8 August 2005

Comments on "Job Loss, Job Finding, and Unemployment in the U.S. Economy over the Past Fifty Years" By Robert E. Hall

Prepared for the NBER Macro Annual

Steven J. Davis

Like several other recent studies, Robert Hall's paper puts the job-finding rate front and center of efforts to explain unemployment fluctuations. Three observations motivate this attention to the job-finding rate. First, the rate at which job-seeking workers find and accept new employment positions fluctuates in a strongly pro-cyclical manner. Second, changes in estimated job-finding rates account for much of the movements in the unemployment rate over time. And third, the job-finding rate is a key variable in equilibrium search and matching theories that build on Diamond (1982), Mortensen (1982) and Pissarides (1985). In light of these observations, I share Hall's view that the hiring decision is a central topic for students of unemployment fluctuations.

My remarks below take issue with other themes in Hall's paper. For example, Hall suggests that new research and new data challenge the traditional view that "a recession begins with a wave of layoffs, mainly in cyclical durable-goods industries." There is little in Hall's paper or other recent research that undermines this aspect of the traditional view. It is useful, however, to recognize that the declining share of aggregate employment in cyclically sensitive durable-goods industries tends to diminish the wave of layoffs that accompany recessions.

Hall also downplays the distinction between quits and layoffs, and the heterogeneous character of separations more generally, choosing instead to focus on the

total rate of job separations. This choice fits with the theoretical models that Hall considers, but it has three shortcomings as a device for organizing the evidence. First, there is wide variability in the nature of employment relationships and the resulting job separations. Some separations reflect the termination of long-tenure employment relationships, some reflect the termination of unsuccessful matches after a short trial period, and some reflect the end of short jobs that were never intended to endure. Second, some separations occur at the initiative of workers (quits) and others at the initiative of employers (layoffs). Much evidence indicates that the post-separation path of earnings and unemployment differ sharply between quits and layoffs. Third, the ratio of quits to layoffs rises and falls with the growth rate of employment, so that the composition of total separations varies in a systematic cyclical manner. I argue below that the cyclical behavior of job loss and worker displacement remains a key issue for macroeconomic analyses of labor market fluctuations. In this respect, my views are closer to Hall (1995) than Hall (2005).

Hall's Method for Estimating Separation Rates Back to 1948

To estimate the rate of job separations back to 1948, Hall first fits the relationship between separations and net employment growth to monthly, industry-level data for the period covered by the JOLTS (December 2000 forward). He then relies on the fitted relationship and historical data on net employment growth to obtain an estimated series for the job separations rate back to 1948, shown in his Figure 2.

To evaluate Hall's method, it is helpful to plot the industry-level data on the separations rate against the net growth rate. See my Figure 1, which also shows a

nonparametric regression fit of the separations rate to the net growth rate. There is a pronounced nonlinearity in the separations-net relationship, with a slope of about -1.6 to the left of zero and 0.6 to the right of zero. By way of comparison, Hall obtains an estimated slope of -0.29 to the left of zero and 0.05 to the right of zero. I suspect that Hall finds a much flatter relationship and a much less pronounced nonlinearity because his regression relies on the BLS payroll survey for data on industry-level employment growth. In contrast, my Figure 1 relies on JOLTS data for both the separations rate and the net growth rate. Discrepancies between the two surveys lead to measurement error in Hall's regressors, which is likely to attenuate the estimated relationship.[i] The fitted relationship in my Figure 1 would produce a greater rise in the estimated separations rate during recessions, especially deep ones, than Hall's fitted relationship. I conclude that Hall understates the volatility and cyclical movements in the total separations rate.

[Figure 1 here]

Hall's Method for Estimating Job-Finding Rates Back to 1948

Given the separations rate, *s,* Hall calculates the job-finding rate as

$$f = s\left(E / X\right) \;\Rightarrow\; \log(f) = \log(s) + \log(E / X), \tag{1}$$

where E denotes employment and X is Hall's measure of expanded unemployment. It follows from (1) that any understatement in the cyclical variation of the estimated separations rate translates directly into a corresponding overstatement for the job-finding rate. Hence, I also conclude that Hall exaggerates cyclical movements in the job-finding rate. This conclusion is reinforced by comparing Hall's series for the job-finding rate in his Figure 9 to direct estimates of the job-finding rate for unemployed workers in

Bleakley et al. (1999) and Shimer (2005a,b). Nevertheless, it is important to recognize that direct estimates of job-finding rates for unemployed workers also show strongly pro-cyclical movements.

The Job-Finding Rate and the Cyclical Behavior of Unemployment Flows

Changes in the job-finding rate play a bigger role than changes in the separations rate in accounting for movements in the unemployment rate. Hall states this point in a very strong form, claiming that "Unemployment rises [in recessions] almost entirely because jobs become harder to find." Shimer (2005b) makes the point using the steady-state expression for unemployment:

$$\text{(Steady-State Unemployment Rate)}_t = s_t/(s_t + f_t), \qquad (2)$$

where s_t denotes the rate of job separations for employed persons at *t,* and f_t denotes the job-finding rate for unemployed persons. Shimer observes that this steady-state expression closely approximates the actual unemployment rate in monthly data. In light of this observation, he compares (2) to the time series generated by $\bar{s}/(\bar{s} + f_t)$, where $\bar{s}$ is the mean separations rate. This generated series closely tracks major movements in the postwar U.S. unemployment rate, although it typically understates the rise in unemployment during recessions. In comparison, the time series generated by $s_t/(s_t + \bar{f})$ fares not nearly as well in accounting for unemployment rate movements. These results lead Shimer to conclude that changes in the job-finding rate play the major role in accounting for unemployment rate movements, very similar to Hall's view.

However, it is also important to recognize that the cyclical behavior of unemployment inflows and outflows cannot be explained without appealing to a leading

role for changes in the job separations rate. Several empirical studies document the rise in worker flows from employment to unemployment *and* from unemployment to employment during postwar U.S. recessions.[ii] For example, Figure 10 in Blanchard and Diamond (1990) shows that the monthly flows from employment to unemployment nearly double during the 1970 and 1973-75 recessions, and that flows from unemployment to employment rise by more than one-third. Accounting for this pattern in unemployment flows requires a central role for the job separations rate.

To see this point, consider my Figure 2, which plots the monthly path of unemployment, workers flows from employment to unemployment (E→U), and worker flows from unemployment to employment (U→E) in response to a hypothetical drop in the job-finding rate. All three variables are expressed as percentages of a constant labor force. In generating these response paths, I consider a two-state system that starts at a steady state with a monthly job-finding probability of .46 and a monthly job separation probability of .035, the mean values in the postwar U.S. economy according to Shimer's estimates. As seen in Figure 2, a drop in the job-finding probability to .30 raises the unemployment rate from about 5 percent to about 9 percent. In constructing the figure, I rely on Shimer's careful analysis of time aggregation to simulate measured flows given monthly sampling of a continuous-time process.[iii] In this way, I capture the measured rise in E→U flows associated with a drop in the job-finding probability and a greater likelihood that a job-losing worker is unemployed at the sampling date.

[Figure 2 here]

Figure 2 illustrates two points. First, the large drop in the job-finding rate triggers a modest rise of roughly 10% in the measured E→U flows, much smaller than the

observed rise in major recessions. Thus, the time aggregation effect, while undoubtedly present in the data, is too weak to account for the recessionary rise in E→U flows documented by Blanchard and Diamond and other researchers. To explain this rise, it is essential to posit a sharp rise in the job separations rate. Second, the hypothetical drop in the job-finding rate leads to a decline in measured U→E flows on impact and in the near-term aftermath. This hypothetical response path is dramatically at odds with the evidence. To explain the evidence, it is again necessary to posit a sharp rise in the separations rate. In fact, the two-state system can simultaneously generate large increases in E→U and U→E flows by combining a sizable drop in the job-finding rate with a sizable rise in the separations rate.

These observations about the cyclical behavior of unemployment inflows and outflows provide another indication that something is amiss in Hall's characterization of the job separations rate. Either the separations rate exhibits considerable counter-cyclical variation, contrary to Hall's claim, or the propensity of separated workers to become unemployed rises sharply in recessions. A lower job-finding rate does not, by itself, raise measured unemployment inflows by nearly enough to explain the data.

Cyclical Variation in Quits, Layoffs, and the Composition of Job Separations

A long line of empirical research – dating back at least to Slichter (1921) and Woytinksy (1942) and including more recent contributions by Akerlof et al. (1988) and others – stresses the pro-cyclical behavior of quits and the counter-cyclical behavior of layoffs. JOLTS data show the same pattern, but the decline in quits and the rise in layoffs are small in the recent recession, as Hall notes. Of course, the recent recession also

involves a mild employment contraction, which may account for the modest movements in quit and layoff rates.

My Figure 3, reproduced from Davis, Faberman and Haltiwanger (2005), provides some evidence on this point. The figure plots the layoff-separation ratio against the net employment growth rate in the manufacturing sector for the recent period covered by JOLTS and for the 1947 to 1981 period covered by the BLS Manufacturing Turnover Data (MTD).[iv] A quadratic polynomial in the net growth rate is separately fit to the observations from each data set. The figure shows that layoffs account for a larger (smaller) fraction of separations when the employment growth rate is low (high). The layoff-separation ratio varies widely, ranging from less than .2 to more than .7. The sensitivity of the layoff-separation ratio to the net growth rate is nearly identical in the JOLTS and the MTD, but the range of net growth rate observations is much narrower in the JOLTS. That is, Figure 3 indicates that the period covered by JOLTS exhibits modest variation in the layoff-separation ratio because employment growth fluctuates in a narrow range during the JOLTS sample period.

[Figure 3 here]

Another BLS data set provides additional evidence on the behavior of layoffs before, during and after the 2001 recession. The Mass Layoff Statistics (MLS) report monthly data for mass layoff actions – episodes in which an establishment has at least 50 initial claims for unemployment insurance during a 5-week period. The MLS reports the number of such actions and the number of unemployment insurance claimants involved in these actions. This number is a much narrower measure of layoffs than the JOLTS

measure, but the concept of mass layoff actions is closer to the worker displacement events that are associated with large and persistent earnings losses for laid-off workers.[v]

My Figure 4 reproduces a BLS chart for the number of claimants involved in mass layoff actions from June 2000 to May 2005.[vi] MLS data for the five years prior to June 2000 show that the number of mass layoff claimants fluctuates in the range of roughly 100,000 to 150,000 per month, except for a single month in 1998. Hence, the sustained upsurge in mass layoff claimants that begins in November 2000 is unlike any other episode in the eleven years covered by the MLS. These data support the view that recessions, including the mild recession of 2001, bring a wave of additional layoffs. Figure 4 also shows that the manufacturing sector accounts for a disproportionate share of these additional layoffs, in line with the traditional view of recessions.

[Figure 4 here]

Boisjoly et al. (1998) provide evidence on the cyclicality of layoff rates using data from the Panel Study of Income Dynamics. They consider male household heads, 25-59 years old with at least one year of tenure on the job and at least 1,000 hours of work in the previous year. Their Figures 1 and 2, which cover the period from 1968 to 1992, show that layoff rates for these workers rise by roughly 50-100 per cent in recessions. Many authors have produced evidence of large counter-cyclical movements in layoff rates by examining Current Population Survey (CPS) data on unemployment inflows by reason for unemployment and worker flows out of employment by reason. See, for example, Davis, Haltiwanger and Schuh (1996, chapter 6) and Bleakley et al. (1999).

The Cyclical Behavior of Job Destruction Rates

A decline in the common component of plant-level employment growth raises the job destruction rate and lowers the job creation rate. If the common component were the whole story behind cyclical movements in job creation and destruction, then the two series would exhibit similar variability over time. In fact, the shape of the cross-sectional growth rate density changes over the cycle in a way that accentuates the job destruction rise in downturns. Davis and Haltiwanger (1989, 1990) and Foote (1998) provide evidence on this point. As Foote (1998, page 818) put it, an aggregate employment contraction involves "an increase in the number of firms making large downward adjustments, with comparatively little change in the number of firms making positive adjustments or none at all."[vii]

One way to see this point is to compare the job destruction series generated by the common component of plant-level growth to the actual job destruction series. I carry out this comparison along the lines suggested by Hall's equation (2). I first fit the empirical distribution of plant-level growth rates, $F(\varepsilon)$ in Hall's notation, to quarterly plant-level data in the Longitudinal Research Database for the 1972 to 1993 period. There are more than 4 million plant-level observations, so it is easy to obtain precise estimates of $F(\varepsilon)$ using simple nonparametric methods. Next, given the average empirical distribution $F(\varepsilon)$, I feed through the realized time series of aggregate net employment growth rates, z_t. This procedure yields a simulated job destruction series, $\hat{d}_t$ in Hall's notation, which I compare to the actual job destruction series in Figure 5.[viii] Figure 6 reports an analogous comparison for job creation.

[Figure 5 here]

[Figure 6 here]

Figure 5 shows that the simulated destruction series understates the observed job destruction spike in all four recessions, more so in the deeper contractions of 1973/74 and 1981/82. Likewise, Figure 6 shows that the simulated creation series overstates the decline in actual job creation in recessions. The variance ratio, Var(JD)/Var(JC), is 1.04 in the simulated data and 2.26 in the actual data. Thus, the asymmetry in the cyclical behavior of job creation and destruction is not captured by movements in the common component of plant-level employment growth.

The Connection between Job Destruction and Layoffs

Job destruction is closely associated with layoffs and worker displacement. Several pieces of evidence support this claim. For example, Bleakley et al. (1999) show that major job destruction spikes in the manufacturing sector coincide with spikes in the flow of manufacturing workers out of employment. This pattern is apparent in one of their charts, reproduced here as Figure 7. The lower curve in Figure 7 shows the quarterly job destruction rate in the U.S. manufacturing sector, as calculated from the LRD by Davis, Haltiwanger and Schuh (1996) and expressed at a monthly rate. The upper curve shows the monthly exit rate from manufacturing employment to unemployment or out of the labor force, as calculated from CPS gross flows data by Bleakley et al. The two curves mirror one another closely in the three recession episodes.[ix]

The JOLTS data afford new opportunities to investigate the relationship between job and worker flows. Pursuing this line of investigation, Figure 12 in Davis, Faberman and Haltiwanger (2005) shows a tight link between job destruction and layoffs in the

cross-section of JOLTS establishments. Their Table 3 reports a monthly time-series regression of the JOLTS layoff rate on JOLTS-based job creation and destruction rates. The estimated regression coefficients are -.02 on the creation rate and .59 on the destruction rate, with a standard error of about .06 for both coefficients. The adjusted R-squared value for the regression is .76. This time-series regression implies that the layoff rate is highly sensitive to the job destruction rate. In short, the JOLTS data show a close connection between job destruction and layoffs over time at the aggregate level and in the cross section of establishment-level observations.

This JOLTS-based evidence also provides additional support for the view that layoff rates fluctuate in a strongly counter-cyclical manner. In particular, the JOLTS times-series regression implies 59 additional layoffs for each 100 destroyed jobs. By all available evidence, the job destruction rate rises in recessions, sharply so in the manufacturing sector.

The Quit-Layoff Distinction

There is a large body of research on the wage, earnings, and employment outcomes associated with quits and layoffs. As I now discuss, this research provides good reasons to question Hall's focus on the total job separations rate and his decision to downplay the quit-layoff distinction.

Layoffs are associated with greater unemployment incidence and longer unemployment spells than quits. For example, Leighton and Mincer (1982) find that laid-off workers are twice as likely as quits to become unemployed in the National Longitudinal Survey of men. Similarly, McLaughlin (1990) finds higher unemployment

incidence for laid-off workers in the Panel Study of Income Dynamics. Mincer (1986) finds that two-thirds of layoffs among white men result in unemployment, as compared to one-third of quits. Conditional on unemployment, mean spell length is nearly twice as long for laid-off workers in Mincer's study. Similarly, CPS data show that monthly escape rates from unemployment are 10-15 percentage points lower for permanent layoffs than for quits. See Figure 6.8 in Davis, Haltiwanger and Schuh (1996) and Figure 4 in Bleakley et al. (1999).

Many laid-off workers experience large and persistent earnings losses, apparently as a direct consequence of job loss. The evidence on this point is most dramatic and compelling for prime-age workers who lose high-tenure jobs in mass layoff events. These job losers experience large, persistent declines in earnings relative to their previous earnings and relative to the earnings of observationally similar workers who are not laid off. Jacobson, Lalonde and Sullivan (1993) provide one of the best and best-known studies of this phenomenon. Stevens (1997) finds that an initial displacement event raises a worker's incidence of job loss for several years thereafter. Similarly, Ruhm (1991) finds that displaced workers experience higher unemployment rates for at least four years after the initial job loss event. Topel (1990) presents evidence that earnings losses (relative to pre-displacement levels) are smaller and less persistent for job losers with lower tenure.

Summarizing the evidence on the quit-layoff distinction: laid-off workers are more likely to become unemployed; they have lower exit rates from unemployment; they experience less employment stability following an initial displacement event; they often experience a large and persistent decline in earnings; and the loss in earnings is bigger

and more persistent for job losers with higher tenure. As I have also discussed, the incidence of layoffs fluctuates in a strongly counter-cyclical manner. In short, laid-off workers experience significantly worse labor market outcomes, and recessions bring many more laid-off workers.

There are many competing interpretations for these and other systematic outcome differences between quits and layoffs. One view interprets all separations (and retentions) as efficient outcomes in the sense that they maximize the joint surplus of employer and worker. According to this view, quits and layoffs are mere labels that lack deeper economic significance. McLaughlin (1990, 1991) provides the most detailed development of this view. Another view, articulated by Hall and Lazear (1994), stresses two-sided information asymmetries that preclude fully efficient separation outcomes in bilateral employment relationships. According to this view, second-best solutions to informational problems lead to real wage rigidity and the excess sensitivity of quits and layoffs to labor demand.[x] Other interpretations of the quit-layoff distinction stress legal and institutional constraints on compensation and separations, negative effects of wage cuts on employee morale and productivity (Bewley, 1999), adverse selection effects on quits and workforce quality induced by wage cuts (Weiss, 1990), and insider-outsider conflicts that lead to inefficient wage structures and rigid separation policies (Lindbeck and Snower, 2002).

Many of these other interpretations of the quit-layoff distinction depart, implicitly or explicitly, from a strictly bilateral perspective on compensation, separations and other aspects of the employment relationship. Collective bargaining provides an obvious example. Aside from collective bargaining and legal constraints, employers often rely on

wage policies – rather than individually bargained wages – to determine compensation and influence turnover. These policies specify wages as a function of seniority, credentials, and position within an organization, and concerns about internal pay structure loom large. Such "multi-lateral" compensation policies offer greater scope for a meaningful distinction between quits and layoffs than the bilateral perspective that pervades equilibrium search theories. It is a challenge to incorporate "multi-lateral" aspects of compensation and turnover and departures from bilateral efficiency into equilibrium search models. My impression is that equilibrium search theories have, for the most part, steered clear of these issues for reasons of analytical simplicity, rather than evidence that they are unimportant.

Unemployment and Earnings Losses in Equilibrium Search Models

In the class of equilibrium search models with efficient separations and homogeneous workers and jobs, the impact of job loss and unemployment on lifetime earnings is rather modest. More to the point, the earnings losses in these models are much smaller than the estimated impact of job loss in the empirical literature on displaced workers. Simple back-of-the envelope calculations serve to illustrate these points.

First, consider the impact of job loss and unemployment in the theory. Make the following assumptions:

i. An expected working life of 40 years with 5.5% of time spent unemployed.
ii. A flat wage profile.
iii. Job loss brings one month of unemployment, followed by a return to employment at the job-finding rate of .46 per month.

iv. No unemployment benefits.

v. An annual discount rate of 3 percent.

Given these assumptions, the negative income effect associated with unemployment amounts to 0.8% of expected lifetime earnings in present value terms. If jobless benefits are available for the first six months of an unemployment spell at a replacement rate of 40%, then the negative income effect shrinks to 0.5% of lifetime earnings. If, instead, we assume that the job-fining rate is only .30 per month, then the negative income effect of unemployment amounts to 1.2% of lifetime earnings in the case of no unemployment benefits, and 0.8% in the case with unemployment benefits. If anything, these numbers overstate the impact of job loss in this class of models, because I have ignored other sources of implicit income during unemployment, and I have assumed that job loss always entails at least one month of unemployment.

Now consider the impact of job loss in the empirical literature on displaced workers. I draw on the estimated earnings impact of job loss in the study by Jacobson, Lalonde and Sullivan (1993). They consider a "mass-layoff" sample of workers with job tenure of six or more years, and who lose jobs during the early and mid 1980s. Their sample contains job separators from establishments in Pennsylvania that, within a year of separation, have employment levels at least 30% below their maximum levels in the late 1970s. They further require that the employer have at least 50 employees in 1979, and that separators have positive earnings (in Pennsylvania) during each calendar year. They find that mean earnings fall by 50% in the quarter of displacement, then recover by roughly half over the following six quarters. Five years after displacement, mean earnings remain 25% below pre-displacement levels.

Based on this evidence, consider an illustrative calculation in which displacement brings a 40% earnings reduction in year 1, a 30% reduction in year 2, and a 25% reduction in years 3 to 6. This time profile of lost earnings implies that job displacement lowers the present value of lifetime earnings by roughly 8 to 18 percent, depending on whether and when earnings return to baseline after year 6 and assuming that the displacement event occurs at the midpoint of the working life. Thus, the estimated earnings losses associated with worker displacement in the study by Jacobson, Lalonde and Sullivan are an order of magnitude larger than the losses implied by the class of equilibrium search models with efficient separations and homogeneous workers and jobs. See Den Haan, Ramey and Watson (2000) for a much fuller analysis of whether equilibrium search models can explain the empirical evidence on displaced workers.

My illustrative calculations highlight the wide gulf between equilibrium search models with efficient separations and the empirical evidence on the earnings effects of job loss and worker displacement. One might respond that this class of models has focused on unemployment fluctuations and labor market flows, not the earnings losses associated with job loss. No doubt, this focus is a useful one in many respects. But this focus is too narrow to address many of the most important questions associated with job loss and cyclical fluctuations in the labor market.

Concluding Remarks

Let me summarize my main points:

1. Although he overstates the case, Hall rightly stresses the pro-cyclical behavior of the job-finding rate in his account of unemployment rate fluctuations. Progress in

research on the "Economics of the Job-Finding Rate" can significantly improve our understanding of unemployment behavior.

2. Hall understates the extent of counter-cyclical movements in the job separations rate. More important, his focus on the total separations rate is misplaced in my view. Layoffs are strongly counter cyclical, and quits are strongly pro cyclical. Laid-off workers become unemployed at a higher rate, experience longer unemployment spells and have inferior post-separation earnings paths.
3. Explaining the cyclical behavior of unemployment inflows and outflows requires a leading role for counter-cyclical movements in the job separations rate or the propensity of separated workers to become unemployed.
4. Job destruction and layoffs are closely connected in the micro cross section and over time at the aggregate level. Mass-layoff events associated with rapid job destruction involve large and persistent earnings losses for many of the job losers.
5. The quit-layoff distinction, the efficiency of separations, and empirical evidence on the earnings losses of displaced workers are troublesome issues for equilibrium search theories of unemployment and labor market flows. Attention to these issues is essential if these theories are to provide a broad analytical treatment of labor market fluctuations and their consequences.

References

Akerlof, George A., Andrew K. Rose and Janet Yellen (1988) "Job Switching and Job Satisfaction in the U.S. Labor Market," *Brookings Papers on Economic Activity, 1988,* no. 2.

Bewley, Truman (1999) *Why Wages Don't Fall During a Recession.* Cambridge, Massachusetts: Harvard University Press.

Blanchard, Olivier Jean and Peter Diamond (1990) "The Cyclical Behavior of the Gross Flows of U.S. Workers," *Brookings Papers on Economic Activity, 1990:2,* 85-143.

Bleakley, Hoyt, Ann E. Ferris and Jeffrey C. Fuhrer (1999) "New Data on Worker Flows During Business Cycles," *New England Economic Review* (July/Agust), 49-76.

Boisjoly, Johanne, Greg J. Duncan and Timothy Smeeding (1998) "The Shifting Incidence of Involuntary Job Losses from 1968 to 1992," *Industrial Relations, 37,* no. 2 (April), 207-231.

Darby, Michael, John Haltiwanger and Mark Plant (1986) "The Ins and Outs of Unemployment: The Ins Win," NBER Working Paper No. 1997, August.

Davis, Steven J. (1987) "Fluctuations in the Pace of Labor Reallocation," *Carnegie-Rochester Conference Series on Public Policy, 27,* 335-402.

Davis, Steven J., Jason Faberman and John Haltiwanger (2005) "The Flow Approach to Labor Markets: New Data and Recent Evidence," IZA Discussion Paper 1639.

Davis, Steven J. and John Haltiwanger (1989) "Gross Job Creation, Gross Job Destruction, and Employment Reallocation," Working Papers in Economics E-89-33, The Hoover Institution, Stanford University.

Davis, Steven J. and John Haltiwanger (1990) "Gross Job Creation and Destruction: Microeconomic Evidence and Macroeconomic Implications," *NBER Macroeconomics Annual,* edited by Olivier Jean Blanchard and Stanley Fischer. Cambridge, MA: MIT Press.

Davis, Steven J., John C. Haltiwanger and Scott Schuh (1996) *Job Creation and Destruction.* Cambridge, MA: The MIT Press.

Den Haan, Wouter, Garey Ramey and Joel Watson (2000) "Job Destruction and the Experiences of Displaced Workers," *Carnegie-Rochester Conference Series on Public Policy,* 52, 87-128.

Diamond, Peter A. (1982) "Aggregate Demand Management in Search Equilibrium," *Journal of Political Economy,* 90, no. 5, 881-894.

Foote, Christopher L. (1998) "Trend Employment Growth and the Bunching of Job Creation and Destruction," *Quarterly Journal of Economics,* 113, no. 3 (August), 809-934.

Hall, Robert E. (1995) "Lost Jobs," *Brookings Papers on Economic Activity, 1995* (1), 221-273.

Hall, Robert E. (2005) "Job Loss, Job Finding, and Unemployment in the U.S. Economy over the Past Fifty Years," Stanford University, July 12.

Hall, Robert E. and Edward P. Lazear (1984) "The Excess Sensitivity of Layoffs and Quits to Demand," *Journal of Labor Economics,* 2, no. 2, 233-257.

Jacobson, Louis S., Robert J. Lalonde and Daniel G. Sullivan (1993) "Earnings Losses of Displaced Workers," *American Economic Review* 83, no. 4: 685-709.

Leighton, Linda and Jacob Mincer (1982) "Labor Turnover and Youth Unemployment," in *The Youth Labor Market Problem: Its Nature, Causes and Consequences,* edited by Richard Freeman and David Wise. Chicago: University of Chicago Press.

Lindbeck, Assar and Dennis J. Snower (2002) "The Insider-Outsider Theory: A Survey," IZA Discussion Paper No. 534.

McLaughlin, Kenneth J. (1990) "General Productivity Growth in a Theory of Quits and Layoffs," *Journal of Labor Economics, 8,* no. 1 (January), 75-98.

McLaughlin, Kenneth J. (1991) "A Theory of Quits and Layoffs with Efficient Turnover," *Journal of Political Economy, 99,* no. 1, 1-29.

Mincer, Jacob (1986) "Wage Changes in Job Changes," *Research in Labor Economics, 8A,* 171-197.

Mortensen, Dale T. (1982) "Property Rights and Efficiency in Mating, Racing and Related Games," *American Economic Review* 72, no. 5, 968-979.

Pissarides, Christopher (1985) "Short-Run Equilibrium Dynamics of Unemployment, Vacancies, and Real Wages," *American Economic Review,* 95, no. 1, 25-49.

Ramey, Garey and Joel Watson (1997) "Contractual Fragility, Job Destruction and Business Cycles," *Quarterly Journal of Economics* 112, 873-911.

Ruhm, Christopher J. (1991) "Are Workers Permanently Scarred by Job Displacements?" *American Economic Review* 81, no. 1, 319-324.

Shimer, Robert (2005a) "The Cyclical Behavior of Equilibrium Unemployment and Vacancies," *American Economic Review* 95, no 1, 25-49.

Shimer, Robert (2005b) "Reassessing the Ins and Outs of Unemployment." Paper presented at the NBER Economic Fluctuations Program Meeting in Cambridge, Massachusetts on July 16, 2005.

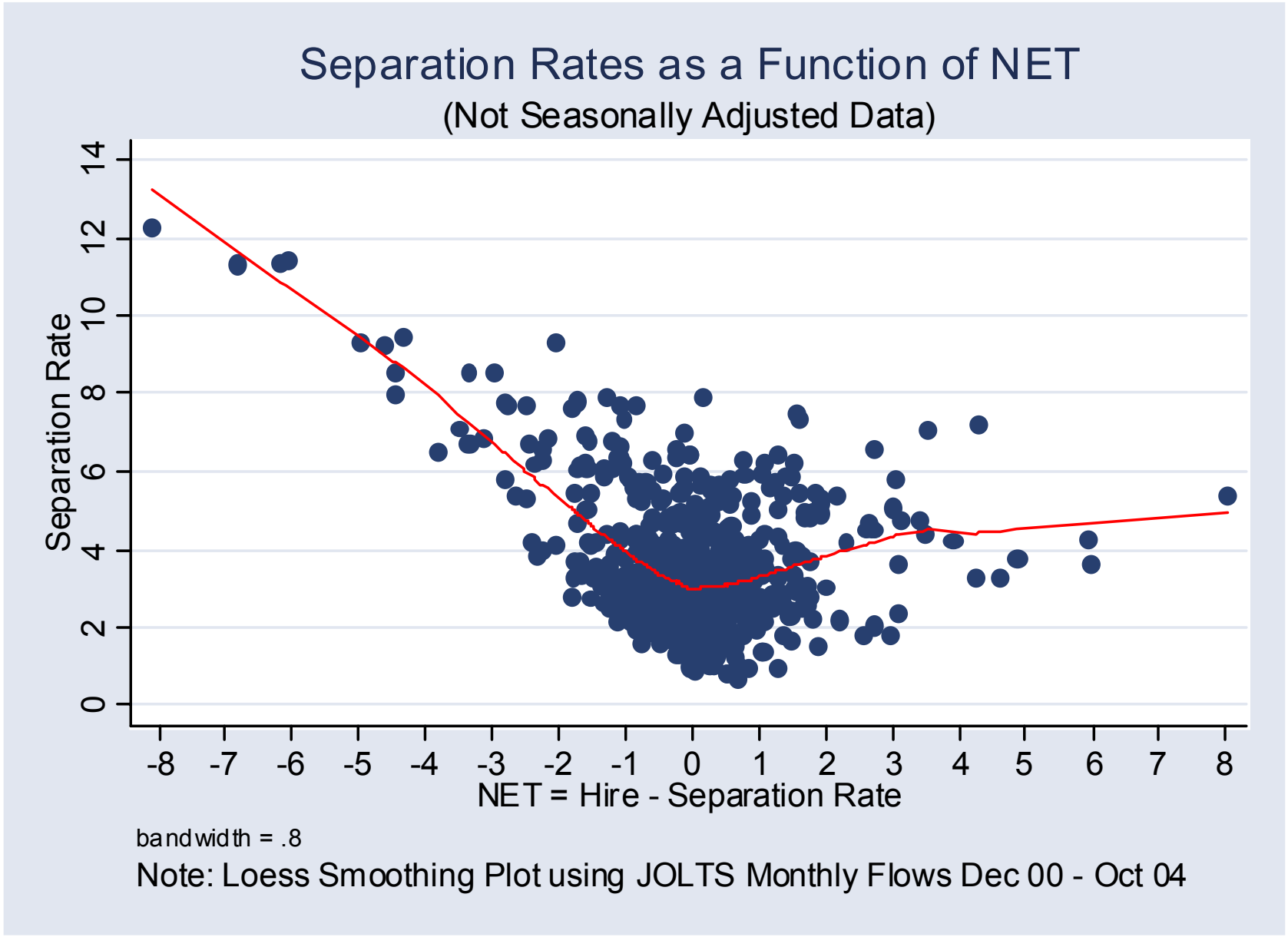
Slichter, Sumner H. (1921) *The Turnover of Factory Labor.* New York: D. Appleton and Company.

Stevens, A. H. (1997) "Persistent Effects of Job Displacement: The Importance of Multiple Job Losses," *Journal of Labor Economics* 15, 165-188.

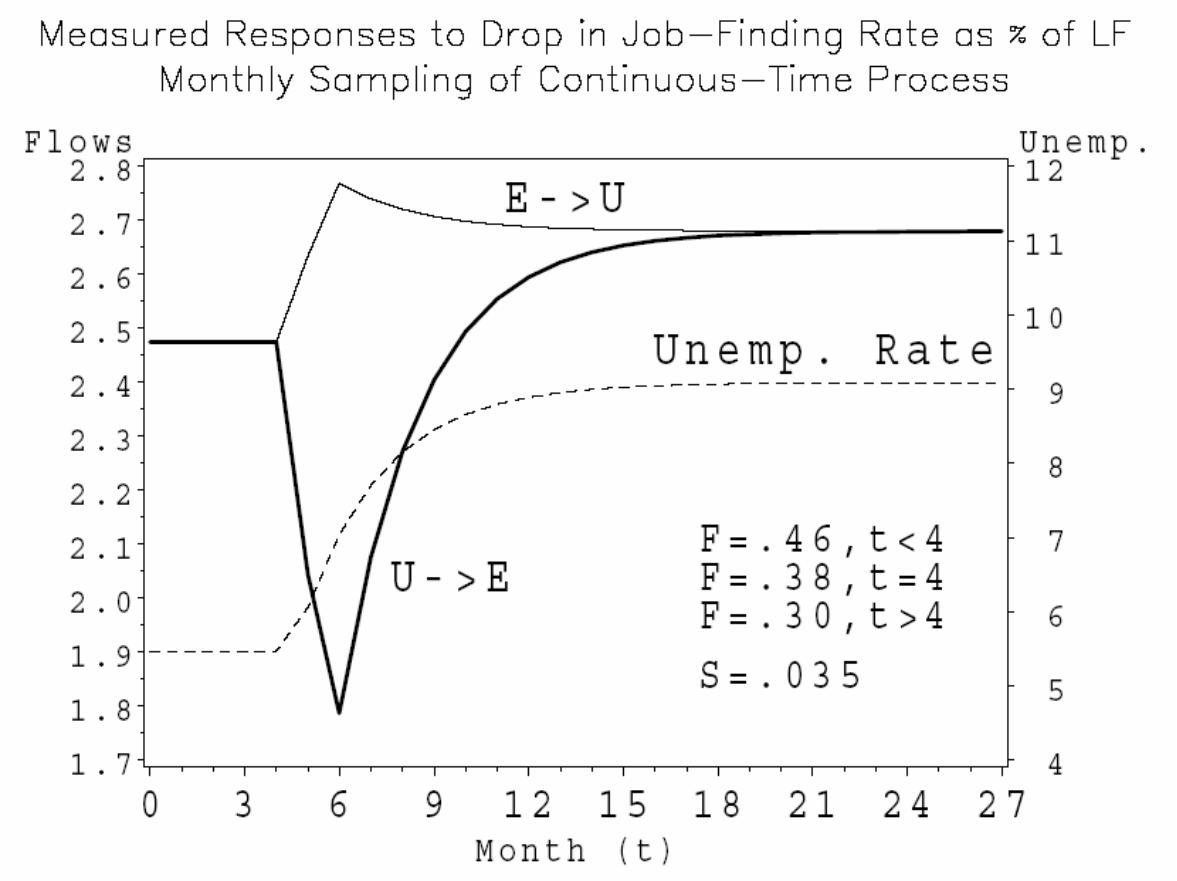
Topel, Robert (1990) "Specific Capital and Unemployment: Measuring the Costs and Consequences of Worker Displacment," *Carnegie-Rochester Conference Series on Public Policy,* 33, 181-214.

Weiss, Andrew (1990) *Efficiency Wages: Models of Unemployment, Layoffs and Wage Dispersion.* Princeton, New Jersey: Princeton University Press.

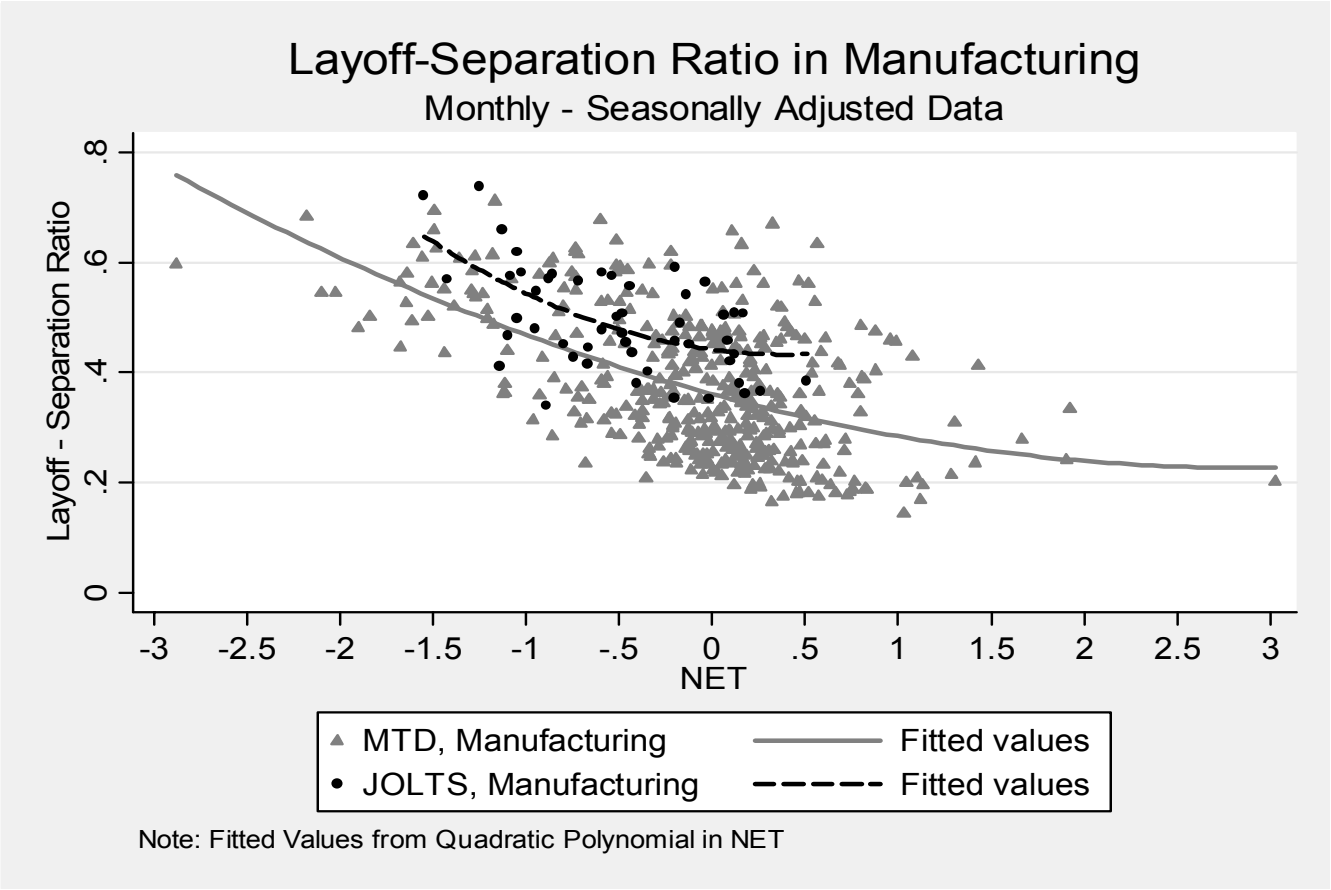
Woytinsky, W.S. (1942) *Three Aspects of Labor Dynamics: A Report Prepared for the Committee on Social Security.* Washington, D.C.: Social Science Research Council. Reprinted in 1974 by Greenwood Press in Westport, Connecticut.


Separation Rates as a Function of NET
(Not Seasonally Adjusted Data)
Separation Rate
0
2
4
6
8
10
12
14
-8
-7
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
NET = Hire - Separation Rate
bandwidth = .8
Note: Loess Smoothing Plot using JOLTS Monthly Flows Dec 00 - Oct 04

[Figure 1 is shown on the previous page. Figure 2 is shown on this page.]

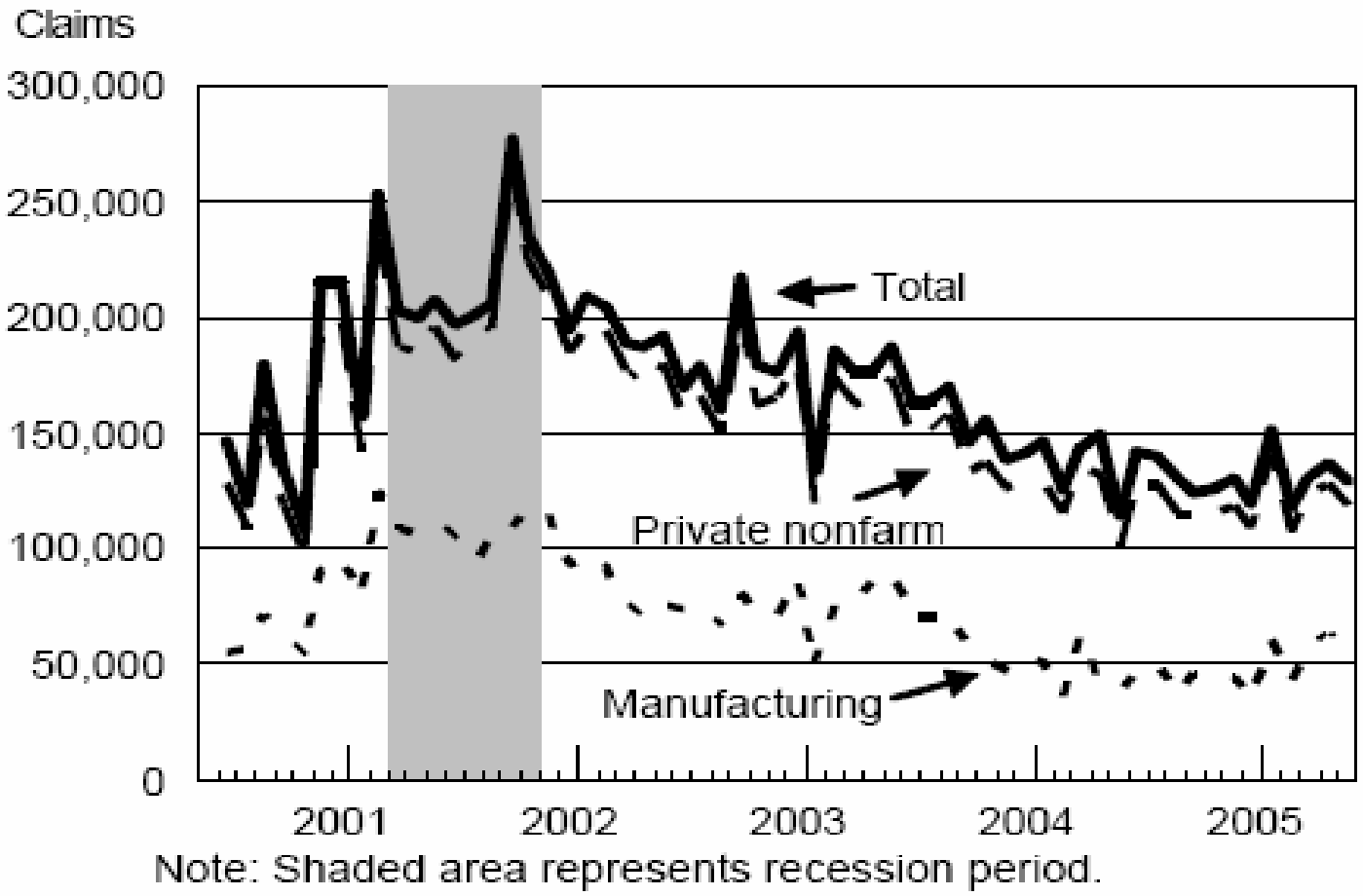


[Figure 3 is shown below.]



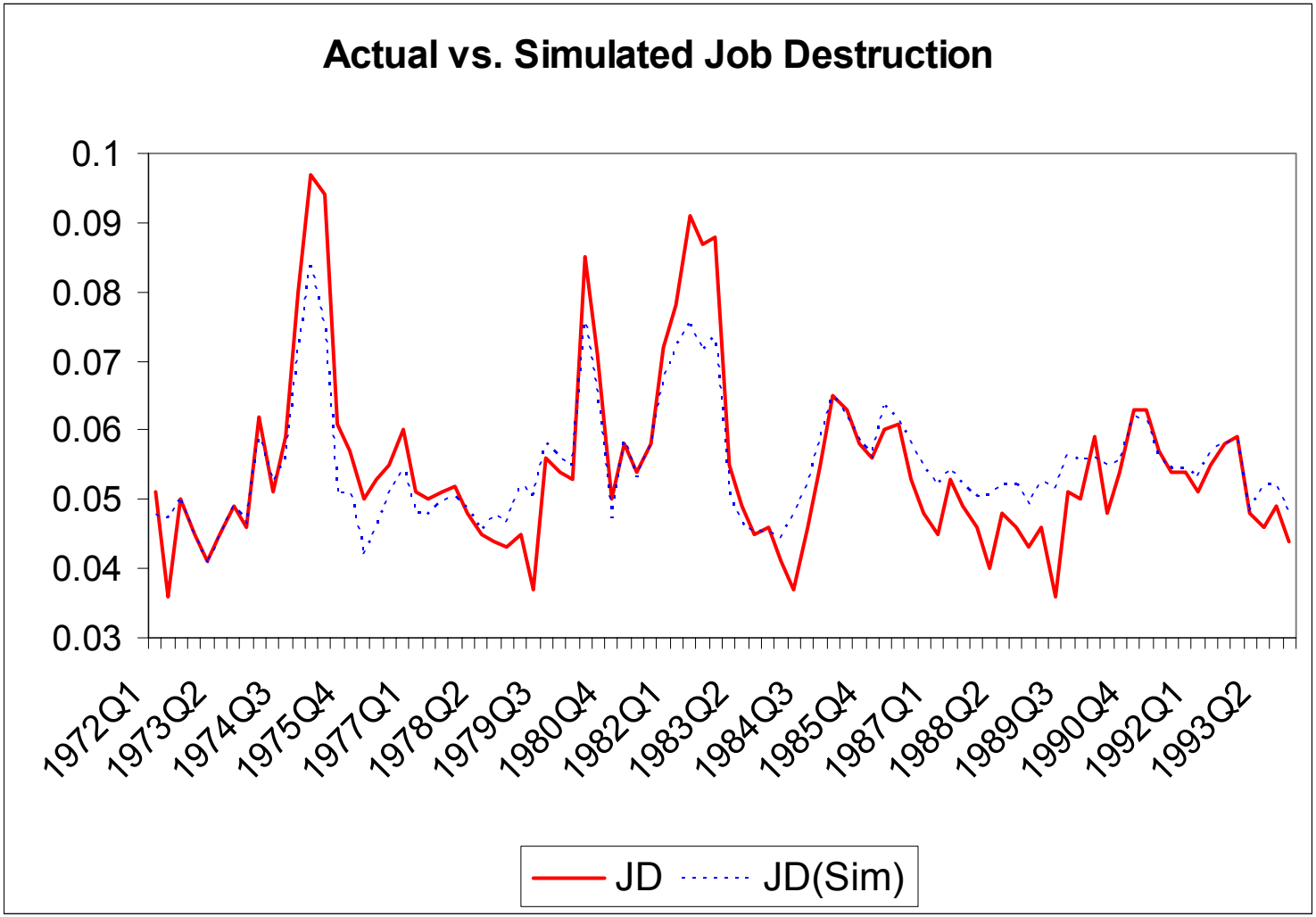
[Figure 4 is shown on the next page.]

Chart 2. Mass layoff initial claims, seasonally adjusted, June 2000-May 2005

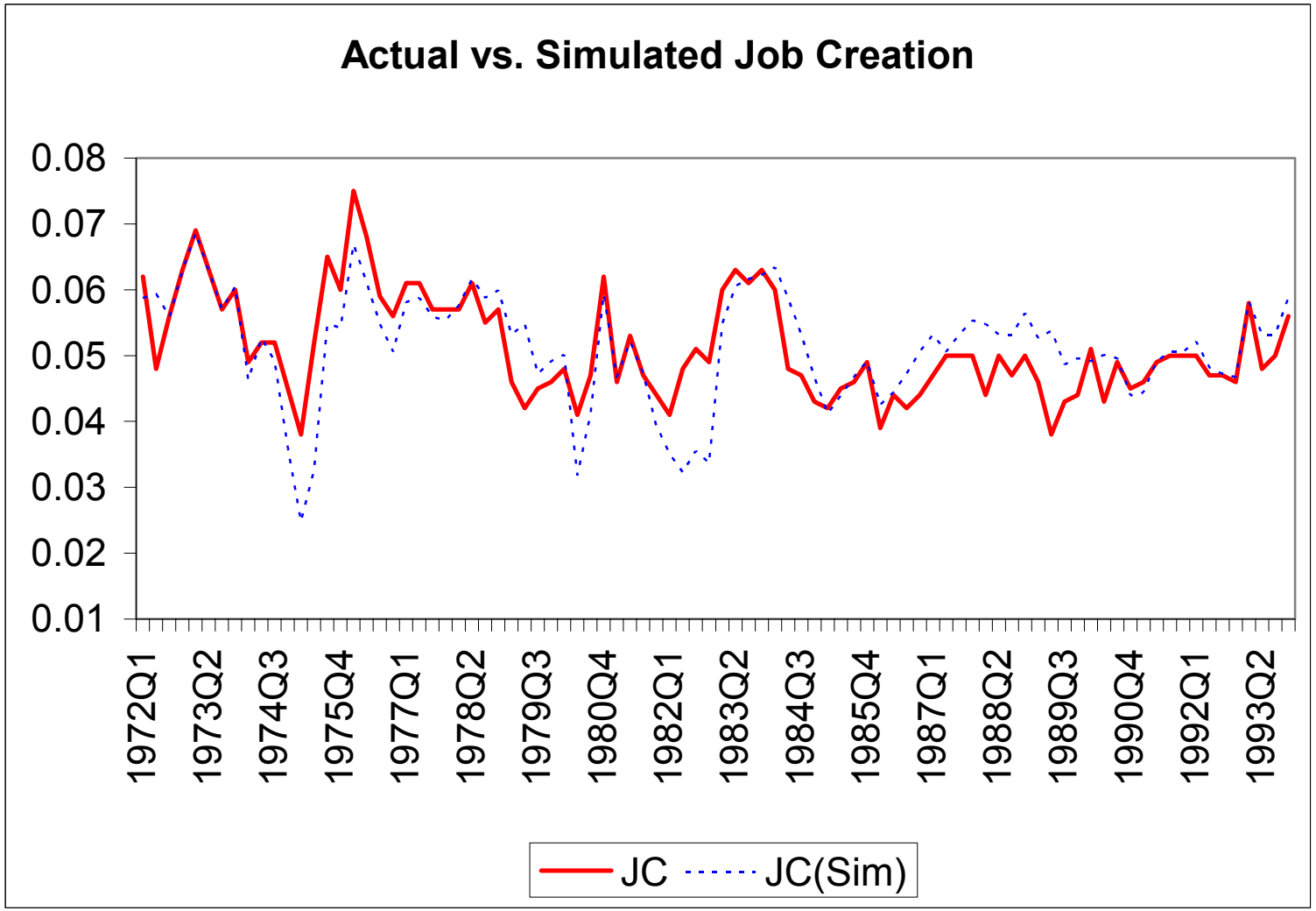


Note: Shaded area represents recession period.

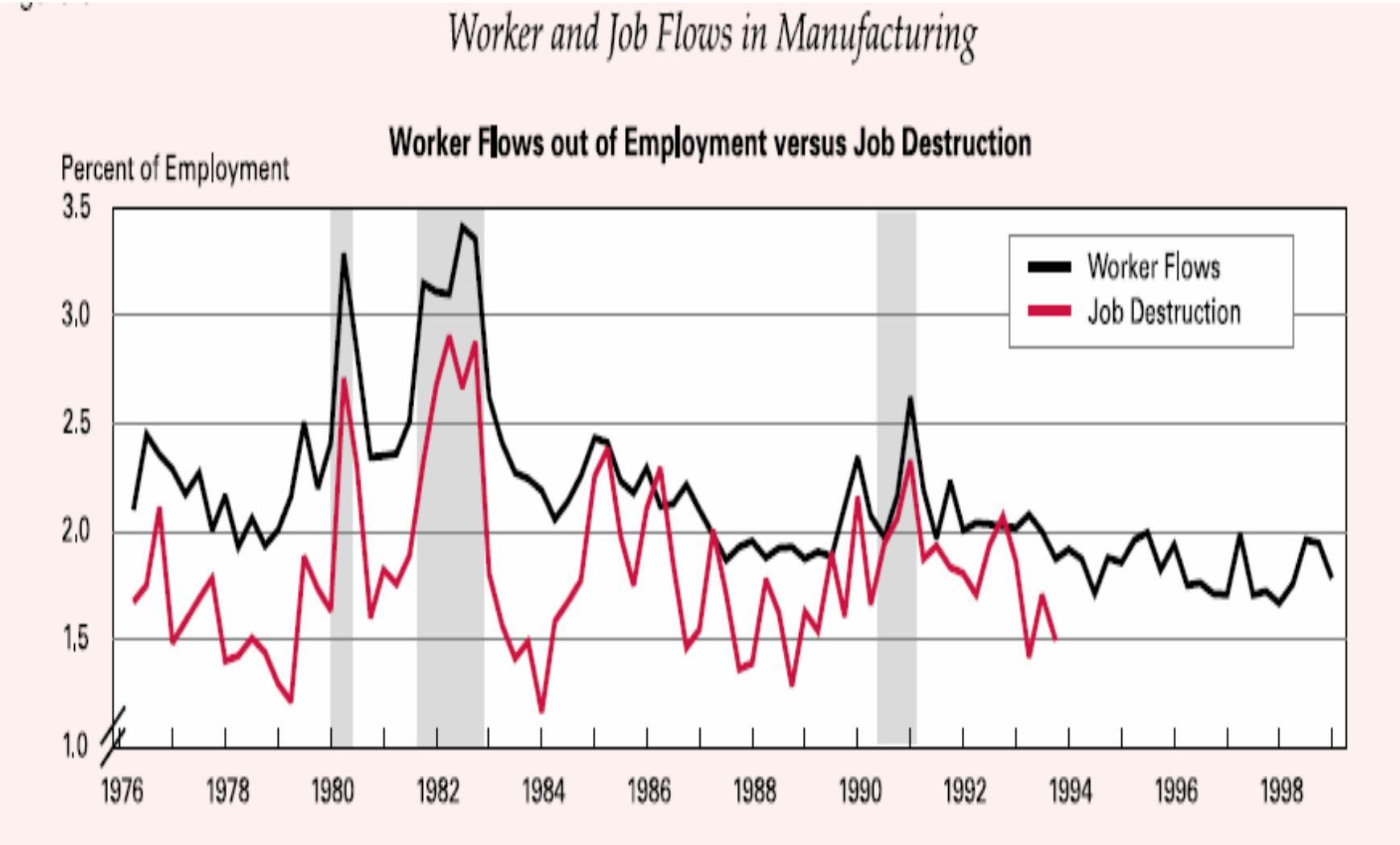
[Figure 5 shown on this page]



[Figure 6 shown on this page]



[Figure 7 shown on this page]



[i] Sampling variability is one potentially important source of attenuation bias. In this regard, the precision of the payroll survey measures is not the key issue. Rather, the issue is whether the payroll survey accurately mimics industry-level growth rates for the much smaller set of establishments sampled in the JOLTS. In addition, there are discrepancies between the payroll survey and the JOLTS that do not appear to be the result of sampling variability. These discrepancies are apparent even at the aggregate level. For example, the payroll survey shows a net private sector employment decline of -1.35% from December 2000 to September 2004. In contrast, the cumulated difference between hires and separations in the JOLTS over this period amounts to an increase of 0.88% of December 2000 employment. (These calculations make use of not seasonally adjusted data downloaded from the BLS web site on July 29, 2005. I have made a small adjustment to the JOLTS data to account for differences in the within-month timing of the two surveys.)

[ii] A partial list includes Darby, Haltiwanger and Plant (1986), Davis (1987), Blanchard and Diamond (1990), Davis, Haltiwanger and Schuh (1996) and Bleakley et al. (1999).

[iii] Footnote 5 on page 10 of Shimer (2005b) displays the relevant state equations.

[iv] The Manufacturing Turnover Data were discontinued in 1981.

[v] For example, see Jacobson, Lalonde and Sullivan (1993).

[vi] Downloaded from the BLS web site on July 21, 2005.

[vii] While Davis and Haltiwanger (1989, 1990) and Foote (1998) reach similar conclusions about the cyclical behavior of the cross-sectional growth rate distribution, the topic merits further study. Davis and Haltiwanger consider the U.S. manufacturing sector only, and Foote considers a single state, Michigan.

[viii] An issue that arises in executing this procedure is how to handle the large mass point in the empirical distribution at a growth rate of zero. This mass point is present at all stages of the business cycle, and its size does not vary systematically with the cycle. In calculating the simulated job creation and destruction series, I let the zero mass point vary in size over time exactly as it does in the data, but I do not shift its location.

[ix] The analysis in Bleakley et al. also indicates that much of the comovement in the two series reflects temporary layoffs; i.e., separations of workers who expect to be recalled to their former jobs. Temporary layoffs are another aspect of heterogeneity in the character of job separations.

[x] Although not focused on the quit-layoff distinction, Ramey and Watson (1987) develop a different theory of inefficient separations that does not rely on wage rigidity.