

Addressing Credit and Basis Risk Arising From Hedging Weather-related Risk with Weather Derivatives

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Abstract

Weather derivatives are a relatively recent innovation, but according to the Chicago Mercantile Exchange (CME), are the fastest growing derivative market today. They are used to manage weather related risks which previously were exclusively handled by insurance products, and represent the latest product in the continuing convergence of financial and insurance research and markets. A weather derivative pay-off based upon the realization of an underlying weather index, much like stock index based derivatives pay-off based upon a realization of the underlying stock index. The pay-off from a weather derivative can offset losses generated by adverse weather conditions. The use of these derivatives creates new risks, however, depending upon whether an exchange traded derivative or an over-the-counter (OTC) derivative is used. This paper examines the effectiveness of using a basis derivative strategy in conjunction with an exchange traded weather derivative to mitigate credit risk inherent in OTC transactions, and basis risk inherent in exchange-traded transactions. We examine the effectiveness of this strategy for summer and winter seasons, with both linear and nonlinear hedging instruments. Finally, we compare the effectiveness obtained using the CME and Risk Management Solutions, Inc. (RMS) weather indices. Results show that hedging methods are significantly more effective for winter than for summer, for both the CME and RMS weather indices, and for both linear and nonlinear basis derivative instruments. It is also found that the RMS regional weather indices are more effective than the CME weather indices for creating a basis hedging strategy, and that the effectiveness weather risk management can vary significantly by region of the country.

Keywords: credit (default) risk, basis risk, weather risk management, hedging effectiveness