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The non-accelerating inflationary rate of unemployment (NAIRU) is a fundamental concept in macroeconomics. Defined as the rate of unemployment at which the inflationary rate does not change, NAIRU is widely used by policymakers to help determine fiscal and monetary policy. However, NAIRU presents a challenge in that one cannot directly observe NAIRU in the same manner that one can observe the unemployment rate. This challenge also makes it difficult to determine how accurate one's estimates of NAIRU are. In our approach to estimate NAIRU, we employ various univariate smoothers and filters in order to extract the underlying trend from the cyclical unemployment rate. We also use a state-space model and the Kalman Filter along with an EM Algorithm to extract the unobserved state of NAIRU. We expand upon current methods used to estimate NAIRU by utilizing a more general multivariate autoregressive state-space model (MARSS) that incorporates structural changes in the labor market. When assessing the predictive ability of our estimates of NAIRU using the Phillips curve, we find that our estimates perform as well or better than those provided by the Congressional Budget Office. (Received July 25, 2014)