The Labor Market in the Great Recession

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Main Findings

We examine the adjustment of the labor market during the 2007 recession, and place it in the broader context of previous postwar downturns. What emerges is a picture of labor market dynamics with three key recurring themes:

- The 2007 recession is the deepest labor market downturn in postwar era.
- Until 2009, labor market adjustment has resembled past severe downturns.
- During late 2009, path of adjustment has departed from prior deep recessions.
Outline

- Basic facts about the labor market
  - Unemployment rate
  - Labor force participation rate
  - Employment to population ratio
  - Total hours worked
- Unemployment inflows and outflows
- Who has been hit the hardest?
- Historical relationships
- Outlook and Risks
The Unemployment Rate 1948-2010

Seasonally adjusted monthly series

Percent of Labor Force

Deepest and longest postwar rise in unemployment
The depth of the current ramp-up is unprecedented: The unemployment has risen over 5.5 percentage points since early 2007. The next largest postwar ramp-up was in 1973/4, when unemployment rose only 4.25%.

The length of the recession also is unprecedented, with unemployment rising for 3 consecutive years.

But the level of joblessness has not risen to the peak of 11% witnessed in the 1982 recession.
The Age Structure of the Labor Force

The unemployment rate is:

\[ u_t = \sum_j \omega_{j,t} u_{j,t} \]

where
\( \omega_{j,t} \): the labor force share of group \( j \) at time \( t \)
\( u_{j,t} \): the unemployment rate of group \( j \) at time \( t \)

The age-adjusted unemployment rate can be computed by setting:

\[ \omega_{j,t} = \omega_{j,2010} \]
We also make composition adjustments for the full interaction of age, gender, race and education, as well as for each dimension individually.

- Gender: very little impact.
- Race: shift towards low unemployment groups.
- Education: shift towards better educated workers who face lower unemployment rates on average.
Composition-adjusted Unemployment

Adjusted for full age, gender, race and education interactions

The unemployment rate is defined as:

\[ u_t = 1 - \left( \frac{E_t}{L_t} \right). \]

The change in the unemployment rate can be decomposed into parts accounted for by logarithmic variation in the labor force participation rate and the employment to population ratio:

\[ du_t = (1 - u_t) \left[ d\log(L_t/P_t) - d\log(E_t/P_t) \right]. \]
Basic Labor Market Indicators by Recession

Cumulative deviations from pre-recession levels

Change in Unemployment Rate

Log change in E-Pop ratio

Log change in LFPR

Employment and Labor Force Participation

- The record rise in unemployment has been mirrored by a record decline in the employment to population ratio.
- But this has been partially offset by a mild decline in the labor force participation rate.
- Contrasting this with recent recessions reveals that this process of adjustment displays a notable resemblance to that seen in prior recessions.
Hours vs. Bodies

- Total hours worked in the economy is the product of the number employed and hours per worker.
- The log change in total hours worked is the sum of the log change in employment and the log change in hours per worker.
- In the current recession, hours per worker began falling early on in the recession, just as in prior downturns.
- Hours per worker have fallen by 3 log points; employment has fallen by 7 log pointsa 30:70 hours to bodies decomposition of labor input. This is remarkably close to the 1/3:2/3 breakdown noted in prior recessions.
Basic Labor Market Indicators by Recession

Cumulative deviations from pre-recession levels

Change in Unemployment Rate

Log change in Employment

Log change in Hours per Worker

Summary

- Record increase in unemployment (6 percent)
- Record decline in employment (7 percent)
- Record decline in hours/worker (3 percent)
- 30:70 hours/bodies decomposition
- Mild reduction in participation (2 percent)
- Resembles the past
Outline

- Basic facts about the labor market
- Unemployment inflows and outflows
  - Inflows or Outflows?
  - The Role of Job Loss
  - Separations vs Inflows
- Who has been hit the hardest?
- Historical relationships
- Outlook and Risks
The evolution of unemployment:

\[ \frac{dU_t}{dt} = s_t(L_t - U_t) - f_t U_t \]

where \( s_t \) and \( f_t \) are inflow and outflow rates.

Following Shimer (2007), we compute the monthly outflow probability:

\[ F_t = 1 - \frac{(U_{t+1} - U_{t+1}^{<1})}{U_t}. \]

This can be mapped into a Poisson outflow hazard rate

\[ f_t = -\log(1 - F_t). \]
Unemployment Inflows and Outflows

Inflow rate can be obtained by solving:

\[ U_{t+1} = \lambda_t U^*_t + (1 - \lambda_t) U_t. \]

Here unemployment is a weighted average of the flow steady-state level of unemployment

\[ U^*_t = \frac{s_t L_t}{s_t + f_t} \]

and last months unemployment \( U_t \), with weight given by the monthly rate of convergence to steady state

\[ \lambda_t = 1 - e^{-(s_t+f_t)}. \]
Unemployment Inflow and Outflow Rates

Outflow rate, $f$

Inflow rate, $s$

Postwar low in outflow rate = 0.24

Unemployment Inflows and Outflows

- Outflow rate is markedly *procyclical*, displaying prolonged declines in each recession.
- Inflow rate is *countercyclical*, with sharp upswings that subside toward end of recession. In this dimension, the current recession is no different.
- But, what is different is the outflow rate is at a postwar low only around 25% of unemployed workers exit unemployment within one month.
Inflows or Outflows?

Has unemployment increased because

- Inflows rise?
- Outflows slow?
- Or both?

“In the modern U.S. economy, recessions do not begin with a burst of layoffs,” Hall (2005).
Fluctuations in inflows “quantitatively irrelevant during the last two decades,” Shimer (2007).
The unemployment rate in the U.S. is very closely approximated by its flow-steady-state value:

\[ u_t = \frac{U_t}{L_t} \approx u_t^* = \frac{s_t}{s_t + f_t}. \]

Elsby, Michaels and Solon (2009) show that simple log differentiation of this approximate relation implies:

\[ \Delta u_t \approx \beta_{t-1}[\Delta \log s_t - \Delta \log f_t] \]

where

\[ \beta_{t-1} = u_{t-1}(1 - u_{t-1}). \]
Contribution of Inflow and Outflow Rates by Recession

Cumulative log deviations from pre-recession levels

Log change

Log decline in outflow rate

Log increase in inflow rate

Source: Bureau of Labor Statistics and authors' calculations.
Inflows or Outflows?

- Inflows rise early on in recessions, and then subside.
- Outflow rate falls later on in recessions.
- Based partly on the more modest inflow response in 1990 and 2001 recessions, Bob Hall and Rob Shimer have recently argued that variation in the inflow rate is quantitatively irrelevant in modern recessions.

Question: Is this a feature of modern recessions, or of mild recessions?
Contribution of Inflow and Outflow Rates by Recession

Cumulative log deviations from pre-recession levels

Log change

Log decline in outflow rate

Log increase in inflow rate

Source: Bureau of Labor Statistics and authors' calculations.
Inflows

- Inflows increased by about 30 log points to reach a peak in late 2008, and have since subsided.
- Moreover, the behavior of the inflow rate looks just like it did in the 1973/4 recession.
- Sharp rises in unemployment inflows appear to be a stylized feature of *deep* recessions rather than old ones.
- Does that mean that job loss has played a key role in the 2007 recession?
The Role of Job Loss

1. Unemployment Inflow by Reason:
   ▶ Estimates of the unemployment inflow rate are based on the implicit assumption that all inflows into the unemployment pool originate from employment rather than nonparticipation.
   ▶ Two economically distinct driving forces for entry into unemployment: flows from nonparticipation, and flows from employment to unemployment that are associated with elevated rates of job loss.

2. Separations vs Inflows:
   ▶ Job loss is often taken to mean a separation from an employer rather than an inflow into the unemployment pool, the distinction being that workers can, and frequently do, line up new jobs without an intervening unemployment spell, a point that has been made since Mattila (1974), and more recently by Fallick and Fleischman (2004) and Nagypal (2008).
Inflow Rates by Reason for Unemployment

Monthly hazards based on Elsby, Michaels and Solon (2009)

Inflow Hazard

Entrant Inflow Rate

Layoff Inflow Rate

Quit Inflow Rate

Source: Bureau of Labor Statistics and authors’ calculations.
Inflow Rates by Reason for Unemployment

- All of the observed countercyclicality in the aggregate inflow rate noted above is driven by a markedly countercyclical layoff inflow rate.
- The quit inflow rate is comparatively very low and mildly procyclical.
- In addition, inflows due to labor force entry are essentially acyclical.
The Role of Job Loss

- The fact that unemployment inflows have risen markedly in the current recession, and that layoff inflows have dominated that trend, is suggestive of job loss playing a key role in driving cyclical rises in unemployment. But it is not necessarily conclusive.

- As noted by Hall (2005), elevated rates of inflow into unemployment need not be the outcome of elevated rates of separation from employers: Increased inflows in times of recession can occur if workers increasingly are unable to line up new jobs immediately upon separation.

- Under this alternative hypothesis, countercyclical inflows are a symptom of declining rates of job finding among potential job-to-job movers, rather than of elevated rates of job loss.
The Role of Job Loss

- The current downturn is that it is the first full recession covered by the Job Openings and Labor Turnover Survey.
- In contrast to the increase in inflows from employment to unemployment, the rate at which workers have separated from firms in JOLTS has, if anything, gone down.
- This point has been emphasized in recent work by Bob Hall, who calls into question the importance of job loss for the rise in unemployment in times of recession.

Is job loss really irrelevant for the increase in the unemployment rate in the recession?
Separations Rate vs. E-U Transition Rate

Monthly rates computed from JOLTS and CPS data

Total Separation Rate

E-U Transition Rate

Source: Bureau of Labor Statistics and authors’ calculations.
Quits vs. Layoffs

- The quit rate from employers moves *procyclically*, while the layoff rate moves *countercyclically*.
- The reason separations have fallen in the recession is that increases in layoffs have been offset by a slightly larger reduction in quits.
- Workers who quit their previous job face a very low probability of subsequently entering unemployment—averages just 16%. Job-to-job flows drive an important wedge between separations and unemployment inflows due to quits.
- Workers laid off from their previous jobs face a very high probability of entering unemployment—averages 91% since 2001. Job-to-job flows do not appear to be prevalent among laid-off workers.
Separations vs. Layoffs: Layoffs vs. Quits

Source: Bureau of Labor Statistics and authors' calculations.
The Role of Job Loss

- Layoffs ↑ and quits ↓ (JOLTS)
- Laid-off workers 5 times more likely to become unemployed than quits (JOLTS, CPS).
- Quits account for only a small fraction of unemployment inflows.
- Increased inflows into unemployment can be traced to a shift in separations during the recession toward layoffs, who are very likely to flow into unemployment.
- Increases in the layoff rate have played a central role in accounting for increased rates of entry into unemployment in the current recession.
Contribution of Inflow and Outflow Rates by Recession

Cumulative log deviations from pre-recession levels

Log change

Log decline in outflow rate

Log increase in inflow rate

Source: Bureau of Labor Statistics and authors’ calculations.
Outline

- Basic facts about the labor market
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- Who has been hit the hardest?
- Historical relationships
- Outlook and Risks
Outline

Unemployment rates are higher for

- Men—*Mancession*
- Younger workers
- Workers in goods-producing industries
- Less educated workers

Historically high unemployment gaps between

- Men and women
- College educated and less-than-college educated
- Young and prime-age workers

Gaps driven by *differences in inflow rates.*
Inflow Rates by Gender

12-month moving averages of seasonally adjusted data

Source: Bureau of Labor Statistics and authors' calculations
Outflow Rates by Gender

12-month moving averages of seasonally adjusted data

Monthly hazard

Source: Bureau of Labor Statistics and authors' calculations
Outline

- Basic facts about the labor market
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- Who has been hit the hardest?
- Historical relationships
  - Okun’s Law
  - Beveridge Curve
  - Matching Function
- Outlook and Risks
Okun’s Law

One of the most robust aggregate statistical relationships for the U.S. economy is the negative comovement between changes in the unemployment rate and growth in GDP: Okun’s (1962) Law.

This rule of thumb has performed remarkably well in accounting for the evolution of Okun’s Law in the first part of the 2007 recession through 2009Q1.

The last nine months of 2009, however, have witnessed an important departure from the historical path of Okun’s Law: Even though overall economic activity, as measured by GDP, rebounded in the second half of 2009, the unemployment rate continued to rise.
Okun’s Law

Based on CBO potential output and Nairu (1949-now)

Unemployment gap

2009Q2 2009Q3 2009Q4
4 6

2007 recession

2008Q3 2008Q4
2
2008Q1 2008Q2
-
0
-2
-4
-6

Output gap

No recession

Prev recession

Source: Bureau of Economic Analysis, Bureau of Labor Statistics, and Congressional Budget Office
Beveridge Curve

There has been a remarkably stable negative association between job openings and the unemployment rate: Beveridge Curve.

The vacancy series is based on Barnichon (2009), who builds a vacancy posting index for the years 1951 to 2009 by combining information from the total print and online help-wanted advertising indexes with JOLTS.

The rise in unemployment in 2009 also has been extreme relative to vacancies. There has been a divergence from the historical Beveridge Curve relation.
Beveridge Curve

HP-filtered log-levels of unemployment rate and vacancies

Source: Bureau of Labor Statistics, Barnichon (2009), and authors’ calculations
Matching Function

- Historically, a strong relationship has existed between the outflow rate and the vacancy-unemployment ratio.

- We plot the logarithmic deviations from Hodrick-Prescott filtered trends of the outflow rate and the ratio of the number of vacancies to the number of unemployed persons. Shimer (2005) refers to this positive relationship as the matching function.

- Recent months have witnessed a divergence from that relation as the outflow rate has plummeted.
Matching Function

HP-filtered log-levels; seasonally adjusted

Outflow hazard rate

No recession

Previous recessions

2007 recession

Vacancy-unemployment ratio

Source: Bureau of Labor Statistics, Barnichon (2009), and authors' calculations
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- Historical relationships
- Outlook and Risks
  - Mismatch: Sectoral and Geographic
  - Emergency Unemployment Compensation
  - Sclerosis
  - Duration Dependence
One potential reason for a persistent reduction in match efficiency is a mismatch between the skills and the skill requirements of job openings.

For example, Groshen and Potter (2003) have argued that the jobless recoveries after the 1990 and 2001 recessions were in large part due to structural reallocation of workers across sectors in the economy. They claim that this reallocation led to a mismatch in skill-mix that resulted in a slower adjustment of the labor market than in previous recessions.

More recently, Phelps (2008) has reiterated this concern in relation to construction and finance workers in the 2007 recession.
A. Sectoral Mismatch

- This reallocation argument suggests that workers that were employed in sectors in structural decline will have a harder time finding jobs than other workers.
- Will reallocation of workers from declining to expanding sectors slow recovery?
- Do we see divergence in outflow rates from unemployment between those who previously were employed in industries in structural decline versus those of other workers?
- Unemployment exit rates by sector of origin have fallen uniformly in recession.
Unemployment Outflow Hazards by Industry

12-m moving averages of monthly data

Monthly outflow hazard

Source: Bureau of Labor Statistics and authors' calculations
B. Geographic Mismatch

- Job applicants could be more reluctant to apply for and accept jobs that are not within commuting distance from their current residence and would require them to sell their homes.
- Negative equity $\rightarrow$ less likely to move. Ferreira, Gyourko and Tracy (2009).
- Internal migration rates at an all time low. Frey (2009).
Emergency Unemployment Compensation

- EUC \( \rightarrow \) up to 53 extra weeks of UI benefit.
- UI coverage rates averaged 50% and increasing.

Krueger and Meyer (2002) suggest that extra week of eligibility
- 0.08 to 0.2 week increase in UI spell duration.
- 15 to 40% of increase in unemployment.

EUC effect likely to be at lower end of range:
- UI extended in times of recession
Sclerosis

- Definition of sclerosis in the sense of Blanchard (2000): “Flows decrease, individual unemployment duration increases, and so does the proportion of long-term unemployed.”
- Outflow rate at record low.
- Duration of unemployment at record high.
- Low outflow rates slow pace of worker reallocation and recovery of unemployment
  - Quantitatively small.
  - U.S. outflow rate still 4 times in Europe in 1980s.
Duration Dependence

The change in the outflow probability:

$$\Delta F_t = \sum_d (\omega_{dt} \Delta F_{dt} + \Delta \omega_{dt} F_{dt-1}).$$

Two concerns

1. Long-term unemployed might be disproportionately affected and disenfranchised from the labor market.

2. Duration dependence can affect the cyclicality of the aggregate outflow rate via changes in the duration structure of unemployment.
Duration Dependence

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Outflow Probabilities by Duration

Quarterly averages of seasonally adjusted monthly rates

F(0m-1m)
F(1m-3m)
F(3m-6m)
F(6m+)

Source: Current Population Survey, authors' calculations
Duration Dependence: First Concern

- Consistent with the literature on negative duration dependence in unemployment exit rates, the hazards for exiting unemployment decline as duration rises.
- There is no evidence that exit rates have fallen disproportionately among the high duration unemployed in the last five recessions.
- The cyclicality of outflow rates displays an extraordinary regularity across duration groups.
- In sum, there appears to be little evidence to suggest that elevated rates of joblessness are a symptom of diminished employment.
Duration Dependence

The change in the outflow probability:

$$\Delta F_t = \sum_d (\omega_{dt} \Delta F_{dt} + \Delta \omega_{dt} F_{dt-1})$$.

Two concerns

1. Long-term unemployed might be disproportionately affected and disenfranchised from the labor market.
2. Duration dependence can affect the cyclicality of the aggregate outflow rate via changes in the duration structure of unemployment.
Duration Dependence: Second Concern

The stock of unemployed workers of duration over time:

$$u_{dt+1} = (1 - F_{d-1t})u_{d-1t}.$$  

The unemployment share of duration group d:

$$\omega_{dt+1} = (1 - F_{d-1t})(u_t/u_{t+1})\omega_{d-1t}.$$  

Persistence in the duration structure

- Lasting residue of long-term unemployed in future
- Exit unemployment slowly
- Depress future aggregate outflow rates

A Simulation: Simulate the future evolution of the aggregate outflow rate in the wake of the current recession, assuming that outflow rates for each duration group, as well as the aggregate inflow rate, rebound in proportion to that witnessed in the 1983/4 recovery.
Aggregate Outflow Probability Simulations

Outflow probability simulation based on 1983 recovery

Monthly outflow probability

F(0m-1m)

Aggregate F 1983-based

Aggregate F counterfactual

F(1m-3m)

F(3m-6m)

F(6m+)

Source: Assuming post 1982 recession percentage changes in outflow rates
Concluding Remarks

- Little doubt this is a Great Recession
- 2007/8: Echoes past severe downturns
- 2009: Causes for concern
- 2010+: Likely slow recovery
- But European-style hysteresis unlikely
  - U.S. outflow rate still 4 times Europe in 1980s
  - E.g. exit rate in 80s Spain 5% per month