

Why Are Some Recoveries Short and Others Long?

Edward E. Leamer

Emeritus Professor, UCLA

UCLA Anderson Forecast

Appendix: Seasonal Adjustment of US State Data

The FRED website has the monthly total payrolls for the 50 US states from 1990 to the present depicted in Figure 20. Several of these states have extreme seasonal variability which would make it difficult to identify the peak, trough and recovery months. The first step is do a seasonal adjustment using equations like the one in Table 8 which is a regression of the log of Alaska total payrolls on eleven monthly indicators, a constant and a trend that increments one each year. The seasonally adjusted log data are computed with the formula

$$\log_aknan_sa = \text{resid} + (@\text{coefs}(1) + @\text{coefs}(2) + @\text{coefs}(3) + @\text{coefs}(4) + @\text{coefs}(5) + @\text{coefs}(6) + @\text{coefs}(7) + @\text{coefs}(8) + @\text{coefs}(9) + @\text{coefs}(10) + @\text{coefs}(11)) / 12 + @\text{coefs}(12) + @\text{coefs}(13) * (@\text{trend} / 12)$$

The log of Alaska total payrolls and the corresponding seasonally adjusted data are displayed in Figure 21. The seasonal patterns for all 50 states are depicted in the three images in Figure 22. January is the weakest month for all but four states in the bottom image that have July as the weakest month: Arizona, Florida, North Carolina and also Vermont, which is a surprise. The pattern with January min and June Max is the most frequent case. Alaska is the outlier by far, with jobs “frozen” to minimal levels from November to February and a 14% swing from January to July.

The seasonally adjusted data for all 50 States are illustrated in Figure 15 with the official US recessions shaded in red. These official US recessions identify periods of weakness for many states, but the timing of the recessions is not exactly the same in all states, especially so for the 1990/91 mild recession.

Table 1 Alaska Seasonal Regression

Dependent Variable: LOG(AKNAN)

Method: Least Squares

Date: 06/17/20 Time: 16:06

Sample: 1990M01 2020M04

Included observations: 364

Variable	Coefficient	Std. Error	t-Statistic	Prob.
@MONTH=1	-0.024824	0.009079	-2.734041	0.0066
@MONTH=2	-0.003346	0.009079	-0.368507	0.7127
@MONTH=3	0.005058	0.009079	0.557048	0.5778
@MONTH=4	0.015289	0.009079	1.683956	0.0931
@MONTH=5	0.058544	0.009154	6.395449	0.0000
@MONTH=6	0.097851	0.009154	10.68964	0.0000
@MONTH=7	0.115482	0.009154	12.61600	0.0000
@MONTH=8	0.111687	0.009153	12.20163	0.0000
@MONTH=9	0.087239	0.009153	9.530832	0.0000
@MONTH=10	0.039697	0.009153	4.336910	0.0000
@MONTH=11	0.010479	0.009153	1.144854	0.2530
C	5.468119	0.007252	753.9835	0.0000
@TREND/12	0.012098	0.000212	57.00215	0.0000
R-squared	0.917039	Mean dependent var	5.693370	
Adjusted R-squared	0.914203	S.D. dependent var	0.121027	
S.E. of regression	0.035450	Akaike info criterion	-3.806320	
Sum squared resid	0.441105	Schwarz criterion	-3.667136	
Log likelihood	705.7503	Hannan-Quinn criter.	-3.751001	
F-statistic	323.3255	Durbin-Watson stat	0.073141	
Prob(F-statistic)	0.000000			

Figures: Seasonal Adjustment

Figure 1 Total Payrolls: 50 US States

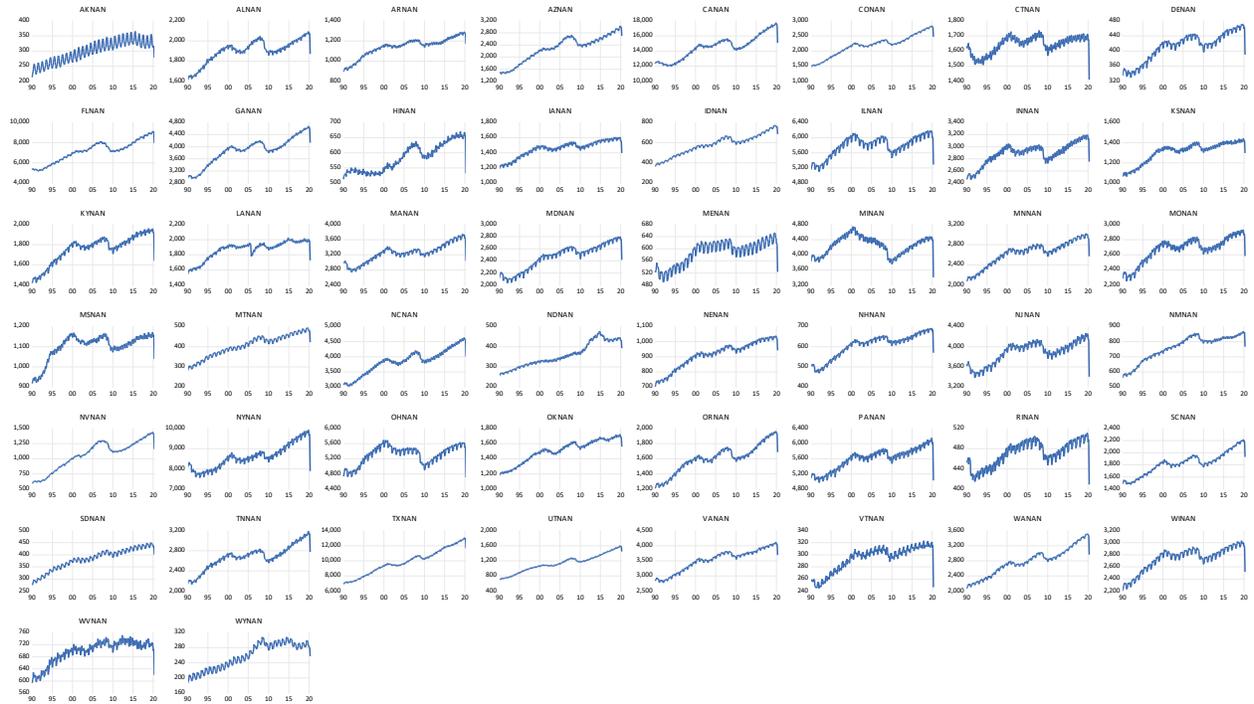


Figure 2 Alaska Seasonally Adjusted Data

Log of Alaska Total Payrolls
Raw Data and Seasonally Adjusted Data

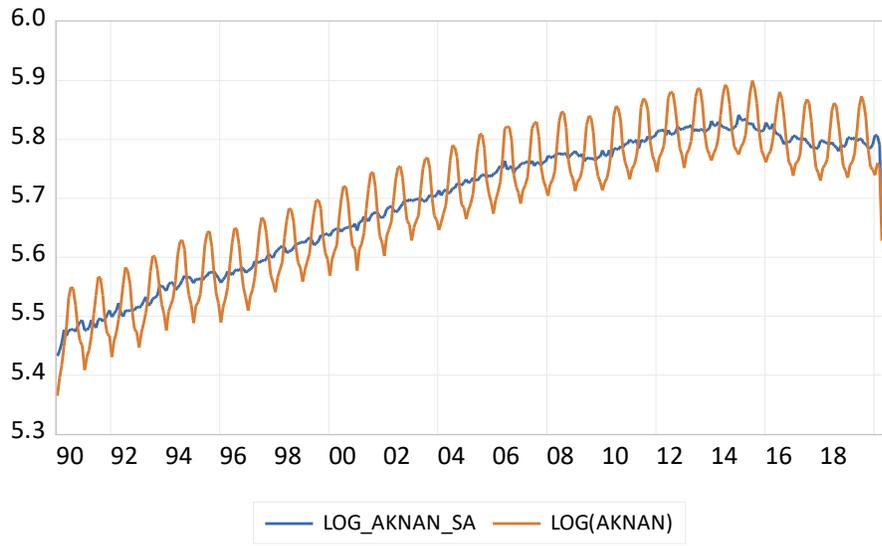
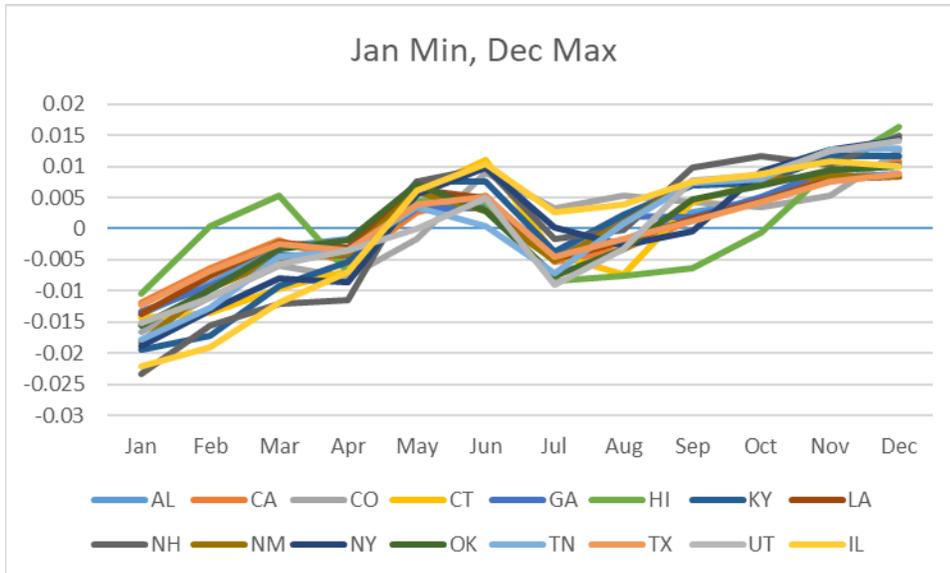
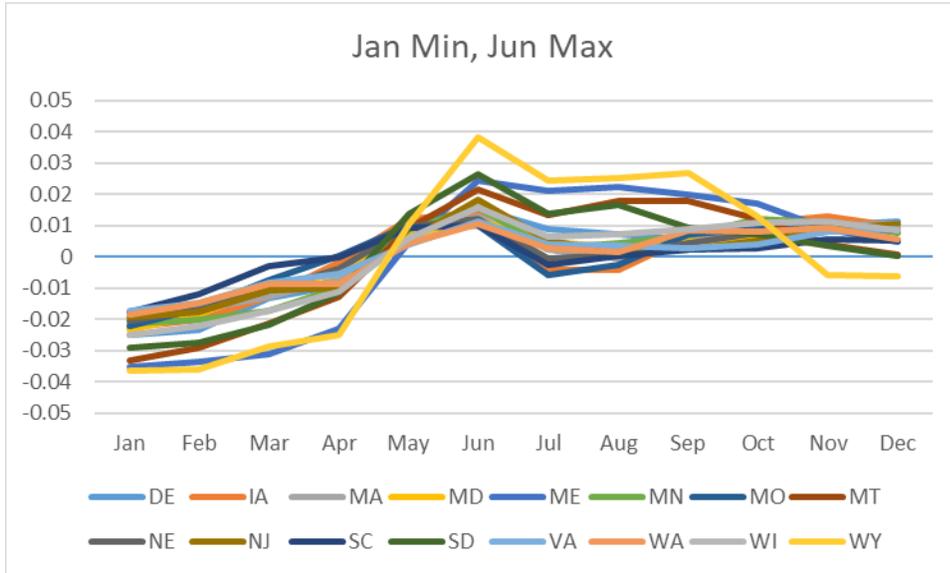


Figure 3

Seasonal Patterns



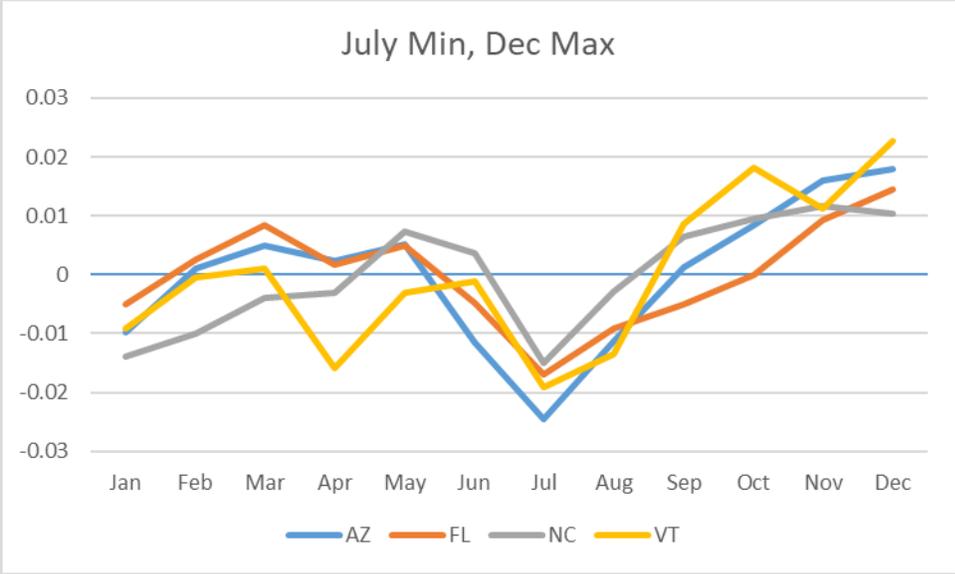
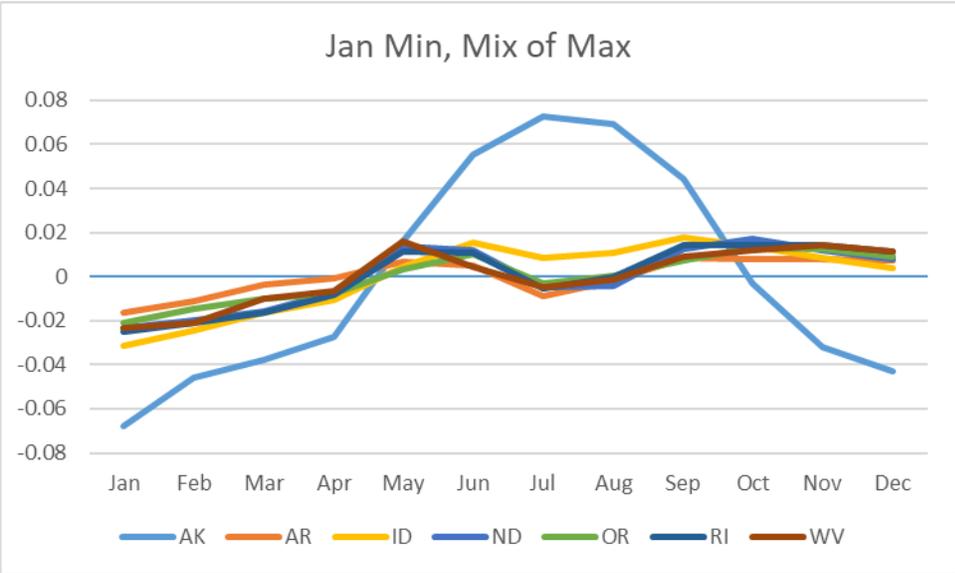
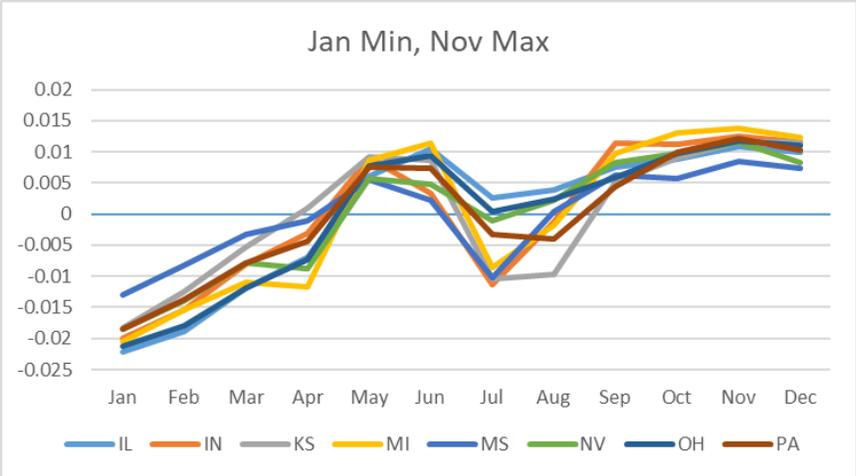


Figure 4 Recession/Recovery Periods of 50 US States

