

Reassessing the Unemployment Fluctuations from a Different Perspective**İşsizlik dalgalanmalarının farklı bir perspektiften yeniden değerlendirmesi****Hakan ULUCAN¹**¹Pamukkale Üniversitesi, İİBF, Denizli. hulucan@pau.edu.tr

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Abstract

The sources of unemployment fluctuations have been research objectives of many studies for a long time. The main research question of these studies is whether the fluctuations into or out of unemployment derives the unemployment rate. This line of research has attracted a great attention recently, because, as Shimer (2012) has confirmed that the flows out of unemployment fluctuate more than the flows into unemployment and derive the unemployment rate. This study asks if there is any flaw in Shimer's formulation that might possibly lead to a bias in his results and, accordingly, this study took a closer look into the mechanics of the statistical model he constructs. This study observe that Shimer focuses on transition "rates," which suggests that the denominator is smaller for the entry behavior than it is for the exit behavior, as the pool of unemployed is typically much smaller than the pool of employed. On the other hand this study focuses on transition number rather than rates. The result of this study is that employment to unemployment transitions are countercyclical and explains the most of the fluctuations in the number of unemployed contradicting with the results of Shimer (2012). On the other hand, the transitions out of unemployment shows a cyclical pattern.

Keywords: Unemployment dynamics, unemployment fluctuations, labor market, labor market transitions.

JEL codes: J6, E24, E32

Özet

İşsizlik Dalgalanmalarının kaynağı uzun süredir pek çok çalışmanın araştırma amacı olmuştur. Bu çalışmaların temel araştırma sorusu işsizliğe girişlerin mi yoksa işsizlikten çıkışların mı işsizlik oranlarını belirlediğidir. Bu araştırma son dönemde büyük ilgi çekmektedir çünkü Shimer (2012) işsizlikten çıkışların işsizliğe girişlerden daha fazla dalgalandığını ve işsizlik oranını belirlediğini göstermiştir. Bu çalışma Shimer'in modelinde yanlılığa sebep olabilecek bir kusur olup olmadığını sorgulamaktadır. Bu sebeple bu çalışmada Shimer'in kullandığı matematiksel ve istatistiksel model mekaniklerine derin bir inceleme getirilmektedir. Shimer çalışmasında iş gücü piyasasındaki durumlar arasındaki geçişleri incelerken geçiş oranlarını ele almıştır. Örnek olarak, işsiz kalan kişilerin oranı bu kişilerin sayısını toplam istihdam edilen kişi sayısına bölerek hesaplanmışken, iş bulan kişilerin oranı ise bu kişileri toplam işsiz sayısına bölerek hesaplanmaktadır. Bu durumda payda işsizliğe girenler için yüksek işsizlikten çıkanlar için düşük olacaktır. Bu durumda da iş bulan kişilerin dalgalanması daha yüksek olacaktır. Yani bu gözlemler göstermektedir ki Shimer'in modeli işsizlikten çıkan kişilerin dalgalanmasını olması gerekenden daha yüksek göstermektedir. Bu çalışmada işsizliğe girişler ve çıkışların işsizlik ile olan döngüsel ilişkisini direk olarak oranlar üzerinden değil sayılar üzerinden incelenmektedir. Sayılara odaklanıldığında sonuçlar, Shimer'in aksine, göstermektedir ki işsizlik havuzuna girişlerin işsizlik havuzundan çıkışlarda daha fazla dalgalanmaktadır ve işsizlik havuzuna girişlerin işsiz sayısındaki değişimleri daha büyük ölçüde açıklamaktadır.

Anahtar kelimeler: İşsizlik dinamikleri, işsizlik dalgalanmaları, işgücü piyasası, iş gücü piyasası geçişleri.

JEL kodları: J6, E24, E32

1. INTRODUCTION

The main factor behind the fluctuations in unemployment rate is extensively discussed in the literature. The studies try to find out whether the transitions into unemployment (ins of unemployment) or transitions from unemployment (outs of unemployment) are the main responsible factors behind the unemployment rates. The studies in this literature are also related with cyclical features of the labor market transitions.

Mortensen Pissarides search and matching model expects that employment exit rates are more volatile than the unemployment exit (job finding) rates. In this framework, employment exit rates are the main responsible factor behind the unemployment rates. Darby, Haltiwanger and Plant (1986) point out that the number and the types of entries to unemployment pool is the most important factor in unemployment incidence [see also Darby, Haltiwanger and Plant (1985)]. According to their "heterogeneity hypothesis" the exit from employment and the entries to unemployment, are the main essential elements in the explanation of unemployment rates. Empirical findings on positive relationship between unemployment duration and incidence are mainly due to varying types of exits from employment according to their study. Individuals with higher unemployment duration dominate pool of unemployed in recessions, by increasing the average unemployment duration. Although there is no change in group and individual levels of unemployment duration, the average duration is increased. This finding explains implications of empirical observation suggesting that there is positive correlation between unemployment duration and unemployment rates. There is indeed no change in individual level of unemployment duration by time.

On the other hand, Sider (1985), Baker (1992), and Shimer (2012) suggest that the transitions from unemployment to employment are the main factor behind the fluctuations in unemployment rate. These studies are regarded as an opposition to Darby, Haltiwanger and Plant (1986) [see also Shimer (2005) for another opposition to conventional view]. The studies of Sider and Baker compute the unemployment continuation probabilities based on the number of the individuals from different unemployment duration categories in order to calculate the expected unemployment duration of whole sample and demographic groups. Baker (1992) examines the relationship between unemployment rate and expected unemployment duration and concludes that the fluctuations in unemployment durations account for approximately the sixty percent of the fluctuations in unemployment rate. This means that the transitions from unemployment explain more than half of the fluctuations of unemployment rate. Furthermore, the heterogeneity hypothesis is rejected in this study. Shimer (2012) also finds that the transitions from unemployment plays more important role in determining the unemployment rate than transitions into unemployment by implementing a continuous time Markov Model. Shimer also rejects the heterogeneity hypothesis.

The most influential study is that of Shimer (2012) among the studies suggesting the transitions out of unemployment are the main factors behind the fluctuations in

unemployment rate. Shimmer (2012) states that the flow rates into unemployment are almost acyclical whereas the flows from unemployment are procyclical with the economic activity¹

Shimmer also states that the cyclical movements of the flows out of unemployment are the most essential factor accounting for the cyclical fluctuations in unemployment rate. The main aim of this study is to examine the Shimer's mathematical and statistical model and check his results from a different perspective by using CPS (Current Population Survey) data set. After taking a deeper glance at his statistical model, it is observed he focuses on transition "rates." The cyclicity of transition numbers rather than rates is considered to find out the relationship between unemployment and unemployment fluctuations in this study. A descriptive analysis is conducted. Then, a simple regression model is estimated. The result of this study is that the transitions from employment to unemployment are more cyclical than the transitions from unemployment to employment when the transition numbers are analyzed. This cast a suspicion on the Shimer's statistical model that the model can include some scale effects of the denominators of transition rates.

The study is planned as follows. In Section 2, "Method" data issues, methodology of this study and its departures from that of Shimer (2012), and descriptive analysis are provided. The mathematical and statistical characteristics of Shimer's model are also examined in Section 2. The results of the regression are exposed in Section 3. The study ends with conclusion in Section 4.

2. METHOD

In order to examine the labor market fluctuations, an empirical analysis is conducted depending on the transition numbers in labor market. Firstly, a descriptive analysis is performed. Then, a simple regression model is carried out. Before the analysis, the data, sample and model issues are provided in this section.

2.1. Data

The monthly Current Population Survey (CPS)² data of the USA is utilized in all computations and estimations in this study. The CPS data set is constituted by Bureau of Labor Statistics (BLS) of the United States in order to gather information on the labor force situations and earnings of the US population. Bureau of Labor Statistics publishes technical papers to give comprehensive information on the CPS data sets [see U.S. Bureau of Labor Statistics (2002) and U.S. Bureau of Labor Statistics (2006)].

2.1. Sample

Approximately, 60,000 households are questioned in each month. The survey includes rotational groups surveyed for a successive 4 months before a break of 8 months, and re-interviewed 4 months following the break. Therefore, they are in the data set for 8 months, the fifth month representing the first month after the break.

¹ (Procyclicality indicates that the variable is positively related to the economic activity. Countercyclicality is the inverse of procyclicality. A procyclical variable increases in the expansion times while countercyclical variable increase in recession times. On the other hand, acyclical variable shows a pattern regardless of the economic activity).

² Darby, Haltiwanger, and Plant (1986), Baker (1992), Shimer (2012) are among the studies that utilize CPS data set. This data set is used by most of the studies in the empirical literature of labor market transitions.

The rotation groups are followed for tracking an individual from month to month in order to observe the transitions between labor market status categories. Personal identification (id) numbers are generated to match the individuals from one month to the next depending on household id numbers, individual line numbers, and the variables of personal characteristics such as sex, age, and race, since an individual identification number is not available in the original dataset. The study includes the period from January 1980 to February 2012. The dataset takes into account the people from the civilian non-institutional population of age 16 and above.

2.2. Model

Shimer (2012) analyzes the transitions among three different employment states: employment, unemployment, and inactivity from the matched records of the data. He uses sample weights to calculate the gross flows between employment states. Employment to employment, employment to unemployment, employment to inactivity, unemployment to employment, unemployment to unemployment, unemployment to inactivity, inactivity to employment, inactivity to unemployment, and inactivity to inactivity are nine transitions for which he construct the gross flows.

The characteristics of the model of Shimer (2012) are explained below in order to see how his model includes scale effects on the transitions. Shimer calculates 9 entrance shares from the gross flows in a manner that each flow is divided by total flows from the initial state. To illustrate, share of employment to employment transition is calculated by dividing the gross employment to employment flow by the sum of employment to employment, employment to unemployment, and employment to inactivity transitions. Therefore the sum of the shares of transitions from employment is equal to one. Similarly, the shares of transitions from unemployment and inactivity equal to one. These entrance shares are presented below. $n_t^{ik}(\tau)$ represents the number of transitions from state i to state k whereas $\sum_j N_t^{ij}(\tau)$ represents the total number of transitions from state i to all states.

$$n_t^{EU}(\tau) = \frac{N_t^{EU}(\tau)}{\sum_j N_t^{Ej}(\tau)}, n_t^{EI}(\tau) = \frac{N_t^{EI}(\tau)}{\sum_j N_t^{Ej}(\tau)}, n_t^{EE}(\tau) = \frac{N_t^{EE}(\tau)}{\sum_j N_t^{Ej}(\tau)}, n_t^{UE}(\tau) = \frac{N_t^{UE}(\tau)}{\sum_j N_t^{Uj}(\tau)},$$

$$n_t^{UI}(\tau) = \frac{N_t^{UI}(\tau)}{\sum_j N_t^{Uj}(\tau)}, n_t^{UU}(\tau) = \frac{N_t^{UU}(\tau)}{\sum_j N_t^{Uj}(\tau)}, n_t^{IU}(\tau) = \frac{N_t^{IU}(\tau)}{\sum_j N_t^{Ij}(\tau)}, n_t^{IE}(\tau) = \frac{N_t^{IE}(\tau)}{\sum_j N_t^{Ij}(\tau)},$$

$$n_t^{II}(\tau) = \frac{N_t^{II}(\tau)}{\sum_j N_t^{Ij}(\tau)}.$$

According to the Shimer's Model, any state variable $s(t + \tau)$ evolves according to the law of motion represented in equation (1). The entrance share $n_t(\tau)$ matrix is a 3×3 matrix the sum of the columns of which is equal to one. On the other hand, λ_t is a 3×3 Markov transition rate matrix the sum of the columns of which is equal to zero, representing the transition probabilities among the labor market states. Shimer (2012) solves this continuous time Markov model in order to get the transition probabilities. Then, Shimer conducts a regression in order to explain the contribution of each transition probability to the

fluctuations of the unemployment rate. He concludes that the major source of the fluctuations in the unemployment rate is the fluctuations in the transitions from unemployment to employment, which are outs of unemployment.

$$\dot{s}(t + \tau) = \lambda_t s(t + \tau). \quad (1)$$

The model has three implications. First, a transition rate is roughly obtained by dividing the number of people transitioning into the total number of people in the relevant state. For example, transition rate from unemployment to employment equals the ratio of those choosing to switch to employment from unemployment to the total number of unemployed individuals before the transition. Second, not only the numerator, but also the denominator fluctuates. And, third, the extent of the fluctuations in rates depends on how large is the relevant state (i.e., the denominator).

This third point deserves further explanations. Suppose that we see 1000 more workers quitting unemployment and getting employed. At the same time, 1000 more workers are quitting their jobs and becoming unemployed. In this case, the change in the number of unemployed will be zero (the rate of unemployment will change in an atomistic amount). However, the change in the exit rate from unemployment will be much bigger than the change in the entry into unemployment. The reason is the relative magnitudes of the denominators.

Shimer's conclusions have a counterintuitive flavor: he says that unemployment fluctuations are determined mostly by how workers transition from unemployment to employment rather than employment to unemployment. This means that hiring and job finding behaviors dominate exits, quits, and layoff. However, we see mass layoffs during crises and only little separations during booms. Moreover, individuals tend to reduce their reservations wages during recessions, which mitigates the cyclical nature of unemployment to employment transitions. In sum, the conclusions above suggests that maybe the mechanics of Shimer's method are generating part of his results.

2.3. Descriptive Analysis

To address the concerns about Shimer's model, a preliminary descriptive analysis is conducted. Descriptive figures on the "number" of workers transitioning across labor market states rather than "rates" are exposed. Figure 3 and Figure 4 presents these numbers for the employment-to-unemployment and unemployment-to-employment transitions, respectively. A preliminary eyeball test suggests that the transitions from employment to unemployment seem to be more cyclical than the transitions from unemployment to employment. This observation contradicts with Shimer's results. Moreover, Figure 1 suggests that the number of unemployed (i.e., the denominator for the exit rate from unemployment) fluctuates a lot over the business cycle but the number of employed is relatively stable.

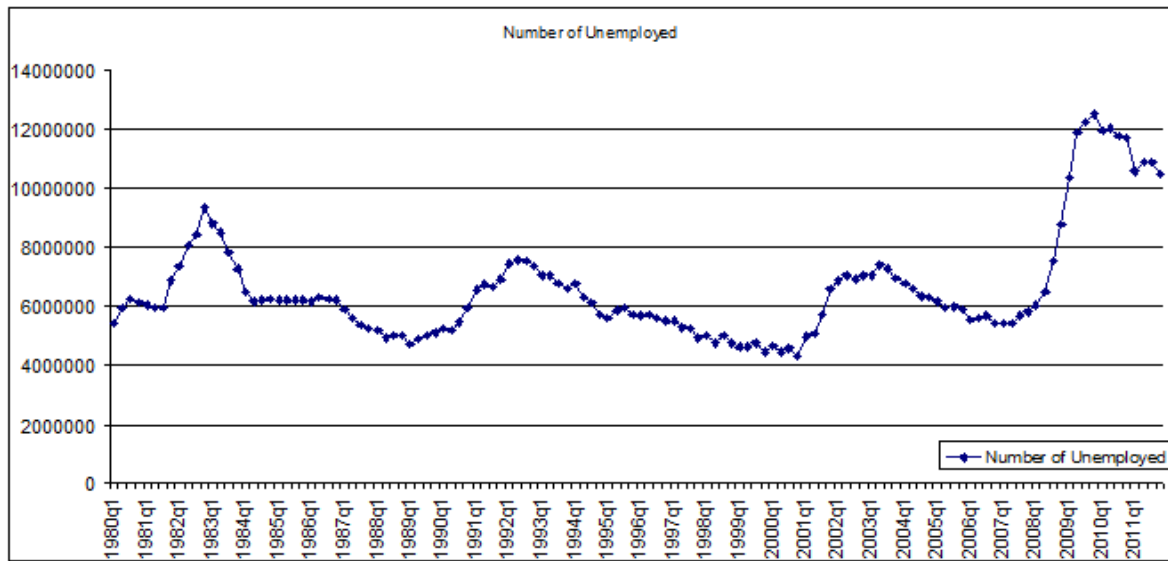


Figure 1. The number of unemployed series from the first quarter of 1980 to last quarter of 2011.

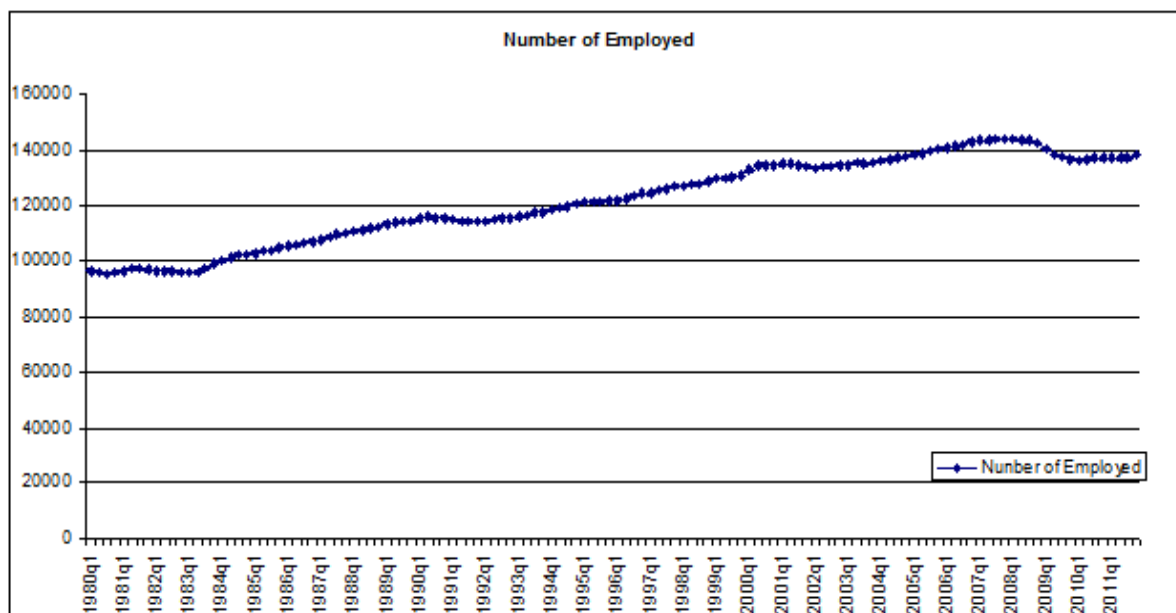


Figure 2. The number of employed series from the first quarter of 1980 to last quarter of 2011 from published series of BLS.

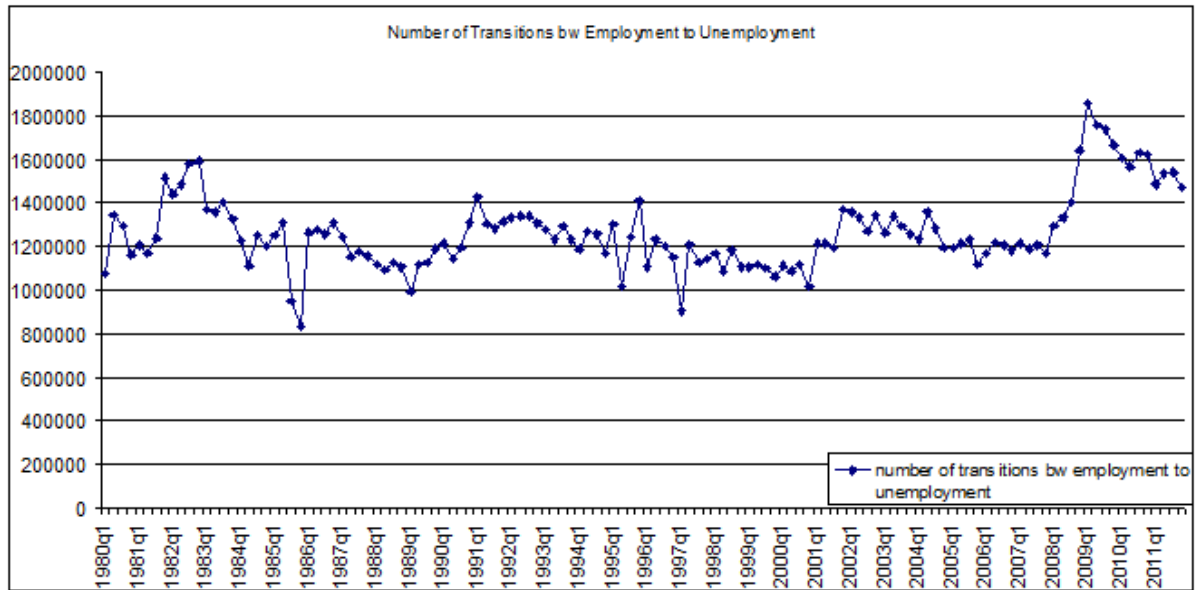


Figure 3. The number of transitions from employment to unemployment from the first quarter of 1980 to last quarter of 2011.

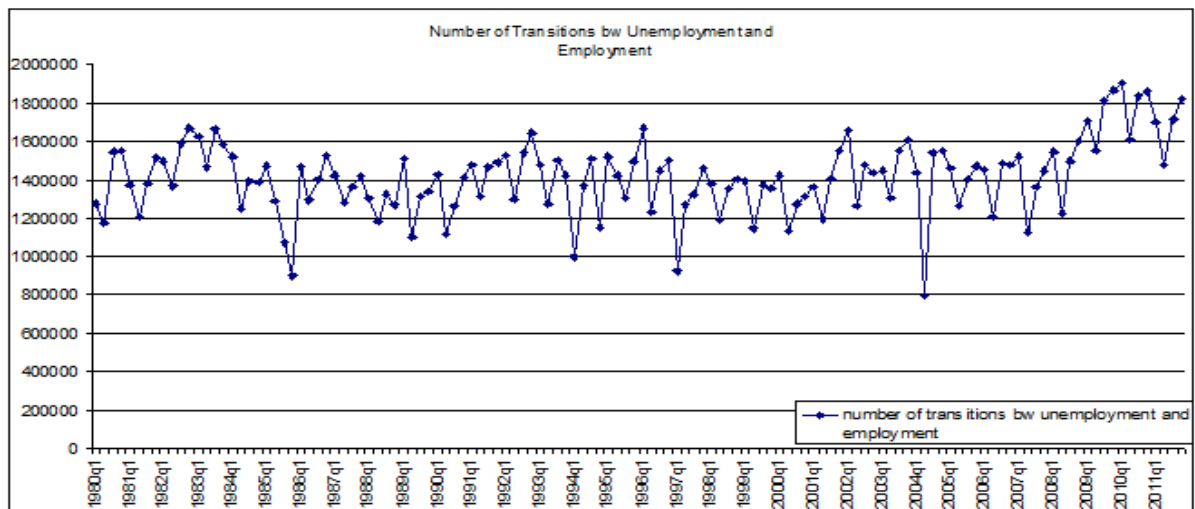


Figure 4. The number of transitions from unemployment to employment from the first quarter of 1980 to last quarter of 2011.

The number of transitions from employment to unemployment matches with the number of unemployed. On the other hand the transitions from unemployment to employment are seem to be acyclical and regardless of the number of unemployed. The number of transitions between employment to unemployment shows considerable jumps in the recessions in the first part of 1980s, first part of 1990s, first part of 2000s and the 2007-2008 in the USA economy. On the other hand the number of transitions between unemployment to employment shows a stable pattern towards the period. This indicates that the number of

transitions from employment to unemployment is more sensitive to the recessions and more cyclical than the number of transitions from unemployment to employment.

3. ESTIMATION RESULTS

To carry out analysis over numbers, a simple regression of the number of unemployed on the number of people transitioning across states is conducted. This is very similar to Shimer's regressions except that this study focuses on numbers rather than rates. Employment to employment (EE), employment to unemployment (EU), employment to inactivity (EI), unemployment to employment (UE), unemployment to unemployment (UU), unemployment to inactivity (UI), inactivity to employment (IE), inactivity to unemployment (IU), and inactivity to inactivity (II) are nine transitions for which transition number are constructed. The log of number of unemployed is regressed on the log of transition numbers. Note that the final series used in the regression are constructed from the seasonally adjusted (using ratio-to-moving average technique) raw data and, then, are detrended using a Hodrick-Prescott filter with a smoothing parameter 10^5 . Hodrick-Prescott filter is used to detrend data and to see the cyclical relationship between the number of unemployed and all other transitions.

Table 1: Regression results

Regression on the number of unemployed	
Independent variables	Explanatory power
EU	0.958* (0.220)
EI	0.162 (0.177)
UE	-0.04 (0.184)
UI	-0.153* (0.078)
IE	-1.269* (0.2316)
IU	0.164* (0.078)
EE	-0.008 (0.0134)
UU	1.255* (0.184)
II	-0.0201* (0.005)

Table 1: The results of the regression of the number of transitions on the number of unemployed. The stars shows that the parameter is significant at 10% confidence level. The variables with no star denotes that the parameter is insignificant. The sample period is from 1980q1 to 2011q4 (128 quarters). The series are detrended using HP filter with a smoothing parameter 10^5 before the estimation in order to detrend the data set.

Table 1 presents the regression results. The regression results indicate that the transitions from employment to unemployment have a very large explanatory power, while transitions

from unemployment to employment have none. This result supports our descriptive analysis of the transitions. Employment to unemployment transitions explains most of the fluctuations in the number of unemployed.

All estimated parameters are economically explainable. The transitions with positive parameters are countercyclical while the transitions with negative signs are procyclical. The transitions with insignificant parameters are regarded as acyclical. The negatively significant parameter of the transitions from unemployment to inactivity states that the discouraged worker effect is an important phenomenon in the USA. The negatively significant parameter of transition from inactivity to employment shows that this transition is procyclical. The transitions from inactivity to inactivity are also procyclical. The employment to unemployment, inactivity to unemployment, and unemployment to unemployment transitions are countercyclical.

The cyclical features of the transitions estimated in this study contradicts with Shimer (2012). Shimer reports that employment to unemployment transitions are acyclical whereas unemployment to employment transitions are procyclical and explains most of the fluctuations in unemployment rate. On the other hand, this study shows that employment to unemployment transitions are countercyclical and explains the most of the fluctuations in the number of unemployed.

4. DISCUSSION

It can be concluded that there are returns to developing alternative estimation methods based on numbers rather than rates. The reason is that rates have scale problems. The same number of workers entering and exiting the relevant states might imply very different results if one conduct statistical analysis based on rates than numbers. As a result, one can conclude that Shimer's results will potentially change in a formal model dealing with numbers instead of rates.

The mechanics of the statistical model developed in Shimer (2012) is questioned in this study. It is observed that Shimer focuses on rates of transitions rather than number of transitioning workers. This study shows that this might be generating his results. In particular, the cyclicity in the exit rate from unemployment is admittedly larger than the cyclicity in the job separation rate. But this might be due to the fact the transitions from unemployment to employment come from a much smaller (and also significantly countercyclical) pool of individuals: the unemployed. However, the transitions from employment to unemployment are drawn from a much larger (and much more stable) pool: the pool of employed. I argue that this issue might be the key in understanding the results reported by Shimer. I leave the interesting task of developing a statistical model based on numbers, estimating it, and comparing the outcomes with those of Shimer's study to future research.

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