

Valuation of financial products for weather risk management

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Abstract

We are interested in pricing rainfall options written on precipitation at specific locations. We assume the existence of a tradeable financial instrument in the market whose price process is affected by the quantity of rainfall. We then construct a suitable 'Markovian gamma' model for the rainfall process which accounts for the seasonal change of precipitation and show how maximum likelihood estimators can be obtained for its parameters.

We derive optimal strategies for exponential utility from terminal wealth and determine the utility indifference price of the claim. The method is illustrated with actual measured data on rainfall from a location in Kenya and spot prices of Kenyan electricity companies.