Assessing Regime Switching Equity Return Models

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Abstract

In this paper we examine time series model selection and assessment based on residuals, with a focus on regime switching models. We discuss the difficulties in defining residuals for such processes and propose several possible alternatives. We determine that a stochastic approach to defining the residuals is the only way to generate residuals that are normally distributed under the model hypothesis. The stochastic residuals are then used to assess the fit of several models to the S&P 500 log-returns. We then complement this analysis by performing an out-of-sample forecast for each model. Only two of the models have a greater than 5 percent probability for the dramatic downturn in the equities markets by the end of 2008.