Efficiency of Weather Derivatives: A Study of Rice and Wheat in China

Manuela Ender[1,a], Ruyuan Zhang [2]

[1] Department of Mathematical Sciences

[2]Xi'an Jiaotong-Liverpool University, Suzhou, China

[a] manuela.ender@xjtlu.edu.cn

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Abstract. The efficiency of temperature-based weather derivatives (WD) in reducing risk exposure for Chinese agriculture industry is analyzed in this paper. Therefore, a put option with cumulated growing degree days as its underlying index is assumed to be bought by a farmer as a risk management instrument. A weather-yield model is constructed to find a suitable regression model to predict the crop yield based on weather variables. Through comparing the producers' revenue with and without WD for 57 years, efficiency criteria as risk measures are calculated. The study includes rice and wheat production in the area of Shanghai and Beijing. The results of the efficiency tests show that temperature-based put options are an efficient risk reducing instrument in offsetting yield shortfalls for rice and wheat in China.