Comparing Probability Forecasts in Markov Regime Switching Business Cycle Models

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Abstract

We evaluate techniques for comparing the ability of Markov regime switching (MRS) models to fit underlying regimes of a series of interest. This is particularly important in the business cycle literature where one may be interested in determining whether using leading indicators to allow transition probabilities to vary improves the ability of MRS models to fit the NBER business cycle chronology. This is typically done using the quadratic probability score, or QPS (Diebold and Rudebusch, 1989). Although it is possible to statistically compare the QPS statistics for two MRS models using the Diebold and Mariano (1995) (DM) test statistic for comparing forecasts, we find using a Monte Carlo experiment that the DM statistic tends to under-reject (the null of "no difference in forecast accuracy") when comparing MRS models. This we believe is because of the strong non-normality of the forecast errors of such models. Furthermore, using simulation-based inference we demonstrate that leading indicators improve the fit of an MRS model of the US business cycle chronology by 24 percent, such improvement having a *p*-value of 0.001.

Key Words: Markov Regime Switching, Diebold and Mariano statistic, Quadratic Probability Score, Monte Carlo, Business Cycle

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