MORTALITY MODELING: LEE-CARTER AND THE MACROECONOMY

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Abstract

Using data for six OECD countries, the effect of macroeconomic conditions on the mortality index *kt* in the widely-applied Lee-Carter model is studied. For the period 1950–2005, significant positive correlations are found with real GDP growth rates in Australia, Canada, and the United States, as well as with unemployment rate changes in Japan. Further correlation analysis and stability testing reveals that the link between the economy and mortality is subject to a major structural change in all six countries. Significant break years are identified at the beginning of the 1970s and in the early 1990s. A possible explanation for the observed change in the reaction of aggregate mortality is that procyclical causes of death such as cardiovascular diseases have become less common over the last decades, whereas the opposite is the case for acyclical/countercyclical causes of death like cancer or diabetes.

Keywords: demography, Lee-Carter, business cycle, time series model