14.461: Advanced Macroeconomics I
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# Recitation 9: Empirical Evidence on Labor Market Dynamics

Part II of 14.461 covers topics in the macroeconomic analysis of labor markets. The purpose of this recitation handout is to familiarize you with the empirical evidence concerning the following issues:

- Dynamic behaviour of unemployment over the business cycle
- Unemployment-vacancy relationship
- Job finding and job separation rates
- Job creation and job destruction

## 1. Unemployment and Vacancies over the Business Cycle

This section focuses on the cyclical behaviour of unemployment and vacancies.

### 1.1 Unemployment Dynamics in the US Economy

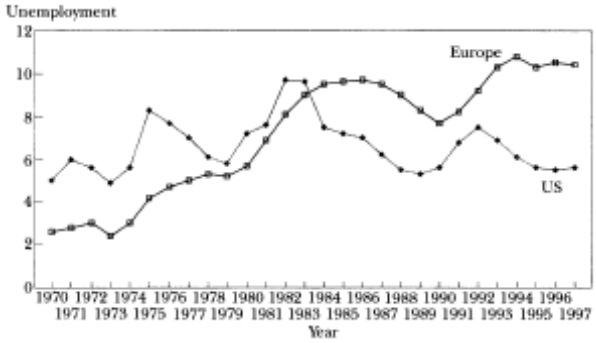
The graph below is reproduced from Shimer (NBER WP, 2003) and illustrates the behaviour of unemployment in the US during 1951-2001. It is clear from the figure that unemployment is not purely driven by transitory business cycle shocks. Rather, there are more persistent shocks to the unemployment rate.


Figure 1: The unemployment rate is a quarterly average of the seasonally adjusted monthly series constructed by the Bureau of Labor Statistics (BLS) from the Current Population Survey, survey home page `http://www.bls.gov/cps/`. The trend is an HP filter of the quarterly data with smoothing parameter $10^5$.

How can we explain the fluctuations in the unemployment rate? Which variables are the key driving forces behind labor market flows into and out of unemployment? In Section 2, I consider some empirical evidence that has been brought to bear upon this matter.

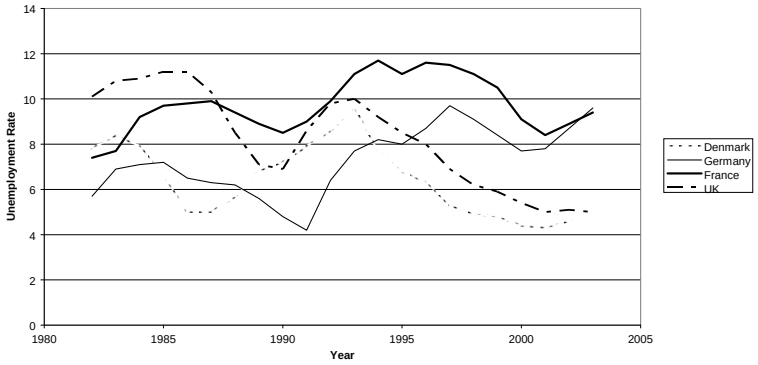
## 1.2 Unemployment Dynamics in European Countries

Unemployment has evolved differently across countries, even in response to similar shocks. In particular, US and European unemployment rates have diverged. While in the 1970s European unemployment was consistently below the US level, during the 1980s and 1990s European unemployent rates have far exceeded those in the US. In large part this has been due to substantial persistence of European unemployment in the wake of recessionary shocks. The diagram from Siebert (1997) below illustrates.




The figure below shows the significant heterogeneity of unemployment rates within Europe since the early 1980s. France and Germany have among the highest and most persistent rates. Unemployment rates in countries like Denmark and the UK are currently lower, and historically they have shown less persistence.

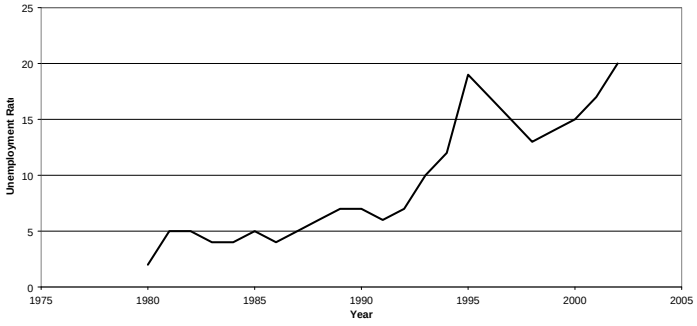
**Figure: Unemployment in European Countries**
*Source: OECD Statistical Compendium*




## 1.3 Note on Unemployment in Non-OECD Economies

Non-OECD countries have yet more varied unemployment responses to shocks. The Argentinian case is illustrated below:

**Figure: Unemployment in Argentina**
*Source: OECD Statistical Compendium*




For the remainder of the handout, I restrict my attention to unemployment in the US.

## 1.4 Unemployment-Vacancy Relationship

The Beveridge Curve plots the relationship between the unemployment rate and the vacancy rate. The graph for the US is presented below. There is a clear downward sloping relationship between the two variables.

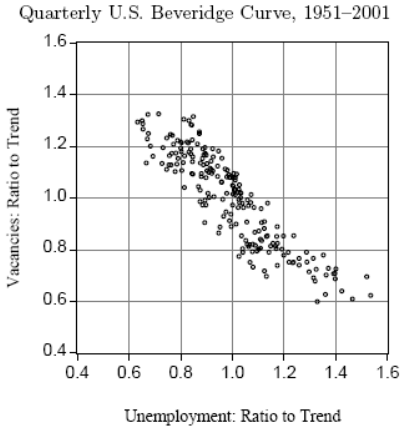



Figure 3: The unemployment rate is constructed by the Bureau of Labor Statistics (BLS) from the Current Population Survey. The help-wanted advertising index is constructed by the Conference Board. Both are quarterly averages of seasonally adjusted monthly series and are expressed as ratios to an HP filter with smoothing parameter $10^5$.

The interpretation of this diagram has been controversial. In particular, macroeconomists have attempted to use the empirical Beveridge curve to discriminate between categories of explanations for unemployment fluctuations. I summarize the arguments briefly here. Blanchard and Diamond (1983) divide the driving shocks of the economy into reallocation and aggregate productivity shocks, and consider a simple search model. Reallocation shocks would tend to increase job inflows and outflows across all industries. Workers become unemployed in the transition between jobs; and jobs become temporarily vacant as firms search for workers. Therefore, vacancies and unemployment should comove. A positive aggregate productivity shock, on the other hand, would tend to reduce the unemployment rate as more worker obtain employment in the expanding goods sector, and higher productivity firms would offer post more vacancies. Therefore, vacancies and unemployment should have negative correlation. They use the empirical evidence captured in the above diagram to argue that aggregate productivity shocks are a more important explanation of unemployment fluctuations than reallocation shocks.

Caballero and Hammour (1996) argue that even reallocation shocks will produce downward sloping Beveridge curves if there is incomplete contracting and concomitant appropriability problems. You will study this approach in more detail in 14.454.

The comovement of the US vacancy-unemployment ratio and average labor productivity is presented in the diagram below, again from Shimer (2003). The comovement is in the direction implied by the arguments above. However, Shimer actually argues in the paper that the magnitude of the fluctuations in average labor productivity is an order of magnitude too small to fully account for the variation in the vacancy-unemployment ratio.

Quarterly U.S. Vacancy-Unemployment Ratio and Average Labor Productivity, 1951–2001

# 2. Job Finding/Separation and Job Creation/Destruction

This section examines proximate determinants of the fluctuations in the unemployment rate.

## 2.1 Job Finding and Job Separation Rates

The value of an unemployed worker is the net present value of the benefit of search, less its cost. The benefit of search depends upon the job finding probability $f$, which corresponds to the number of hires divided by the number of unemployed workers. The value of an employed worker must take into account that the worker can become unemployed again if he is separated from his firm. The job separation probability $s$, which corresponds to the number of layoffs divided by the number of employed workers, will enter his effective discount rate.

The transition equation for unemployment rate can be written as follows:

$$\dot{u} = -fu + s(1-u)$$

which means that the steady state unemployment rate is given by

$$u = \frac{s}{s+f}$$

The steady state unemployment rate will change if either $f$ or $s$ or both change.

Conventional wisdom has maintained that job destruction rather than job creation has been the main factor behind net job losses behind recessions. Much of the empirical evidence until quite recently was based upon manufacturing data. Shimer (2005) has recalculated job finding and job separation probabilities using the rotating panel of the Current Population Survey (CPS) dataset from the Bureau of Labor Statistics (BLS). His data is presented below:

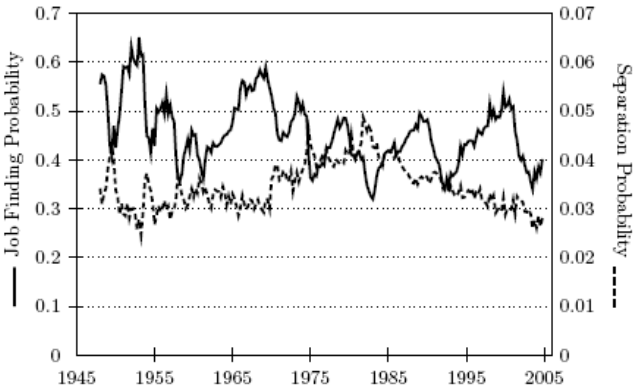



Figure 1: Job Finding and Separation Probabilities, 1948Q1–2004Q4, quarterly average of monthly data. The job finding probability is constructed from unemployment and short term unemployment according to equation (4). The separation probability is constructed from employment, unemployment, and the job finding probability according to equation (5). Employment, unemployment, and short term unemployment data are constructed by the BLS from the CPS and seasonally adjusted. Short term unemployment data are adjusted for the 1994 CPS redesign as described in Appendix A.

The job finding probability is strongly procyclical while the job separation rate is acyclical.

He then constructs artificial series for the unemployment rate under two assumptions: (i) Only job finding probabilities vary as in the data but job separation is constant; (ii) Only job separation probabilities vary as in the data but job finding is constant. The generated graphs are presented on the next page. Shimer views this as evidence for the proposition that variations in the job finding probability are the proximate factor behind unemployment fluctuations.

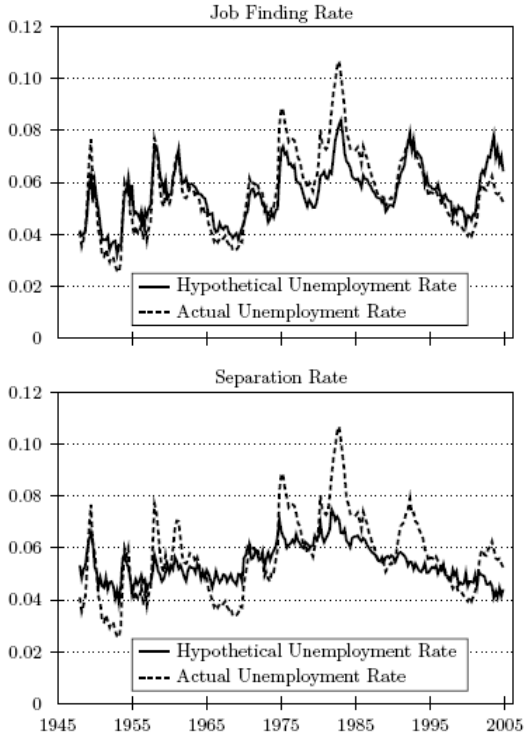



Figure 2: Contribution of Fluctuations in the Job Finding and Separation Rates to Fluctuations in the Unemployment Rate, 1948Q1–2004Q4, quarterly average of monthly data. The job finding rate $f_t$ is constructed from unemployment and short term unemployment according to equation (4). The separation rate $s_t$ is constructed from employment, unemployment, and the job finding rate according to equation (5). The top panel shows the hypothetical unemployment rate if there were only fluctuations in the job finding rate, $\bar{s}/(\bar{s}+f_t)$, and the bottom panel shows the corresponding unemployment rate with only fluctuations in the separation rate, $s_t/(s_t+\bar{f})$. Both panels show the actual unemployment rate for comparison. Employment, unemployment, and short term unemployment data are constructed by the BLS from the CPS and seasonally adjusted. Short term unemployment data are adjusted for the 1994 CPS redesign as described in Appendix A.

Of course, job finding/separation and job creation/destruction are not identical objects.

## 2.2 Job Creation and Job Destruction

The method of calculation of the job finding and separation rates is not innocuous. The job finding rate is the number of hires divided by the number of unemployed. It is possible that the denominator contributes significantly to volatility in this ratio. The job separation rate is the number of layoffs divided by the number of employed workers. The denominator in this case is very large, rendering any changes in layoffs hardly noticable.

Because of this, a procyclical job finding rate and an acylical job separation rate is consistent with the proposition that job destruction accounts for unemployment fluctuations but adjustment in the economy is slow so that hiring does not respond much. This observation limits how far Shimer's analysis can deconstruct the conventional wisdom. The argument in this section has been taken from Professor Caballero's chapter manuscript.

Davis, Haltiwanger and Schuh (1998) present evidence regarding job creation and destruction:

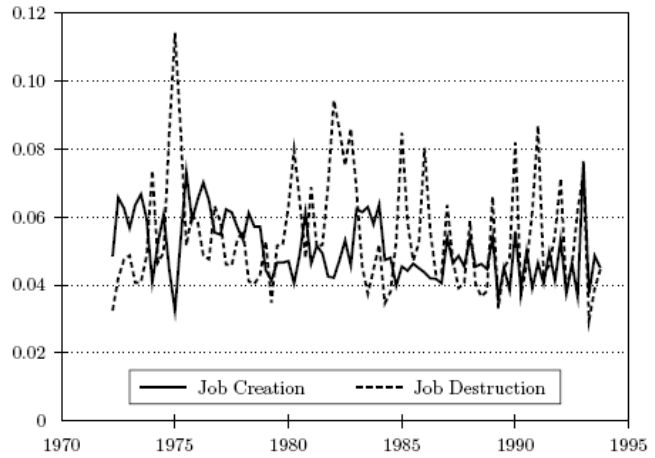



Figure 11: Job Creation and Job Destruction in Manufacturing, United States, 1972Q2–1993Q4. The data are constructed by Davis, Haltiwanger, and Schuh and are available from `http://www.bsos.umd.edu/econ/haltiwanger/download.htm`. They are seasonally adjusted.

Shimer (2005) displays the recalculated series for the period after 1992:

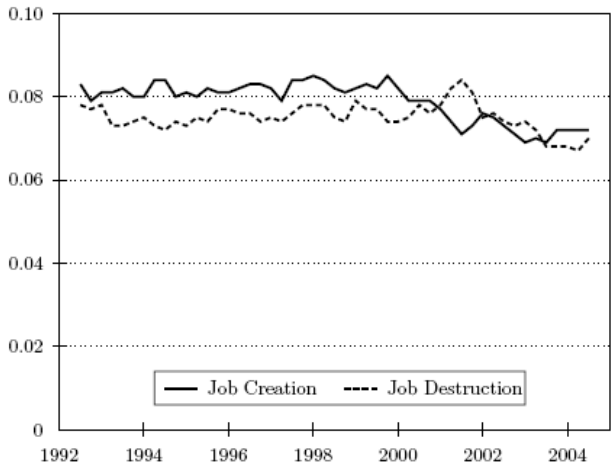



Figure 12: Job Destruction and Job Creation, United States, 1992Q3–2004Q3. The data are constructed by the BLS as part of the BED and are seasonally adjusted.

# 3. References

The figures and tables presented above have been reproduced from the following books and papers:


- Steven J. Davis, John C. Haltiwanger and Scott Schuh, "Job Creation and Destruction," MIT Press (1998).
- Robert E. Hall (2003), "Modern Theory of Unemployment Fluctuations: Empirics and Policy Applications," American Economic Review (Papers and Proceedings) 93:145-150.
- Horst Siebert (1997), "Labor Market Rigidities: At the Root of Unemployment in Europe," Journal of Economic Perspectives, 11(3): 37-54.
- Robert Shimer (2003), "The Cyclical Behavior of Equilibrium Unemployment and Vacancies: ," NBER Working Paper 9536, subsequently published in American Economic Review, 95(1): 25-49.
- Robert Shimer (2005), "Reassessing the Ins and Outs of Unemployment," Working Paper presented at NBER Summer Conference 2005.