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## **Cyclical Convergence in the EU Countries: An Identification of Turning Points Based on the Hidden Markov Models**

Cyclical convergence generally means the tendency toward synchronization of business cycles between various countries. In empirical studies, there are various ways of testing cyclical convergence, depending e.g. on whether business cycles or growth cycles are tested, on the method used to eliminate the trend, or the way in which turning points are identified. This paper employs a new tool in identifying turning points, namely Hidden Markov Models (HMM) and the Viterbi path.

The empirical analysis carried out in the paper covers the European Union countries. Turning points are identified on the basis of annual and quarterly GDP statistics for different EU member states. It will enable us to assess the synchronization of business and growth cycles within the EU. Moreover, it will be the sensitivity analysis in terms of proper time interval to identify turning points (it is interesting whether peaks and troughs for annual and quarterly GDP statistics are similar or completely different).

In the case of Poland, turning points will be also identified for monthly business survey data taken from the Research Institute of Economic Development (IRG SGH). Survey data are often employed as leading indicators in economic barometers. On the basis of the HMM procedure, we will check whether turning points for the monthly survey data have leading properties for the fluctuations of GDP.