Modeling and Forecasting CAT and HDD Indices for Weather Derivative Pricing

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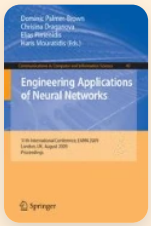

Engineering Applications of Neural Networks

(EANN 2009)

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Part of the book series: Communications in Computer and Information Science ((CCIS,volume 43))

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Abstract

In this paper, we use wavelet neural networks in order to model a mean-reverting Ornstein-Uhlenbeck temperature process, with seasonality in the level and volatility. We forecast up to two months ahead out of sample daily temperatures and we simulate the corresponding Cumulative Average Temperature and Heating Degree Day indices. The proposed model is validated in 8 European and 5 USA

cities all traded in Chicago Mercantile Exchange. Our results suggest that the proposed method outperforms alternative pricing methods proposed in prior studies in most cases. Our findings suggest that wavelet networks can model the temperature process very well and consequently they constitute a very accurate and efficient tool for weather derivatives pricing. Finally, we provide the pricing equations for temperature futures on Heating Degree Day index.

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Cite this paper

Zapranis, A., Alexandridis, A. (2009). Modeling and Forecasting CAT and HDD Indices for Weather Derivative Pricing. In: Palmer-Brown, D., Draganova, C., Pimenidis, E., Mouratidis, H. (eds) Engineering Applications of Neural Networks. EANN 2009. Communications in Computer and Information Science, vol 43. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-03969-0_20

.RIS .ENW .BIB

DOI
https://doi.org/10.1007/978-3-642-03969-0_20

Publisher Name
Springer, Berlin, Heidelberg

Print ISBN
978-3-642-03968-3

Online ISBN
978-3-642-03969-0

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Keywords

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