Hiring, Churn and the Business Cycle

Edward P. Lazear
Graduate School of Business
and
Hoover Institution
Stanford University
Lazear_Edward@GSB.Stanford.Edu

and

James R. Spletzer
Bureau of Labor Statistics
Spletzer.Jim@bls.gov

December 15, 2011

The views expressed in this paper are solely those of the authors and do not necessarily reflect the official positions or policies of the U.S. Bureau of Labor Statistics.

Hires occur for two reasons - to grow a business and to replace those who have left. Hiring can be for expansion or it can be associated with churn. Analogously, separations reflect a decrease in the size of the business or the departure of a current employee who is replaced by a new employee. The importance of churn, growth hires, and employment-decreasing separations changes over the business cycle in a logical way.

Churn is an important part of employment dynamics, allowing workers to move to their most efficient use. Although churn has no direct effect on employment growth since for every worker who separates another worker is hired into the business, understanding churn helps provide a clearer picture of what happens to the labor market when the economy slows and when it recovers.

We present empirical evidence on churn from the Job Openings and Labor Turnover Survey (JOLTS) microdata. Churn is procyclical. Churn declines during recessions because separations, which during good times would have been associated with a replacement hire, are allowed to go unfilled during recessions. As a result, employment declines. Churn also declines during recessions because workers become reluctant to quit their jobs, and in response businesses reduce their hiring. Hiring declines during recessions. During the 2007-09 recession, four-fifths of hiring reductions are associated with reduced churn, not with reductions in job creation.

Recession-induced decreases in churn are important because they are likely to reduce the efficiency with which the labor force operates. Churn moves workers from less productive uses to more productive ones. The efficiency cost of reduced churn can be substantial if the increased labor misallocation that occurs during recessions is permanent or long lasting. We estimate that the cost of reduced churn is about two-fifths of a percentage point of GDP annually throughout the three-and-one-half year period since the beginning of the recession.

I. An Accounting Framework

Hires occur in businesses that are expanding, contracting, or staying the same size. Define H_E, H_C, and H_Z as hiring in expanding, contracting, and zero change businesses, and define H as total hires in the economy: $H = H_E + H_C + H_Z$. Similarly, separations S occur in businesses that are expanding, contracting, or staying the same size, such that $S = S_E + S_C + S_Z$.

In expanding businesses, hires can be decomposed into growth hires H^G_E and replacement hires H^R_E. For example, a business that expands by three may hire seven workers and lose four workers to quits, layoffs, or retirement. The four workers hired to replace the separating workers are replacement hires (H^R_E), and the remaining three workers are hires to grow the business (H^G_E).[1] Note that growth hiring in expanding businesses is the same as job creation. Also note that the number of replacement hires in expanding businesses H^R_E is equal to the number of separating workers in expanding businesses S_E.

In contracting businesses, separations can be decomposed into separations that decrease the size of the business S^D_C and separations that are replaced by hired workers S^R_C. The number of replacement separations in contracting businesses is the same as the number of workers hired in contracting businesses, $S^R_C=H_C$, and separating workers to decrease employment in the business (S^D_C) is the same as job destruction. To complete the accounting framework, the number of hires in zero growth businesses, H_Z, is identical to the number of separations in zero growth businesses, S_Z.

[1] Ideally, growth hires and replacement hires could be defined at the "job" level within businesses. For example, if four secretaries quit and the business hires two secretaries and five computer programmers, one may want to say that only two secretary positions are being replaced, and the five computer programmers are growth hires. The JOLTS data do not permit an examination at this level of detail. All workers are treated alike when measuring hires into and separations from the business.

Churn is defined as the hires and separations that offset each other within a business. Define C_E, C_C, and C_Z as churn in expanding, contracting, and zero change businesses:

(1) a. $C_E = H^R_E = S_E$

b. $C_C = H_C = S^R_C$

c. $C_Z = H_Z = S_Z$.

Total churn in the economy is $C = C_E + C_C + C_Z$. Additionally,

(2) a. $H = H^G_E + C$

b. $S = S^D_C + C$.

II. The Dynamics of Hiring and Separation During Recessions

The net change in employment, using (2a) and (2b), is $H - S = H^G_E - S^D_C$. Employment declines in recessions because either growth hires fall or employment-decreasing separations rise. Note that total churn C, which is a part of both total hires and total separations, does not affect net employment growth H-S. However, understanding the business-cycle pattern of churn gives a richer picture of what happens during recessions.

As the economy slows and businesses decrease their hiring, separations that would have been matched by hiring during good times remain unfilled and churn can turn into employment-decreasing separations. Conversely, when separations rise as the economy slows, hiring that would have expanded the size of the business during good times becomes churn. If the first mechanism is dominant, then churn would fall during recessions. If the second is dominant, then churn would rise.

It is also possible for churn to change without any change in growth hires or employment decreasing separations. For example, businesses could go from hiring and separating, say, ten

percent of their workers per quarter to hiring and separating five percent per quarter. Another complication is that separations are comprised of both quits and layoffs, which operate differently in recessions. Quits are worker-induced separations that fall during recessions, whereas layoffs are employer-induced separations that tend to rise in recessions.[2]

Growth hires are expected to decline and employment-decreasing separations are expected to increase during recessions. Similarly, there should be fewer expanding businesses and more contracting businesses during recessions. There is no clear prediction regarding the net change of zero-growth business, since some expanding businesses will become zero-growth businesses and some zero-growth businesses will become contracting businesses.

III. The JOLTS Data and Descriptive Statistics

The Job Openings and Labor Turnover Survey (JOLTS) is a monthly survey that produces data on hires, separations, and job openings (for information on the JOLTS, see http://www.bls.gov/jlt/). The JOLTS is composed of a random sample of 16,000 business establishments, of which approximately 10,500 provide data on a regular basis. We use JOLTS microdata from December 2000 through June 2011. Although the JOLTS data are reported monthly, the estimates reported here are based on a quarterly frequency, since we believe that churn is best measured over the longer period.[3]

JOLTS microdata are used to classify establishments as expanding, contracting, or zero growth and thereby obtain all of the relevant information to estimate equations (1) and (2). The seasonally adjusted time series of the five components of equation (2) are given in Figure 1. The

[2] Bruyere, Podgornik, and Spletzer (2011) provide a detailed description of the behavior of quits and layoffs during the 2007-2009 recession.

[3] A quarter seems an appropriately short enough period to link a hire to a separation but not so short as to render the notion of churn meaningless.

estimates of total hires and total separations resemble the published JOLTS data, and the estimates of growth hires and declining separations resemble the published job creation and job destruction data from the BLS Business Employment Dynamics (BED) program.[4]

Figure 1 documents several interesting findings about churn. First, churn is procyclical. Over the entire 2001:Q1 – 2011:Q2 time period of our sample, the correlation between the amount of churn in the economy and the unemployment rate is -.96. The correlation between churn and net employment growth is .43 (and is .79 over the time period 2001:Q1 – 2009:Q2). Second, during the mid 2000s, churn is 65 percent of total hires.[5] Third, churn fell dramatically during the 2007-09 recession, from 8.3 million in 2007:Q4 to 5.3 million in 2009:Q2. This is a decline of 36 percent over 6 quarters. During the same time period, hires fell by 3.8 million. Thus 79 percent of the steep decline in hires during the most recent recession can be attributed to a decline in churn. Although job creation falls as well, changes in job creation are only about one-fourth as important as changes in churn in explaining what happens to hiring during recessions.

V. Hiring, Churn, and the Business Cycle

To better understand the dynamics of churn, we turn to Table 1. The statistics in Table 1 compare 2007:Q4, the start of the most recent recession, to 2009:Q1, the labor market trough of

[4] Two details warrant mention. First, our estimates of quarterly hires and separations are approximately 12 million during the mid-2000's, which is less than the approximately 15 million implied by the published monthly statistics. The primary reason for this discrepancy is that the published statistics are based on tabulated microdata plus imputed hires and separations from unobserved births and deaths. We ignore this latter component. Second, our estimates of H^G_E and S^D_C are not strictly comparable to the quarterly BED statistics. Our quarterly JOLTS data are for the total nonfarm economy, whereas the BED data are for the total private economy. Furthermore, as noted by Davis, Faberman, Haltiwanger, and Rucker (2010), there are differences between the BED and the JOLTS that suggest caution when comparing statistics from the two different data sources.

[5] This finding is similar to the existing literature. Looking at quarterly statistics from the U.S. labor market, Anderson and Meyer (1994, Table 13) find that 69 percent of hiring is churn, Burgess, Lane, and Stevens (2000, Tables 1 and 2) find that roughly 70 percent of hiring is churn, and the statistics cited by Davis, Faberman, and Haltiwanger (2006, Table 1) suggest that between 42 and 72 percent of hiring is churn.

the most recent recession.[6] The statistics in the first two columns of Table 1 are from the seasonally adjusted time series underlying Figure 1.[7]

The large decline in churn that happened during the most recent recession is documented in Table 1. The magnitude of churn was 8.3 million in 2007:Q4, and fell by 2.4 million to 5.9 million in 2009:Q1. There are two forces contributing to this large decline: the number of establishments with churn fell from 1.9 million to 1.6 million, and the average size of churn within an establishment, conditional on having churn, fell from 4.44 to 3.78. A formal decomposition attributes 52 percent of the decline in total churn to the decrease in the number of establishments and 48 percent to the decrease in the average size of churn.

The decline in churn occurs in all types of establishments: expanding, zero growth, and contracting. The bulk of the decrease in churn, 70.5 percent, occurs in expanding establishments. 70 percent of the decline in churn in expanding establishments is due to a fall in the number of expanding establishments with churn (from 689 thousand to 479 thousand), and 30 percent is due to a decline in the average size of churn, conditional on churn, within expanding establishments (from 6.02 to 5.15). Churn declines in expanding establishments because quits fall. When the economy enters a recession, expanding firms have fewer replacement slots to fill so churn decreases.

It is worthwhile to note that the average number of growth hires per firm in expanding establishments did not change during the onset of the recession (3.04 in 2007:Q4, 3.08 in 2009:Q1), although the number of establishments that are expanding declined substantially.

[6] The peak and trough differs for each series in Figure 1. 2007:Q4 is the last quarter of substantial positive net employment growth, and the trough of net employment growth is 2009:Q1.
[7] Our longer working paper (Lazear and Spletzer, 2011b) uses longitudinal microdata to estimate the gross changes underlying the net changes presented in column 3 of Table 1.

Thus the average expanding establishment is still expanding by the same amount at the trough relative to the peak, but the amount of churn associated with this expansion is much less.

VI. Discussion

When a shock like that suffered during a recession reduces the demand for labor, the optimal size of the business declines. This leads to decreased churn through two channels. First, businesses reduce their hiring during recessions, which reduces the number of separated workers whom they replace. This leads to a decrease in churn as well as an increase in employment-decreasing separations. Second, as seen in the published JOLTS data, quits decline as the economy slows. This will lead to a corresponding reduction in hires necessary to replace the separations, and churn declines. During the last recession, most of the reduction in hires reflected a decrease in churn rather than a fall in job creation.

The reduction in churn that occurs during recessions has implications for efficiency. In the period beginning with the first quarter of 2008, churn was depressed by about 2.3 million per quarter through the last date available (2011 q2). Under a number of assumptions,[8] we estimate that the loss in output during the recession and its aftermath resulting from reduced churn equaled $208 billion. On an annual basis, this amounts to about .4% of GDP for a period of 3½ years. Although there are a number of assumptions required to obtain this estimate, we believe they are reasonable ones. As a consequence, we conclude that reduced churn, which results in a

[8] Using estimates from Fallick, Haltiwanger, and McEntarfer (2011), the median wage change for workers who change jobs and are re-employed the same quarter or the next quarter is 8.56%. If this reflects the typical gain in productivity (not wage) from a move, then the average quarterly productivity gain from a job change is about $1000. Multiplying this times the number of changes that would have occurred since the beginning of the recession, but did not because of reduced churn, yields an estimate of about $208 billion total lost over the 14 quarters starting in 2008 q1. Dividing by average annual GDP over this period results in .4% on an annualized basis for 3½ years.

failure to allocate workers to their most productive uses, produces a significant unmeasured additional cost of recessions.

REFERENCES

Anderson, Patricia M. and Bruce D. Meyer. "The Extent and Consequences of Job Turnover," *Brookings Papers on Economic Activity: Microeconomics*, (1994), pp. 177-236.

Bruyere, Caryn N., Guy L. Podgornik, and James R. Spletzer. "Employment Dynamics Over the Last Decade," *Monthly Labor Review*, Vol. 134, No. 8 (August 2011), pp. 16-29.

Burgess, Simon, Julia Lane, and David Stevens. "Job Flows, Worker Flows, and Churning," *Journal of Labor Economics*, Vol. 18, No. 3 (July 2000), pp. 473-502.

Davis, Steven J., R. Jason Faberman, and John C. Haltiwanger. "The Flow Approach to Labor Markets: New Data Sources and Micro-Macro Links," *The Journal of Economic Perspectives*, Vol. 20, No. 3 (Summer, 2006), pp. 3-26.

Davis, Steven J., R. Jason Faberman, John C. Haltiwanger, and Ian Rucker. "Adjusted Estimates of Worker Flows and Job Openings in JOLTS," in *Labor in the New Economy*, edited by Katharine G. Abraham, James R. Spletzer, and Michael J. Harper, University of Chicago Press (2010), pp. 187-216.

Fallick, Bruce, John Haltiwanger, and Erika McEntarfer. "Nonemployment Duration and the Consequences of Job Separations," unpublished working paper, 2011. Available at http://www.sole-jole.org/11156.pdf (accessed November 15, 2011).

Lazear, Edward P. and James R. Spletzer. "Firing and Hiring," unpublished working paper, 2011a.

Lazear, Edward P. and James R. Spletzer. "The Gross Flows of Hiring, Separations, and Churn," unpublished working paper, 2011b.

Figure 1: Quarterly Hires and Separations, 2001:Q1 – 2011:Q2
Authors' Tabulation of JOLTS Microdata

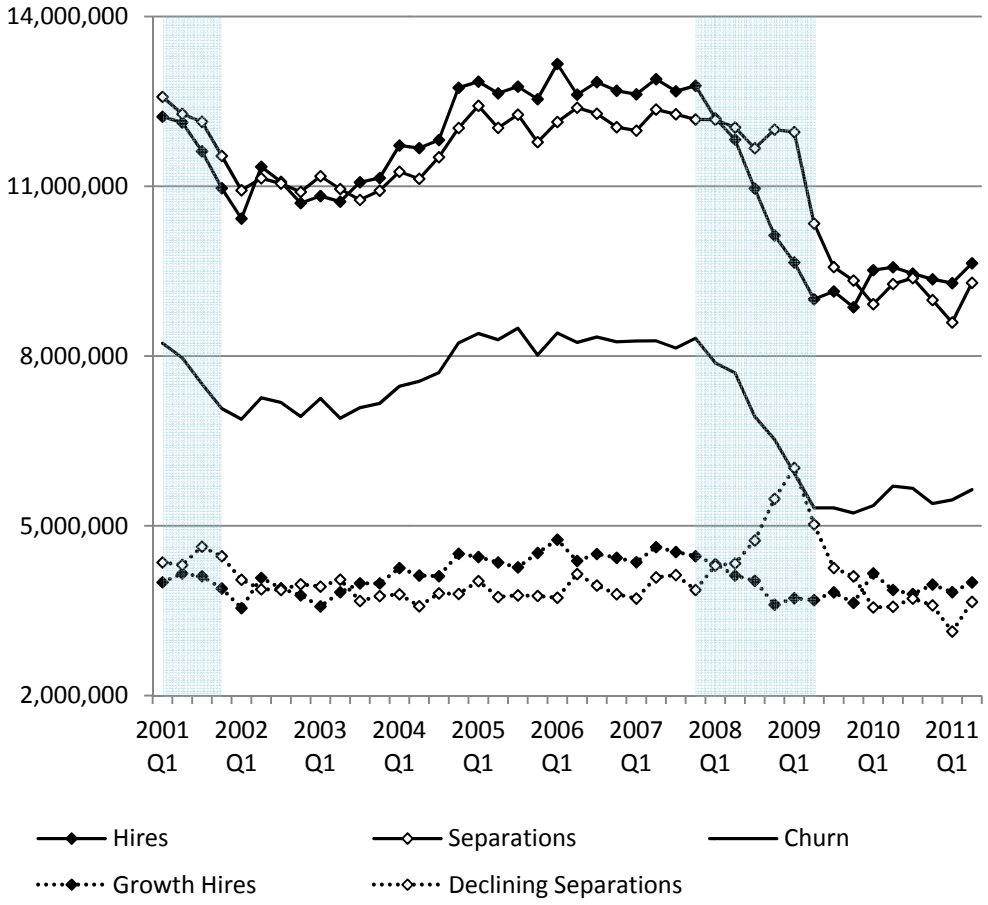

Table 1: Quarterly Hires and Separations, 2007:Q4 and 2009:Q1
Authors' Tabulation of JOLTS Microdata

	2007:Q4	2009:Q1	Change 2007:Q4 - 2009:Q1
Total Hires	12,776,495	9,653,551	-3,122,945
# Establishments with Hires	2,652,983	2,297,862	-355,121
Average Size of Hires	4.82	4.20	-0.61
Total Separations	12,180,251	11,957,000	-223,251
# Establishments with Separations	2,769,246	2,773,075	3,828
Average Size of Separations	4.40	4.31	-0.09
Total Churn	8,312,940	5,932,231	-2,380,709
# Establishments with Churn	1,871,800	1,567,922	-303,878
Average Size of Churn	4.44	3.78	-0.66
Growth Hires	4,463,555	3,721,319	-742,236
# Estabs with Growth Hires	1,469,816	1,209,367	-260,450
Average Size of Growth Hires	3.04	3.08	0.04
Churn in Expanding Estabs	4,148,725	2,469,639	-1,679,085
# Expanding Estabs with Churn	688,633	479,427	-209,207
Average Size of Churn	6.02	5.15	-0.87
Churn in Zero Growth Estabs	1,254,901	1,079,974	-174,927
# Zero Growth Estabs with Churn	639,048	526,635	-112,413
Average Size of Churn	1.96	2.05	0.09
Churn in Contracting Estabs	2,909,314	2,382,617	-526,697
# Contracting Estabs with Churn	544,119	561,860	17,742
Average Size of Churn	5.35	4.24	-1.11
Declining Separations	3,867,311	6,024,769	2,157,458
# Estabs with Declining Seps	1,441,565	1,767,013	325,448
Average Size of Declining Seps	2.68	3.41	0.73