1 Outline

Seminal work by Hamilton (1989) proved the efficacy of a novel approach in the econometric analysis of business cycles. This econometric approach – coined a regime-switching model – allowed for the estimation of linear models of nonstationary time series under the assumption that the dependent variable is a realization from one of many possible states. For example, consider real GDP. The expansionary and contractionary states of the economy are well-defined by changes in real GDP. These short-term economic fluctuations from expansion to contraction define what is known in the literature as the business cycle. Understanding the business cycle is important for both theoretical and practical purposes. For theoretical purposes, researchers want to understand how to construct parsimonious models for economic growth. In practice, policymakers and investors want to understand the evolution of business cycles and what variables are leading indicators for future changes in economic activity.

Hamilton (1989) proposed that the growth of real GNP can be modeled by a Markov switching regression with first-order memory. In my paper, I seek to fit a two-state Markov switching model to real GDP and to determine if this model contains information that is economically and statistically significant. To fit the Markov-switching model, I propose several different specifications for the dependent variable $y_t$. One such specification is a simple $AR(p)$ autoregressive process of order $p$. Other specifications may include additional economic indicators such as the unemployment rate or inflation. I will estimate the model using real GDP data up til October 1, 2019. Ideally, the model will be able to differentiate between periods of economic growth (such as the last few years) and those of economic contraction (such as the financial crises in 2008 and subsequent recession). Once this model is estimated, I can evaluate its fit against the dating of the business cycle by the National Bureau of Economic Research (NBER). If expansionary and contractionary periods estimated by the model align with those dated by the NBER, then I can conclude that the Markov switching model provides an economically significant result. Then, I can use the estimated coefficients to evaluate the quality of ex-post predictions. Given that the Markov model is fit using the entire data set, I will be unable to do ex-ante or quasi ex-ante forecasting. In any case, ex-post forecasts should provide
sensible conclusions.

I will likely add additional steps or make changes in my proposed methodology as my data work progresses. As I do, I will clearly explain the reasoning and implementation of behind any changes.