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Unemployment in the US. Unemployment rate versus claimant counts. Mean reversion, persistence or hysteresis

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Abstract

This paper deals with the analysis of US unemployment by means of I(d) techniques and using two different measures, the unemployment rate and the initial claims at different data frequencies. The results indicate that the unemployment rate series are I(d) with d constrained between 0.5 and 1, while the initial claim series display orders of integration close to 1. Thus, mean reversion is only obtained in case of the unemployment rate while the hysteresis hypothesis seems to be supported by the claimant counts.

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1. Introduction

This paper deals with the analysis of US unemployment by looking at two different measures, the unemployment rate and the claimant counts and using I(d) techniques. This is appropriate to determine if the series is stationary I(0), stationary long memory ($0 < d < 0.5$); nonstationary though mean reverting ($0.5 \leq d < 1$), or nonstationary I(1). Each one of these cases correspond to different theories of unemployment, including the Natural Rate of Unemployment (NRU) hypothesis (Phelps, 1967, 1972, Friedman, 1968), the structuralist view of unemployment (Phelps, 1994) in the case of breaks being permitted, persistence, and the hysteresis approach developed by Blanchard and Summers (1986, 1987), Cross (1987), Barro (1988) and others and which would seem to characterize the unemployment in Europe.

The main conclusion obtained in this paper is that the results are very sensitive to the series examined. Thus, using the unemployment rate, the series seems to be nonstationary though mean reverting, with an order of integration of about 0.6. However, if the claimant counts are employed the results are much more persistent, and the order of integration is about 1, supporting the hysteresis view for unemployment.

The layout of the paper is as follows: Section 2 describes the data and the methodology employed. Section 3 displays the results while Section 4 contains some concluding comments.

2. Data

The data sets examined in this paper include the seasonally adjusted unemployment rate and unemployment insurance claims (initial claims) in the US. For the unemployment rate series, we analyze both monthly and quarterly rates, for which the corresponding sample periods go from 1948M1 to 2011M1 and 1948Q1 to 2011Q1 respectively, published by the U.S. Bureau of Labor Statistics. We retrieved the insurance claims series from the U.S. Department of Labor-Office of Unemployment Insurance. The weekly, monthly and quarterly claim count series are examined. The period under analysis for the weekly claim counts ranges from 7 January 1967 to 29 January 2011, and for the monthly and quarterly ones goes from 1967M1 to 2011M1 and 1967Q1 to 2011Q1 respectively. Though not displayed, the series move roughly in a very similar way.

We estimate the series by using the following specification,

$$y_t = \alpha + \beta t + x_t, \qquad (1-L)^d x_t = u_t, \qquad \phi_p(L) u_t = \theta_q(L) \varepsilon_t, \qquad t = 1, 2, \ldots,$$

where p and q are the orders of the AR and MA coefficients respectively. We suppose that p and q are equal to or smaller than 3, and estimate d by maximum likelihood in the time domain using Sowell's (1992) approach. Very similar results were obtained with Dahlhaus' (1989) method in the frequency domain. Using semiparametric methods (Robinson, 1995a,b; Abadir et al., 2007) the results were completely in line with those reported here. We examined the three standard cases of no regressors ($\alpha = \beta = 0$), an intercept ($\beta = 0$) and an intercept with a linear trend. We choose the best specification by looking at the t-values of the deterministic terms along with likelihood criteria such as the AIC, BIC and HIC.

3. Empirical results

Table 1 summarizes the results in terms of the fractional differencing parameter, d, and the short run dynamic ARMA components using the three above-mentioned criteria. We observe that for the unemployment rates, the results are very similar for the two series and the three criteria, the estimated values of d ranging from 0.588 (quarterly series with the AIC) to

0.633 (monthly, AIC). We also notice that in all cases the unit root null hypothesis is decisively rejected in favour of values smaller than 1. If we focus now on the initial claims we observe some differences across the series; the lower estimates of d are obtained in all cases with the quarterly data, the unit root is rejected in favour of mean reversion for the quarterly series with the AIC and HQ criteria, and for the monthly series with the AIC, and in all the other cases, the values of d are close to 1 and the unit root cannot be rejected. Thus, according to the estimates of d, it seems to be a different pattern in the unemployment rates and the initial claims in the US.

Table 1: Estimates of d for the unemployment series

Series	AIC		BIC		HQ	
	D	ARMA	d	ARMA	d	ARMA
Q. Unemp. Rate	0.588	(3, 2)	0.588	(3, 2)	0.588	(3, 2)
M. Unemp. Rate	0.633	(3, 3)	0.597	(2, 2)	0.597	(2, 2)
Q. Claimants	0.533	(2, 0)	0.828	(0, 0)	0.533	(2, 0)
M. Claimants	0.565	(3, 3)	1.041	(3, 0)	1.041	(3, 0)
W. Claimants	0.971	(3, 0)	0.971	(3, 0)	0.971	(3, 0)

Q, M and W means quarterly, monthly and weekly data.

Table 2: Parameter estimates of the selected models.

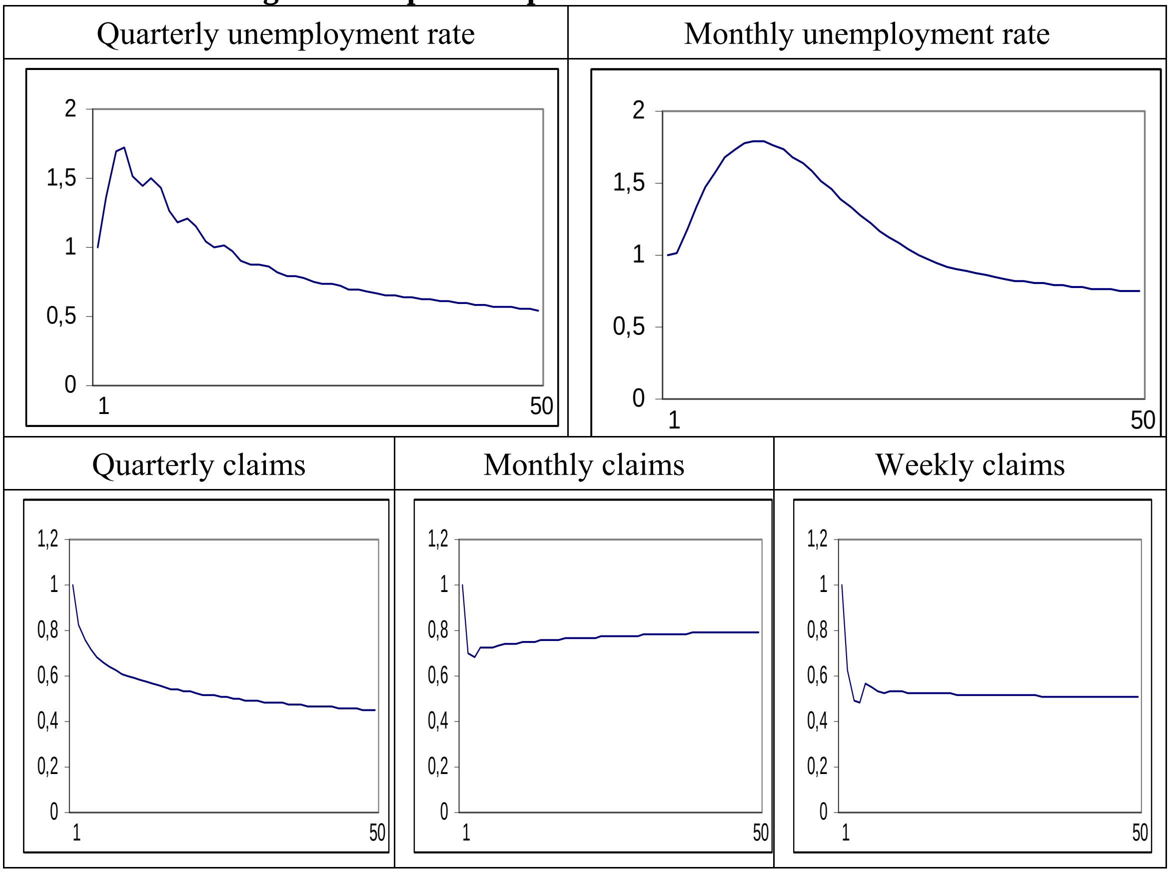
Series	d	AR coefficients			MA coefficients		
		AR-1	AR-2	AR-3	MA-1	MA-2	MA-3
Q. Unemp. Rate	0.588	0.6971	-0.7566	0.5469	0.0713	1.0000	Xxx
M. Unemp. Rate	0.597	1.7569	-0.7874	xxx	-1.3351	0.4938	Xxx
Q. Claimants	0.828	Xxx	Xxx	xxx	xxx	xxx	Xxx
M. Claimants	1.041	-0.3421	-0.1438	-0.0230	xxx	xxx	Xxx
W. Claimants	0.971	-0.3476	-0.2448	-0.1385	xxx	xxx	Xxx

Q, M and W means quarterly, monthly and weekly data.

Table 2 displays the parameter estimates of the selected models for each series, based on several diagnostic tests carried out on the residuals. As mentioned earlier, for the unemployment rate series the unit root is rejected in favour of mean reversion; however, for the initial claims the unit root null cannot be rejected. Thus, in the former case, the NAIRU approach might be satisfied in the long run though with a large degree of persistence; however, for the claimants the hysteresis approach of unemployment seems to be more appropriate.

Figure 1 displays the first 50 impulse responses for each series. We notice that for the unemployment rates, after an initial increase the values start decreasing though at an hyperbolic slow rate. For the claimants, we only observe a slight decrease with the quarterly data, and the response seems to persist forever in the other two cases.

Figure 1: Impulse responses for the selected models



4. Conclusions

In this article we have examined the US unemployment by using I(d) techniques in two different measures, the unemployment rate and the initial claims. In the former case we use quarterly and monthly data, and for the claims we employ weekly, monthly and quarterly data. The main conclusion presented in this work is the different behavior observed in the two variables examined. Thus, for the unemployment rate, the series seem to be I(d) with d strictly below 1 and thus displaying mean reverting behavior and supporting the NAIRU hypothesis though with a large degree of persistence. However, for the initial claims, the values are around the unit root case, and thus supporting the hysteresis approach of unemployment. Therefore, an interesting question that remains to be elucidated is to explain the different behavior in the two variables that might be related with the fact that the unemployment rate is a "*stock*" variable, while the initial claims represent "*flows*" of individuals. This may be related with the work by Chesher and Lancaster (1983). In this classical paper they showed that in the labor market, the joint distributions of observables and unobservables are generally different in the populations flowing into or out of unemployment, in the populations unemployed or employed, and in the whole labor force. Therefore, in nonstationary contexts, the distributions of observable and unbobservable characteristics differs in flows and stocks, implying that estimates of labor market models should be interpreted carefully.

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