

ABSTRACT

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O. Kubatko

AN ANALYSIS OF ECONOMIC AND ECOLOGICAL FLUCTUATIONS BASED ON BANDPASS FILTERS

The paper investigates the properties of ecological and economic fluctuations received through band pass filters. It is provided analysis for the use of band pass filters to retrieve fluctuations from the series of environmental and economic dynamics. It is provided methodical approaches for the use and properties of such band pass filters as Baxter-King, Hodrick-Prescott and Butterworth. The paper describes approaches how to retrieve desired frequency fluctuations and suppress the fluctuations of lower and higher frequencies. The paper underlines that practical implementation of adaptation and/or mitigation measures to environmental and economic fluctuations should take into account the time series properties and filtering options. It is described within this paper the approaches of how to use counter-cyclical and to pro-cyclical fluctuations of ecological and economic development. We have provided calculations for the air pollution fluctuations and GDP per capita fluctuations during 1990 - 2015 years through the Horick-Prescott and Butterworth band pass filters. It was found that air pollution fluctuations are procyclical indicator at the beginning of economic recession and could be used as good indicator of predicting economic shrink. On the other hand, there is no correlation in fluctuations of pollution and GDP during the start of economic recovery period. We have revealed that the growth of GDP per capita fluctuations by 1% increase the fluctuations of air emissions by more than 1.07%. The latter supports the hypothesis that the economic system of Ukraine during the analyzed period was largely dependent on «dirty» industries. We have used the correlation coefficients of two-time series of interrelated environmental and economic fluctuations to make conclusions about phase shift and amplitude gaps, particularly, the higher the correlation coefficient to unity the lower the value of amplitude gap.