Significance of Lost Jobs

Figure 14 presents a time-series estimate of the value associated with permanent, serious job losses in the U.S. economy. The pattern over time is derived from Davis, Haltiwanger, and Schuh's series for gross

Figure 14. Value Associated with Job Losses in the U.S. Economy, Quarterly, 1972–93

Billions of
1987 dollars, a.r.



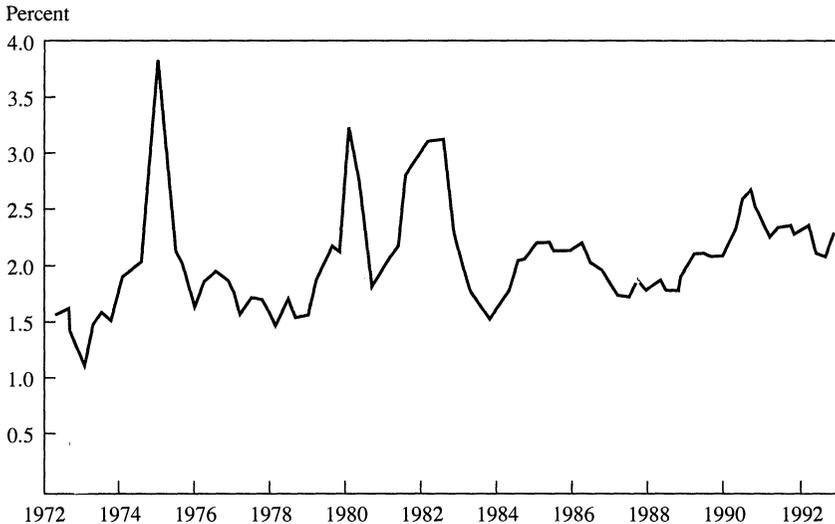
Source: Author's calculations described in text. Tics at first quarter of year shown.

employment reductions.³⁷ Their quarterly series ends in 1988; I extrapolated later values by fitting a regression to their data with current and four lagged values of manufacturing employment, and current and lagged values of new claims for unemployment insurance, together with seasonal dummies, as right-hand variables. I estimated the frequency of serious, permanent job loss corresponding to the PSID concept of job displacement by multiplying gross employment reductions by the ratio of PSID permanent layoffs per quarter to the average value of gross employment reductions (the ratio is 1.81/5.66). I next multiplied by 1.2 to state the effect of a displacement in the PSID in terms of the present value of eventual lost earnings, based on my earlier discussion of Ruhm's findings. Finally, I multiplied by total compensation stated in 1987 dollars, using the GDP deflator. Figure 15 shows the value as a fraction of total compensation.

The value associated with job loss should not be considered a measure of the cost of job loss. Within the theory of job loss outlined earlier, the estimate in figures 14 and 15 is an upper bound on the personal and

37. Davis, Haltiwanger, and Schuh (1995).

Figure 15. Value Associated with Job Losses in the U.S. Economy as a Percentage of Total Compensation, Quarterly, 1972–93



Source: Author's calculations described in text. Ties at first quarter of year shown.

social cost of the suppression of renegotiation. In the extreme case where every worker who loses a job would have been retained if the wage were \$0.01 less per hour, the estimates measure the actual cost. Even in that case, however, the benefits of the suppression of renegotiation need to be reckoned against this measure of cost. Theory suggests that suppression of renegotiation has an important role in stimulating beneficial investment in job-specific skills.

With all these warnings in mind, figures 14 and 15 tell an interesting story. First, recessions are times of huge spikes in job-loss value. From levels around \$25 billion per year in 1972 and 1973, job-loss value peaked at over \$70 billion per year in the sharp contraction in late 1974. The cyclical peaks in 1980 and 1982 reached almost exactly the same levels. From 1984 there has been an upward trend in job-loss value that is greater than the underlying trend in real compensation. Although the cyclical peak in early 1991 was not nearly as pronounced as earlier peaks, it reached a slightly higher level (\$76 billion in 1987 dollars) because it started from a much higher base level. And the recovery since that peak has seen a flow of job-loss value of over \$60 billion per year.

Concluding Remarks

Some basic properties of job loss have emerged in this review of the evidence. Microeconomic studies of serious job loss show significant downstream effects on the subsequent experiences of individuals in the labor market. Loss of a long-term job leads to periods of episodic employment, periods of job search or time out of the labor market, and lower earnings when working. The effects extend for at least four years. In the macroeconomic evidence, bursts of gross employment reductions coincide with abnormal levels of serious job loss. The downstream effects visible in time-series data for unemployment are similar to the effects found in microeconomic data for individuals.

The macroeconomic data show occasional sharp disruptions of employment followed by long periods of rebuilding employment relationships. The length of time that the economy takes to recover from an adverse shock has perplexed macroeconomists for many years. This rebuilding may be an important part of the propagation mechanism of the business cycle.

A related puzzle is why shocks cause such large bursts of primary job loss. One reason may be that employment relationships are fragile because their terms cannot be renegotiated, as discussed early in the paper. The story of fragility, however, must go far beyond the suppression of renegotiation. Much more needs to be done to explain bursts of job losses during the sharp contraction phase of recessions.

Comments and Discussion

Henry Farber: Turnabout being fair play, I am privileged to discuss Bob Hall's paper here today. After all, he discussed my paper on job loss at a microeconomics meeting of the Brookings Panel a few years ago.¹ Hall's new paper shows his strength as a master of synthesis. The paper uses what historians and biographers call secondary sources. Little new empirical analysis is presented. Rather, existing studies become part of an overarching analytical framework to make a strong and important point.

The goal of Hall's analysis is to argue that sharp episodes of job loss at the outset of a recession result in echoes of further job loss long after the initial shock has occurred. He argues that these ripples occur because workers displaced from stable long-term jobs do not settle into new long-term jobs immediately. They suffer periods of employment in interim jobs that are short-lived, some because they are meant to be temporary while the displaced workers search for a new long-term job, and some because match quality may be an experience good, in the sense that workers have to try a job out to determine whether it is a good match or not. Bad matches end while good matches persist.

The Theory of Terminations

The paper has several distinct sections. In the first section, Hall presents a lucid discussion of what he calls a theory of terminations. This discussion makes clear the conditions under which separations will be efficient. In particular, it is required that wages be able to adjust to changing market conditions (alternative wages of workers and value of

1. Farber (1993).

marginal product of workers). Where wages are unable to adjust, perhaps because of incomplete information (employers cannot verify claims of high alternative wages, workers cannot verify claims of low marginal productivity), there is what he terms suppression of renegotiation. In this case there will be excess turnover, a point he has made with Edward Lazear.² Indeed the norms of operation of most U.S. labor markets suggest strongly that renegotiation is suppressed; that individual wages do not adjust to changing market conditions. The goal of this section is to argue that wages do not adjust and hence, that there are excess separations.

Hall makes two other points worth noting. The first is a useful distinction between suppression of renegotiation and the general idea of wage rigidity. While suppression of renegotiation is part of what macroeconomists mean when they talk about wage rigidity, they are also referring to the idea that entry-level wages are rigid: the idea that, in a recession, you generally cannot go to the factory gate, offer to work for less money than existing workers, and be hired. The second point is that suppression of renegotiation may be efficient to the extent that it allows for certain kinds of specific investments in workers that might not otherwise take place. The idea that suppression of renegotiation is a market failure may not be correct.

Synthesis of Existing Empirical Evidence

The second section of the paper is more problematic. Here Hall attempts a synthesis of existing empirical work on job loss and its consequences to make his case that the sharp loss of jobs at the beginning of recessions has longer-term consequences for unemployment.

THE RATE OF JOB LOSS. There is a discussion of alternative measures of quarterly job loss rates presented in table 1. The rate of permanent separations given by the unemployment insurance system includes quits. This measure is very high, but a substantial fraction of separations are not job loss at all. The rate of job loss from the CPS reports of short tenure on the current job likewise includes quits and new entrants, biasing the estimate of the rate of job loss upward. But it also requires that workers be reemployed after a job change, biasing the estimate of the rate of job loss downward. Gross employment reductions from the LRD

2. Hall and Lazear (1984).

cover manufacturing only, and miss job loss that is offset by gains in employment at the establishment level. The data from the PSID and the Displaced Workers Surveys (DWS) seem to me to provide better measures of the rate of job loss because they contain retrospective information on individuals by cause of job change. Of course, these have some problems as well. For example, the DWS is likely to be biased downward because it records no more than one job loss per worker in a five-year interval (three years in the most recent DWS).

Hall has attempted to turn the variety of these measures into a virtue by highlighting their differences. He proceeds to use their different estimates to decompose the overall separation rate (including quits) into its component parts. Voluntary separations and temporary layoffs are a little over one-quarter of total separations. Where does this figure come from? Hall must be subtracting the LRD-based gross employment reduction rate from one or both of the CPS-based separation rates. This is not likely to be very reliable, for the reasons discussed above. Coverage is different. And it is well known from surveys, like the PSID, that contain consistent information on separation by cause, that the ratio of quits to total separations is procyclical. He then uses the approximately 2 percent rate of permanent layoffs found in the PSID in 1985, together with data from the DWS in 1991–93, to conclude that only about 0.6 percent of permanent job loss is “so painful that it is remembered as a displacement as much as three years later.” The fact that these numbers are from different time periods and different points in the cycle surely affects the calculations.

This may be the most extreme example of comparing apples and oranges that I have seen in a while. Hall recognizes the different conceptual bases and time periods of his measures, but he somehow believes that the arithmetic involved in making these breakdowns is reliable. I am not convinced. And the issue of reliability is important because Hall uses these estimates later, when he calibrates his model of labor market dynamics.

EXPERIENCE OF WORKERS AFTER JOB LOSS. The next part of the paper is on the experience of workers after job loss. Here Hall relies almost exclusively on Ruhm’s study of the consequences of job loss using data from the PSID for 1971–75.³ Ruhm estimates the effect of job loss on wage levels and the probability of unemployment for four years after the

3. Ruhm (1991).

loss. His results are quite clear in demonstrating that the consequences of job loss for unemployment probabilities fall off steadily with time, but that the higher unemployment is still significant four years later. Ruhm's results also clearly show that the loss in weekly wages is more persistent than is the higher unemployment. Hall takes these estimates and creates an extreme out-of-sample forecast to compute that eight years after the job loss the combined employment and wage effects of job loss go to zero. I wonder how reliable this forecast is.

On rereading Ruhm's paper, I cannot see how his results can be interpreted as being directly relevant to the effects of the loss of long-term jobs. It is true that the analysis controls for tenure, but since the job loss rate from long-term jobs is very low, surely the estimates are largely determined by the loss of short-term jobs.

EVIDENCE ON LABOR MARKET DYNAMICS. Hall next turns to evidence using data from the LRD on plant-level gross employment reductions. These data seem to show that in the recession of the early 1980s there was a substantial increase in gross employment reductions that diminished only slowly during the recovery in the mid- to late 1980s. This evidence comes only from plants where employment fell and misses job loss in plants where overall employment grew. This may or may not be a problem. But the coverage is only manufacturing. And this could prove problematic as Hall uses these data later to explain labor force status changes (leaving of employment) for the entire labor force. Why should changes in manufacturing employment (which is substantially less than one-quarter of total employment) explain overall labor force changes?

Now Hall runs a regression of his own. He regresses the new unemployment rate from the CPS (workers unemployed less than five weeks divided by the civilian labor force) by cause of separation on the current and seven lagged values of gross employment reductions in manufacturing with seasonal dummies. This is done quarterly from 1978 through 1988, and there are forty-four observations. Hall focuses particularly on the permanent layoff regression, noting that the lags have fairly large effects even seven years out. However, no standard errors are presented so it is simply impossible to judge how much credence I should put on his evidence. I do not have much confidence that estimating seven lags from forty-four time-series observations will lead to very precisely estimated lag coefficients.

On a similar note, the finding that a much larger fraction of the total amount of temporary layoffs occurs contemporaneously than for permanent layoffs suffers from the lack of a measure of precision. Note finally that the CPS data will miss short unemployment spells (workers who are reemployed or out of the labor force by the time of the CPS interview).

A Model of Labor Market Dynamics

In this section, Hall uses some of the estimates derived earlier, together with some assumed job finding rates that match unemployment rates, to calibrate a nineteen-state Markov process. The job departure rates used are calculated from cross-section CPS tenure data on the basis of strong stationarity assumptions that are not likely to be satisfied. Given the rather terse presentation it is difficult to judge how well this model fits the data, and I do not have much comment to make. It does capture a reasonable amount of the sort of dynamics that Hall highlights in his earlier discussion, particularly the lagged flow into unemployment as displaced workers go through a sequence of jobs and unemployment spells on their way to a new stable job.

The Aggregate Significance of Job Loss

In the final section, Hall calculates the aggregate value of job loss, assuming that all separations were inefficient. In other words, as Hall recognizes, the calculations do not account for any efficiency gains from breaking a match where the worker was being paid more than his value of marginal product. The calculated losses are very large, with huge spikes at the start of recessions, but should I count all of this as social loss?

Overall Evaluation

Despite my criticisms, I think this is a valuable paper. Hall is simply unmatched at putting together information from a variety of sources in an interesting way to make an important point in a convincing way. The central point, which I find compelling, is that the initial surge of job loss in recessions can have important macroeconomic consequences far beyond the contemporaneous effect because workers will take substantial

time to settle into new stable employment relationships. This adjustment may take the form of a sequence of short-term jobs, either as a deliberate strategy or as part of the search for a good match. And these jobs may be punctuated by spells of unemployment, contributing to a higher unemployment rate during the adjustment period.

Finally, I will make my pitch for a microeconomic analysis. The idea driving Hall's analysis is that workers displaced from long-term jobs typically do not find a new long-term job immediately. They go through a job-shopping process, perhaps including spells of unemployment. It seems to me that this phenomenon is independent of whether the job loss occurs as part of a sharp episode of job loss at the beginning of a recession, or is unrelated to any aggregate disturbance. Of course, the speed of adjustment or of finding a long-term job might depend on macroeconomic conditions.

In the end, focused microeconomic longitudinal analyses of the postdisplacement experience of workers who lose long-term jobs are required. Such analyses would provide direct evidence regarding the extent to which displaced workers do, in fact, go through a series of short jobs, perhaps separated by spells of unemployment, before settling into new long-term jobs. Then Hall's insightful model of labor market dynamics, where sharp episodes of job loss echo through time and change the dynamics of labor market adjustment, will finally have some direct support.

John Haltiwanger: In reading this paper I felt how an upstream producer of an intermediate product must feel when a new final product emerges that uses its intermediate product. There is a natural sense of both anticipation and apprehension. One hopes that the final product is a success. One hopes that the intermediate product contributes to the success. One hopes that the intermediate product does not turn out to be the equivalent of the O-Ring.

Any upstream producer of data that is used in this paper will sit up and take notice at this product, since this is a paper with a \$76 billion a year answer. This is the value that is put on the lost jobs in the most recent recession. Most of my comments are, ultimately, related to whether this is a reasonable calculation.

This paper is a very ambitious attempt to provide a conceptual framework for understanding job loss, and then to quantify the magnitude, dy-

namics, and value of the ongoing process of job loss. I think the paper is somewhat more successful in the second part, which focuses on empirical results, than the first, which develops the conceptual framework. There are problems with the second part of the paper, but these problems derive primarily from the inherent difficulties in the first part of the paper in setting out a conceptual framework to understand the dynamics of job loss.

First, consider the conceptual framework. The difficult question addressed is what are the forces leading to efficient versus inefficient—and, presumably, excessive—separations. I think the paper correctly identifies the wage determination process as playing a central role. In particular, it is argued that the key aspect of the employer-employee relationship in this context is suppressed renegotiation. Suppressed renegotiation may be beneficial in terms of promoting investment in firm-specific skills, but may have adverse consequences in terms of promoting efficient separations. I think the idea that something like suppressed renegotiation is related to the simple employer-employee contract that we actually see is probably right, but I still think this story needs further fleshing out. Even more important, the conceptual framework that Hall develops is inherently incomplete, given the ambitious goals of the paper.

I think the paper ultimately seeks to quantify the extent and value of inefficient job loss. What is missing in terms of being able to generate such a calculation? For one, the framework provides no clear guidance on how to distinguish empirically between efficient and inefficient separations. I will show that this means that we really cannot put a value on the cost of inefficient job loss.

Second, while market imperfections in the labor market are obvious sources of inefficient separations, they are hardly the only ones. For example, market imperfections in credit markets are arguably very important in this context. Young small businesses have disproportionately high failure rates and job destruction rates. Some have argued that this finding stems in part from imperfections in credit markets.

The paper is also a bit weak on distinguishing between privately efficient separations and socially efficient separations. From a social efficiency perspective, one potentially important source of inefficient turnover is government policy itself. The paper discusses the role of government intervention, but the attention is primarily on the role of

government in interfering with the employment-at-will doctrine that prevails in the United States.

I think this is too limited a view of the role of government intervention in this context. There are two broad areas of interest here. First, fluctuations in government policies are potentially important as a driving force of the continuing reallocation we actually observe. For example, changes in the magnitude and allocation of defense expenditures and changes in trade policy are sources of allocational changes that will induce turnover.

Second, many government policies impinge on either the marginal job creation or the marginal job destruction decisions by individual producers. For example, subsidizing incumbents in targeted industries may yield too little turnover rather than too much, by allowing the least successful firms, that would otherwise close down or shrink, to survive.

Some of the government intervention at issue here may reflect optimal policy. For example, the policy changes inducing reallocation may be optimal responses to changing economic and world events. Further, one might argue that the subsidization of particular industries may be based on the spillovers associated with the production in that industry. In any event, my point is that characterizing the nature of the efficiency of the observed job loss necessarily involves understanding the role of government intervention in the job reallocation process.

The more general point of this discussion is that in order to generate the calculation that is the objective of this paper we need a more comprehensive conceptual framework. We need a conceptual framework that makes it possible to quantify the turnover that would emerge optimally, given the underlying forces of changes in taste and technology. Based upon this measure, we could then take the difference between the actual and the optimal turnover as an input to quantifying the value of inefficient job loss. This difference would reflect a myriad factors: market imperfections in the labor market (which are stressed in this paper) and market imperfections in credit and product markets, as well as efficiency-enhancing and efficiency-reducing government intervention. I think that it is clear that we are still a long way from being able to accomplish this objective of measuring the extent and identifying the sources of inefficient job loss.

The second part of the paper quantifies the dynamics of job loss, and assigns a value to the job loss. It makes a number of significant contribu-

tions in this regard. First, the paper does a very nice job of relating the various alternative measures of separations. Table 1 and the accompanying discussion will become a standard cite for how to interpret the numbers from a variety of sources. The difficulty here is that separations come in a variety of flavors. Some are separations from one-day or one-week jobs. Others are separations from long-term career jobs. More generally, some are separations that involve a match dissolution while the job continues, and others involve job destruction.

The various sources and associated estimates reflect different components of these separations, and the paper does an excellent job of explaining why these numbers are different. I have found myself on the phone a number of times with reporters asking me to compare the job destruction measures, for example, to the displacement numbers. The next time a reporter calls, I am going to keep this paper by my side.

There are some puzzles in the comparisons of the numbers in table 1 that remain unresolved. For example, the limited evidence available suggests that approximately 40 percent of all separations are associated with direct employment-to-employment transitions.¹ The line labeled "CPS tenure survey, 1981" in table 1 includes direct employment-to-employment transitions, while the "All separations, Current Population Survey" line is a bit mislabeled since it does not include separations resulting in a direct employment-to-employment transition. Beyond the labeling problem, these two estimates are not consistent with the 40 percent figure indicated above (the job loss rate for the "All Separations" line should only be about 60 percent of that of the "tenure survey" line). The paper makes the suggestion that this reflects the high frequency of turnover in the measure based upon the monthly CPS (the "All separations" measure). This may be the means for reconciliation, but it requires verification.

A second, related, contribution of the paper is the evidence on labor market dynamics. Many of us who work with these numbers have calculated that about a third to a half of all job separations are due to job destruction.² A major point of this paper is that this is only part of the story, since job destruction begets further job separations. Workers whose jobs are destroyed seek new matches, and by their very nature, new

1. Davis and Haltiwanger (1995).

2. Davis, Haltiwanger, and Schuh (1995).

matches are subject to higher match termination rates than the typical match.

The paper provides some quite striking evidence on these dynamics, showing that an impulse in job destruction yields persistent rebuilding of employment relationships for several years. This finding is significant for a number of reasons. First, it means that the cumulative contribution of job destruction to total separations is larger than the one-third to one-half calculation discussed above.

Second, this finding suggests that the process whereby permanent job destruction begets further employment losses for several periods may be an important part of persistence that we observe in aggregate fluctuations. There is no shortage of candidate explanations of this persistence. But they have generally been viewed as unsuccessful or incomplete because they can only account quantitatively for relatively short recessions. The long laundry list of factors includes adjustment costs, inventory dynamics, investment dynamics, price stickiness; if I have omitted your pet theory, “just fill in the blanks.”

While this approach looks more promising in terms of accounting for recessions that last for significant periods of time, a number of questions remain open. Of particular interest here is why we observe the burst of permanent—and it is important to emphasize the permanent component—job destruction at the onset of recessions. There have been a number of recent attempts to explain the connection between restructuring and recessions. Here I have in mind the work of Ricardo Caballero, Mohammed Hammour, Dale Mortensen, and Chris Pissarides, the work I have done with Steve Davis, and actually, Hall’s *NBER Macroeconomics Annual* paper that was originally (and still should be) titled, “Recessions as Reorganizations.”³ But this literature is still very much in its infancy.

Finally, we return to the \$76 billion answer. The paper acknowledges that this cannot be interpreted as a measure of the cost (private or social) of job loss. The statement is made that this is an upper bound on the cost of job loss that holds only if all the separations are inefficient. Here we are back to the problem that the framework provides no clear guidance about how to decompose the observed job loss into efficient and inefficient separations.

3. Hall (1991).

However, there are additional important problems with this calculation, including the fact that it depends on the time series of total compensation. To generate this measure of the value of the job loss one multiplies the amount of what is denoted significant job loss by the number of earnings years lost as a result of that job loss times total compensation. Given the total compensation growth over this period, the value associated with the job loss grows over time.

The problem is that the growth in total compensation itself reflects the gains from the process of reallocating resources through job creation and job destruction. One of the key results that has emerged from the work using the plant-level productivity data from the Census Bureau is that an important source of aggregate productivity growth is the reallocation of resources away from the less productive plants to the more productive plants. Here I have in mind the work of Martin Baily, Chuck Hulten, and David Campbell, as well as some of the more recent work I have done with Martin Baily and Eric Bartelsman.

The growth in total compensation used in this paper reflects the growth in productivity associated with the reallocation of resources. It is a bit strange to use total compensation in calculating the cost of the job loss when the measure of compensation itself is affected by the ongoing process of job reallocation of which the job loss is an integral part. Put differently, since we know that the less productive jobs are the ones destroyed, we need to take this into account in generating the associated costs.

It is important to emphasize that this is not just a problem of trying to evaluate the net gain or loss from the process of reallocation. The gross cost of the job loss must also be evaluated at the appropriate compensation for the lost jobs. Lost jobs are from the lower tail of the productivity (and thus compensation) distribution, and this needs to be taken into account.

To sum up, this paper asks virtually all of the right questions about job loss. Further, it makes clear that the development of the various longitudinal worker and establishment databases allows us to investigate these questions in ways that were not possible before. Nevertheless, it leaves the impression that we have a long way to go in developing the appropriate comprehensive framework, both theoretically and empirically, to answer the questions of interest.

General Discussion

George Perry emphasized that the relevance of Hall's results to the dynamics of recessions depends on the macroeconomic paradigm. On the real business cycle paradigm, which does not allow for product market disequilibrium or labor market failures, the job loss dynamics and associated movements in aggregate output and unemployment are part of the efficient reallocation of resources in response to productivity shocks. By contrast, from a neo-Keynsian perspective aggregate demand determines aggregate output and employment, and Hall's job loss dynamics describe how the economy allocates scarce jobs. William Nordhaus noted that, in addition to being silent on which of these paradigms is most accurate, the paper also leaves unexplained the sources of the initial shock to jobs that precipitates a recession.

A number of participants questioned Hall's measure of the costs of job loss. Robert Gordon argued that many job losses, such as those due to plant closing and relocations, are unavoidable. He wondered whether Hall's numbers contain much information beyond that provided by the level and change in the unemployment rate. Hall responded that the ratio of temporary layoff unemployment to total unemployment has decreased dramatically in the past decade, so that a given increase in unemployment is now more costly than before. Ricardo Caballero suggested evaluating the social costs of job loss rather than just the cost to employer and worker. Costs are also borne by the government through lower revenue and higher expenditures for unemployment insurance and social welfare. Nordhaus pointed out that a complete reckoning of the costs of job loss should take into account how people use the time spent not working. Joel Slemrod suggested that the reduction in the value of job-specific human capital was an important component of the welfare cost of job loss, but since these costs also apply to the movement of workers between jobs within firms, they would be hard to measure in the aggregate. Nordhaus observed that the losses of labor estimated by Hall seem inconsistent with the costs of recessions as measured by the Okun gap. According to Hall's calculations, the costs of job loss in excess of the norm totaled around \$35 billion between 1979 and 1982. The shortfall of GDP from potential over that period totaled \$250 billion, which translates into a \$200 billion shortfall in national in-

come. Assuming that the loss is distributed among after-tax profits, proprietor's income, and labor, in proportion to their shares of national income—the nonlabor share, in fact, falls more than proportionately in recessions—labor suffered a loss of something like \$125 billion of income. This is more than triple the size of Hall's figure. Hall thought the difference arose because recessions have effects on workers' incomes beyond the effects through layoffs measured by the PSID, which underlie his calculations.

Margaret Blair and Nordhaus took issue with Hall's view that suppression of renegotiation because of job-specific human capital rationalized layoffs and was nonetheless an optimal arrangement. Blair suggested that if firm-specific investment by employees is really important, use of labor contracts that include profit sharing would deal more efficiently with the problem. Nordhaus noted that other common features of contracts, such as the fact that they are almost always written in nominal rather than real terms, suggest that most contracts are not constrained optimal arrangements. Hall responded that firms do write contingent contracts, sometimes very elaborate ones, but only when the contingencies are observable. He felt that unobservability probably explains the failure to use contingent contracts in most instances. As an example, he noted that law firms fire highly qualified associates who do not become partners. Yet a convincing case has been made that, given asymmetric information about an associate's investment in job-specific human capital, this is actually the best way to run law firms. Furthermore, he argued that it would be meaningless to link the compensation of one lawyer to the profits of the whole firm. Any suitable contingent contract would have to link compensation more closely to the lawyer-client relationship; but this variable is relatively unobservable and too qualitative in nature to embody in a formal contract. Nordhaus, however, warned against inferring much about the general labor market from the high-skilled professions such as law and economics, and about the optimality of cyclical layoffs from the structure of contracts over the life cycle of careers in such professions.

Paul Romer questioned whether parties can commit themselves not to renegotiate. Theory suggests that it is difficult to find mechanisms to force parties to keep their promises after they have obtained what they wanted. But Hall responded that although it may be hard to model theoretically, institutions that are effective at evoking commitment have, in

fact, developed. Firms routinely follow through on promises. There is no obvious commitment mechanism for the Fed, but they would not dream of taking advantage of their second mover position. He concluded that, because games are repeated and reputation is so important, and for other reasons that outstrip our current understanding, effective commitment is a common feature of market economies.

Several comments centered on empirical evidence on the suppression of renegotiation. Slemrod suggested that it would be useful to examine how layoffs, firing, and wage cuts differed for jobs and occupations with different job-specific human capital content. William Brainard and Hall mentioned the work of Truman Bewley, who interviewed firms about their hiring and firing behavior. Bewley's surveys indicate that "everyone in the labor market knows" that cutting wages destroys morale and damages a firm's reputation unless it can be persuasively demonstrated that the firm is in deep financial difficulty. Cutting wages because cheaper labor is available, or because labor is worth less to the firm, is incendiary. The importance of making a credible case that cuts are driven by necessity is clear from the prevalent view of managers that if they cut workers' pay, management should take cuts as well.

Discussion turned to how Hall's paper relates to business cycles. Daniel Sichel pointed out that the cyclical pattern of output is quite different than the pattern of job loss. Excepting the last recovery, time-series evidence indicates that output recovers rapidly; the economy typically climbs from its trough to its prior peak in two quarters. The pattern of large job loss followed by a drawn-out period of job recovery implies dramatic changes in productivity during the recovery.

Several panelists contrasted American with European and Japanese labor market experience. Richard Cooper observed that the turnover figures in table 1 are staggeringly high compared to those of European countries. European unemployment rates are high, but flows into and out of employment are lower. Hall suggested that temp agencies, day work, and very short-term contract work are much less important in European and Japanese labor markets, in part, at least, because of government policy. While a calculation of the costs of job loss using Hall's methodology would be much lower in Europe than in the United States, Cooper stated that economists generally believe that the lack of turnover is a disadvantage for Europe, reducing productive labor reallocation. Hall concurred, arguing that the institution of the short job adds to

the efficiency of the U. S. labor market. However, if the reallocation of labor from nonproductive to productive pursuits is an important part of productivity growth, as John Haltiwanger suggests, the absence of effective internal labor markets would make it difficult to explain the high productivity growth in Japan. This suggests, Brainard and Hall argued, that within-firm labor markets in Europe and Japan may accomplish much of the allocation of labor that involves changing employers in the United States.

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